

1890.

141087

NEW SOUTH WALES.

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VOTES

AND

PROCEEDINGS

OF THE

LEGISLATIVE ASSEMBLY

DURING THE SESSION

OF

1890,

WITH THE VARIOUS DOCUMENTS CONNECTED THEREWITH.

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IN EIGHT VOLUMES.  
VOL. V.

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1890.



WATER SUPPLY AND SEWERAGE— <i>continued</i> —		PAGE.
Metropolitan Water and Sewerage Act—Amended By-laws	...	405
Proposed Extension of Sydney Water Supply to Southern Suburbs, Hurstville and Rockdale— Report of Parliamentary Committee on Public Works	...	415
Metropolitan Water and Sewerage Act Amendment Act of 1889—Proclamation of Boundaries of Liverpool District	...	427
Do do Proclamation of Boundaries of Campbelltown District	...	429
Do do Proclamation of Boundaries of Metropolitan District	...	431
Metropolitan Water and Sewerage Act—By-laws	...	433
Do do By-laws for Country Districts—County of Cum- berland	...	437
Country Towns Water and Sewerage Act of 1880—Municipal District of Wilcannia	...	447
Do do Notifying completion of works for the Borough of Orange	...	449
Do do By-laws, Lismore	...	451
Lands for Public Purposes Acquisition Act—Resumption—Manly Water Supply	...	453
Do do do North Shore Water Supply	...	455
Do do do do	...	457
Do do do Richmond Water Supply	...	459
Do do do City of Sydney Water Supply	...	461
Do do do Conservation of Water at Paterson	...	463
Public Watering Places Act, 1884—Amended Regulations	...	465
Water Conservation Bill—Message	...	467
Board of Water Supply and Sewerage Offices Erection Bill—Message...	...	469
Do do do No. 2—Message	...	471
Proposed Reticulation of the Western Suburbs Drainage Scheme—Report of Parliamentary Standing Committee on Public Works	...	473
Metropolitan Water and Sewerage Act Amendment Act of 1890—Proclamation of certain Sewerage Works	...	483
Metropolitan Water and Sewerage Act—Notification of completion of certain works	...	485
Lands for Public Purposes Acquisition Act—Resumption—Sewerage of Western Suburbs	...	487
Do do do do	...	489
Do do do do	...	491
Do do do Sewerage of Sydney and Suburbs	...	493
Application for Drainage Union at Nowra—Return to Order	...	495
Western Suburbs (City of Sydney)—Sewerage Scheme Reticulation and Completion Bill— Message	...	511
 ROADS AND BRIDGES—		
Cook's River Road—Expenditure on	...	513
Expenditure on Roads in Gunning District	...	515
Repair of Roads from Millthorpe to Lucknow <i>via</i> Spring Hill	...	517
Amounts voted and expended on Roads Tuena to Binda, Binda to Peelwood, &c.	...	519
Road between Narrabri and the Queensland Border—Petition from certain residents of the Territory between Narrabri and the Queensland Border	...	521
Resumption of Molesworth-street, Lismore—Return to Order	...	523
Lands for Public Purposes Acquisition Act—Resumption for approach to Tarreganda Bridge, Parish of Bega	...	557
Public Works Act of 1888—Resumption—Improving the Parramatta Road, Parish of Petersham	...	559
Do do Construction of an approach Road to Meadow Bank Railway Platform	...	561
Proposed Bridge to connect Bullock Island with the mainland at Newcastle—Report of Parliamentary Standing Committee on Public Works	...	563
Bridge connecting Carrington with the mainland at Newcastle—Petition from residents of Newcastle, Hamilton, Wickham, and Carrington—three similar Petitions	...	613
Proposed Bridge over Hunter River at Jerry's Plains—Report of Parliamentary Standing Committee on Public Works	...	615

ROADS AND BRIDGES—*continued*—

	PAGE.
Proposed Iron Bridge at Cowra—Report of Parliamentary Standing Committee on Public Works ... ..	663
Proposed Bridge over Tarban Creek, Parramatta River—Report of Parliamentary Standing Committee on Public Works ... ..	741
Bridges at Morpeth and Hinton—Report by the Examiners of Public Works Proposals ...	773
Bridge to North Shore—Return to Order ... ..	797
Bridges over Mihi and Dangar Creeks—Reports, &c. ... ..	801
Bridge over the Murrumbidgee River at Freshford—Reports respecting ... ..	811
Cowra Bridge Bill—Message ... ..	815
Land for Public Purposes Acquisition Act—Resumption—Approach to Bridge over Bishop's Creek, Rydalmere ... ..	817
The Hinton Punt—Petition from certain persons, praying for the abolition of tolls on ...	819
Traffic across Spit Ferry, Middle Harbour—Return ... ..	821

## RAILWAYS AND TRAMWAYS—

Report of Commissioners for year ending 30th June, 1890 ... ..	823
Do for quarter ending December, 1889 ... ..	891
Do do 31st March, 1890 ... ..	899
Do do 30th June, 1890 ... ..	907
Do do 30th September, 1890 ... ..	915
Report of Board of Inquiry on Accident at Bathurst ... ..	925
Depositions taken at Inquest into Railway Accident near Bathurst—Return to Order ...	939
Charges made by the Commissioners against Mr. Schey, M.P., in reference to Accident near Bathurst ... ..	949
Accident near Bathurst—Further Correspondence ... ..	965
Accident at Coolabah—Report, &c. ... ..	967
Accident at Farley Station—Report of Board of Inquiry ... ..	971
Accident to Express Train at Thirlmere—Report of Board of Inquiry... ..	985
Proposed Branch Line to Ballina—Report of Mr. E. B. Price ... ..	991
Proposed Branch Line from Byrock to Brewarrina—Report of Mr. P. Scarr ... ..	993
Proposed Colo Valley Line—Report of Mr. E. B. Price... ..	995
Proposed Line from Galong to Burrowa—Report of Mr. P. Scarr ... ..	997
Proposed Line, Wagga Wagga to Tumberumba—Report of Commissioners ... ..	1001
Extension in Northern District—Report by Messrs. Scarr and Price ... ..	1003
Pymont and Glebe Island Bridges—Tramway to Balmain—Report of Board on Proposed Construction of ... ..	1019
Establishment of Locomotive Works in the Colony—Correspondence... ..	1023
Pullman Cars—Use of in New South Wales—Return to Order ... ..	1031
Railway from Byrock to Brewarrina—Return to Order ... ..	1037
Alternative Routes for relieving congestion of traffic on Great Western Line—Report of E. B. Price ... ..	1045
Royal Commission appointed to inquire into proposed Extension into the City—Names, &c. ...	1055
Contract for Relaying and Duplicating the Southern Line—Conditions, Specifications, &c....	1057
Light Railways—Information respecting... ..	1071
Cooma Line—Gross Returns of the, from date of opening to 31st May, 1890 ... ..	1073
Coal Contracts for 1890—Return ... ..	1075
Rate for Traction of Coal ... ..	1077
Goods carried to Glen Innes and Guyra Stations during 1889—Return ... ..	1079
Receipts on Railways during month of August—Return ... ..	1081
Duplication of Line from Teralba to Adamstown—Correspondence ... ..	1083
Travelling Allowances to Officers engaged in England for Service in the Colony—Return ...	1087
Time of arrival at Sydney and Albury of Southern Express Trains, from 1st January to 31st October, 1890 ... ..	1089
Proposed Platform at or near Ourimba Creek—Return to Order ... ..	1091
Level Crossings on Railways Bill—Message ... ..	1107
Railway Employés Provident and Pension Fund—Message ... ..	1109
Railway from Hornsby to St. Leonards—Petition from Residents of North Shore, &c. ...	1111
Clarence Railway Construction and Harbour Improvement—Petition from Residents of The Clarence .. ..	1113
Railway from Lismore to The Tweed—Petition from Mayor of Casino ... ..	1115

RAILWAYS AND TRAMWAYS—*continued*—

	PAGE.
Railway from Molong to Parkes and Forbes—Petition from Inhabitants of Cudal ... ..	1117
Do do do certain Residents of Forbes— one similar Petition ... ..	1119
Do do do certain Residents of Canowindra District ... ..	1121
Kiama to Nowra Railway—Petition from certain Residents of Nowra ... ..	1123
Railway to Walgett—Petition from Progress Committee of Walgett ... ..	1125
Employees known as Extra Hands—Petition from certain Servants, praying that the services of, might be retained ... ..	1127
Railway from New England to the Coast—Petition from certain residents of the Tableland of New England and District west of Inverell ... ..	1129
Railway Route from Guyra to Inverell—Petition from certain residents of Ollera, Wands- worth, and Tenterden ... ..	1131
*Public Works Act of 1888—Resumption at Como—For additional siding accommodation ...	1133
Do Resumption—Widening the line from Sydney to Eveleigh ...	1135
Do Resumption at Newtown—Erection of Additional Railway Works ... ..	1137
Do Resumption—Tramway Extension from Leichhardt to Five Dock	1139
Do Resumption—Extension of Tramway from Castlereagh-street to the Randwick Road ... ..	1141
Do Resumption—Construction of line of Tramway from Ashfield to Portland Place ... ..	1143

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

INDEX

TO THE  
VOTES AND PROCEEDINGS

AND  
PAPERS LAID UPON THE TABLE

DURING THE SESSION

OF

1890.

Opened 29 April.—Prorogued 20 December, 1890.

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>A</b>		
ABBOTT, THE HON. JOSEPH PALMER, ESQ., M.P. :— Election of, as Speaker, and presentation of, to His Excellency the Governor, 387. Resignation of, as Member of the Committee of Elections and Qualifications, reported, 391.		
ABIGAIL, FRANCIS, ESQUIRE, M.P. :— Leave of Absence granted to, 18.		
ABORIGINES — Report of Board for Protection of, for 1889, laid on Table, 166.....	7	269
ABSENTEE TAX :— Motion made ( <i>Mr. Creer</i> ) in favour of imposition of, and negatived, 62.		
ACCIDENT AT BATHURST (See "RAILWAYS").		
ADAMSTOWN (See "RAILWAYS").		
ADDITIONAL SITTING DAY :— Motion made ( <i>Sir Henry Parkes</i> ) that Friday be an; that Government business take precedence of General Business until 6 o'clock; that after 6 General Business shall take precedence, and General Orders shall take precedence of Motions, 419. Motion made ( <i>Sir Henry Parkes</i> ) that Monday be an, and that Government Business take precedence, 469. Motion made ( <i>Sir Henry Parkes</i> ) that next Saturday be a sitting day, and that Government Business take precedence, 552.		
ADDRESS :— In Reply to GOVERNOR'S SPEECH :— Brought up, 3; Motion made ( <i>Mr. Vivian</i> ) for adoption, amendment moved ( <i>Mr. Seaver</i> ) to insert new paragraph, and debate adjourned, 4; debate resumed, amendment negatived, and Address passed, 14; Answer from Governor, 15.		
ADDRESSES AND ORDERS :— Alphabetical Register of .....	1	727
ADELAIDE JUBILEE INTERNATIONAL EXHIBITION (See also "NEILD, MR. JOHN CASH") Motion made ( <i>Mr. Fletcher</i> ) for Select Committee to enquire into expenditure of public money in connection with, 353; Report brought up, 520; adopted, 540 .....	8	73
Petition presented from John Cash Neild for leave to be heard by Counsel before the Select Committee, and prayer granted, 414.....	8	127
ADELAIDE POSTAL AND TELEGRAPH CONFERENCE :— Report of Proceedings, laid on Table, 180 .....	7	453

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION, 1890.	PAPERS.	
	VOL.	PAGE.
<b>A</b>		
<b>ADJOURNMENT :—</b>		
Motion made ( <i>Mr. McMillan</i> ) for—Point of Order, raised as to whether it was according to Parliamentary Practice to move two motions of a similar character consecutively; Mr. Speaker ruled that since the Additional Standing Orders, altering the character of the motions for adjournment, had been adopted, the practice of the House of Commons did not apply, 247.		
Motion made ( <i>Sir Henry Parkes</i> ) for, and Speaker calls attention to continued irrelevance or tedious repetition on the part of Mr. A. G. Taylor, and directed the Honorable Member to discontinue his speech, 407; there being no tellers for the noes, motion passed, 407.		
SPECIAL, 14, 373, 383, 393.		
<b>OF HOUSE :—</b>		
Motion made for and passed, 5, 19, 27, 34, 41, 47, 70, 74, 76, 84, 89, 100, 109, 117, 125, 138, 143, 148, 155, 160, 164, 191, 203, 208, 232, 237, 241, 270, 277, 289, 303, 317, 321, 338, 373, 382, 385, 390, 393, 397, 401, 412, 416, 419, 432, 434, 443, 453, 461, 470, 476, 480, 558.		
For want of a quorum before commencement of business, 559.		
For want of a quorum after commencement of business, 104, 121, 134, 178, 195, 211, 253, 329, 342, 345, 349, 353, 449, 458, 486, 499, 521, 530.		
Motion made for and withdrawn, 458.		
<b>OF DEBATE :—</b>		
Motion made for and passed, 4, 33, 53, 58, 62, 63, 70, 74, 80, 96, 100, 109, 203, 269, 282, 296, 300, 317, 342, 397, 443, 458, 466, 520.		
Motion made for and withdrawn, 227, 228, 458.		
Motion made for and negatived, 104, 335, 430-1, 441, 442, 498-9.		
<b>UNDER ADDITIONAL STANDING ORDER No 1 :—Motion made for, on subjects stated below, and negatived.—</b>		
Investigations into recent Railway Disasters, 53.		
Abolition of practice of Imprisonment for Debt—Cases of Ray and Chee Hoy, 76.		
Necessity of dealing with the Rabbit Question, 79, 222.		
Railway Accident at Bathurst and other Railway and Tramway Accidents, 95.		
Agricultural Society's Ground, 103.		
State of the Public Business, 108.		
Administration of the Post and Telegraph Department, 152.		
Charges against the management of the "Vernon," Training-ship, 175.		
Attack made on character of Mr. William Stephen, M.P., by Postmaster-General, 217.		
Mr. Willis and the Railway Commissioners, 239.		
Railway Merchandise and Live Stock Rates, 247.		
The Government and its broken pledges, 253.		
The state of the country in the present crisis, 329.		
The attitude of the Government towards Trades Unions and Unionists with reference to the present labour difficulty, 332.		
The unsatisfactory state of public business, 336.		
Ministerial Statement of the Premier, 373.		
Charge of the Government Business of the House by the Minister of Public Works, 465.		
The labours, constitution, and general character of the Royal Commission appointed to inquire into the cause of Strikes and the Labour Question, 489.		
The unsafe state of the Postal Pillar Boxes now being erected in the City of Sydney, 498.		
The charge of Corruption in connection with the Broken Hill Water Supply Bill, 535.		
<b>ADMINISTRATION OF JUSTICE :—</b>		
<b>ADMINISTRATION OF LICENSING LAW IN BATHURST :—</b>		
Motion made ( <i>Mr. Paul</i> ) for papers in reference to, 231, 269: Return to Order laid on Table, 273.	3	929
<b>APPEAL CASE TO THE PRIVY COUNCIL, ALISON V. BURNS :—</b>		
Information respecting, laid on Table, 226 .....	4	219
<b>CATHERINE HILL BAY :—</b>		
Return respecting, laid on Table, 257 .....	3	859
<b>CASE OF BARRIE V. SIMPSON, LISMORE :—</b>		
Motion made ( <i>Mr. Ewing</i> ) for papers in connection with, 87; Return to Address, laid on Table, 158	3	685
<b>CASE OF EDWARD CLAYTON, TRIED AND CONVICTED AT ALBURY :—</b>		
Motion made ( <i>Mr. Crick</i> ) for papers in connection with, 257; Return to Address, laid on Table, 307.	3	699
<b>CASE OF EDDY V. MARTIN :—</b>		
Motion made ( <i>Mr. Crick</i> ) for papers in connection with, and withdrawn, 303.		
<b>CASE OF GIBBS, TRIED AT POLICE COURT, QUEANBEYAN :—</b>		
Motion made ( <i>Mr. O'Sullivan</i> ) for papers having reference to, 295; Return to Address laid on Table ( <i>not printed</i> ), 535.		
<b>CASE OF HENRY WILLIAMS, WHO WAS ARRESTED AT MOREE :—</b>		
Motion made ( <i>Mr. Garrard</i> ) for papers in connection with, 316; Return to Address, laid on Table, 379 .....	3	707
<b>COURT-HOUSE, REDFERN :—</b>		
Notification of resumption of land under Lands for Public Purposes Acquisition Act, 273 .....	3	857
<b>COURT-HOUSE, THE GLEBE :—</b>		
Notification of resumption of Land under the Land for Public Purposes Acquisition Act, laid on Table, 18 .....	3	855
<b>DISTRICT COURTS ACT OF 1858 :—</b>		
Annual Returns under 103rd Section, laid on Table, 166 .....	3	723
<b>IMPRISONMENT OF CABMAN SWEETMAN, MOUNT RENNIE CRIME :—</b>		
Motion made ( <i>Mr. Crick</i> ) for papers in connection with, 162; Return to Address, laid on Table ( <i>not printed</i> ), 380.		
<b>J. W. EDWARDS' CONDITIONAL PURCHASE, 84-13, COOMA :—</b>		
Return showing instructions given to the Crown Solicitor to employ Counsel before the Land Court, laid on Table ( <i>not printed</i> ), 449.		
<b>LAW REFORM :—</b>		
Motion made ( <i>Mr. Reid</i> ) in reference to Legal Procedure, and urging on the Government the necessity of inquiry with a view to, 479.		
<b>METROPOLITAN MAGISTRATES ACT, 1881.</b>		
Correspondence respecting Rules under Section 8, laid on Table, 237 .....	3	805
<b>MR. T. R. ICELY, VISITING MAGISTRATE TO LORD HOWE ISLAND :—</b>		
Motion made ( <i>Mr. Trull</i> ) for copy of complaints made against, 380; Return to Order, laid on Table, 471 .....	3	713
<b>RAY AND CHEE HOY :—</b>		
Adjournment moved for abolishing practice of Imprisonment for Debt, as exemplified in cases of, 76.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
A		VOL.	PAGE.
<b>ADMINISTRATION OF JUSTICE (continued):—</b>			
<b>REMOVAL OF MR. WILLIS, M.P., FROM THE COMMISSION OF THE PEACE:—</b>			
Petition from Citizens and residents of New South Wales presented in favour of replacing him on the Roll, 516.	3	869	
Correspondence respecting, laid on Table, 558.	3	865	
<b>ADVERTISEMENTS (See "GOVERNMENT").</b>			
<b>AFGHAN CARRIERS:—</b>			
<b>USE OF CAMELS BY IN THE TRANSPORT OF GOODS:—</b>			
Petition presented from certain residents of Bourke, drawing attention to unfair competition with the Carriers of that district, 464.	8	740	
<b>AGENT-GENERAL OF THE COLONY:—</b>			
Motion made ( <i>Mr. Torpy</i> ) to limit duration of term of office of, and by leave withdrawn, 27.			
<b>AGRICULTURAL SOCIETY OF NEW SOUTH WALES LEASE BILL:—</b>			
Petition presented ( <i>Mr. Martin</i> ) for leave to proceed with, under the 65th Standing Order, presented and read 1 <sup>o</sup> , 14; Motion made ( <i>Mr. Martin</i> ) for 2 <sup>o</sup> ; <i>Point of Order</i> submitted as to whether Bill was beyond the Order of Leave, and ruled against by Mr. Speaker; read 2 <sup>o</sup> ; committed, Committee reported no quorum, and House counted out, 104; Order of the Day restored to Paper, 246.			
<b>AGRICULTURAL:—</b>			
<b>SOCIETIES:—</b>			
Motion made ( <i>Mr. Gormly</i> ) for Committee of the Whole for granting to them £1 for £1 raised by private contributions, 12; Order of the Day postponed, 27; House in Committee, Resolution agreed to, 168.			
<b>COLLEGES:—</b>			
Return respecting establishment of, laid on Table, 99.	5	55	
<b>HAM COMMON:—</b>			
Motion made ( <i>Mr. Frank Farnell</i> ) for papers in connection with selection of, for site for College, 211.			
<b>IMPORT DUTIES UPON PRODUCE:—</b>			
Motion made ( <i>Mr. McFarlane</i> ) in favour of, on certain Produce, and Debate adjourned, 443.			
<b>ITALIAN SETTLEMENT, RICHMOND RIVER, KNOWN AS "NEW ITALY":—</b>			
Report by the Director of Forests on, laid on Table, 464.	5	59	
<b>NEW SOUTH WALES, SOCIETY'S GROUND:—</b>			
Adjournment moved to call attention to purposes for which used, 103.			
<b>METROPOLITAN SOCIETY:—</b>			
Return showing amount of money received from the Government since its formation as subsidies and special grants, laid on Table, 107.	5	57	
<b>ALBUM OF CONGRATULATORY CARDS:—</b>			
Received by General Post Office from post offices in other parts of the world, laid on Table (as Exhibit only), 82.			
<b>ALISON V. BURNS—APPEAL CASE (See "CROWN LANDS").</b>			
<b>ALPHABETICAL REGISTERS:—</b>			
Addresses and Orders passed during Session.	1	727	
Bills dealt with during Session.	1	721	
<b>ALTERNATIVE ROUTES (See "RAILWAYS").</b>			
<b>AMENDMENT:—</b>			
Form of, amended by consent, 83.			
<b>AMEROO (See "EDUCATION").</b>			
<b>ANSWERS AND QUESTIONS:—</b>			
Sessional Order passed, 10.			
<b>ANTONY (See "SILK CULTURE").</b>			
<b>APPROPRIATION BILL (SECOND SESSION, 1889):—</b>			
Assent reported, 2.			
<b>APPROPRIATION BILL:—</b>			
Standing orders suspended, 536; Ordered ( <i>Mr. McMillan</i> ) founded on Resolutions of Ways and Means Nos. 3 and 4, presented and read 1 <sup>o</sup> , 549; read 2 <sup>o</sup> , committed, reported with an amendment, report adopted; read 3 <sup>o</sup> , passed, and sent to Council, 555; returned without amendment and Speaker authorized to present to Governor for assent, 558.			
<b>ART GALLERY (See "NATIONAL ART GALLERY").</b>			
<b>ASSEMBLY (See also "ADJOURNMENT"; also "NO QUORUM"; also "MEMBERS"; also "BAR OF THE HOUSE"); also "ELECTORAL":—</b>			
Opening of Session, 1.			
Members sworn, 1 <sup>(2)</sup> , 171, 217, 239, 257, 395, 505.			
Governor's Opening Speech, 2; Address-in-Reply, 34; Answer to Address, 15.			
Elections and Qualifications Committee, 7, 27, 35, 68, 73, 116, 411, 414.			
Sessional Orders passed, 10 <sup>(6)</sup> , 11 <sup>(8)</sup> , 12 <sup>(3)</sup> , 40, 253, 410, 469.			
Sessional Order rescinded, 336.			
Sessional Order negatived, 359.			
Sittings after Midnight, 14, 41, 76, 84, 89, 100, 104, 117, 125, 138, 159, 163, 170, 183, 191, 228, 232, 236, 247, 261, 289, 321, 334, 342, 368, 373, 382, 401, 406, 412, 419, 430, 452, 461, 466, 470, 476, 486, 490, 502, 506, 511, 517, 526, 536, 542, 556.			
Interruptions to proceedings, 217.			
Leave of Absence to Members, 18, 83, 316, 332.			
Business fixed for a future day to take precedence of all other business, 33, 53, 58, 70, 74, 100.			
Business postponed to after Notice of Motion, 305.			
General Business takes precedence at 6 o'clock on Friday, 410, 419, 436, 457, 472, 498, 521.			
Government Business takes precedence after half-past six o'clock, 555.			
House meet at 2 o'clock on Friday, and General Business take precedence until half-past 6 o'clock, 536.			
Government Business to take precedence on Additional Sitting Day, 469, 552.			
Form of amendment to motion, amended by concurrence, 83.			
Orders of the Day of Government Business postponed in a bunch, 143, 266, 282, 314, 416, 512, 549.			
Government Business postponed in a bunch, 400.			
Order of the Day restored to Paper, 246.			
Order of the Day discharged, 133, 208, 288 <sup>(2)</sup> , 341, 423, 461, 521 <sup>(2)</sup> , 524, 534, 553 <sup>(2)</sup> .			
Bills withdrawn, 133, 208, 288 <sup>(2)</sup> , 341, 423, 461, 521 <sup>(2)</sup> , 534, 553 <sup>(2)</sup> .			
Bills laid aside, 294, 360.			
Motion to lay Bill aside negatived, 348-9.			
Vacant Seat, 139, 157, 161, 223, 375, 431-2.			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>A</b>		
<b>ASSEMBLY (continued):—</b>		
Chairman of Committees appointed for day only, 162.		
Ministerial Statement made by Sir Henry Parkes, 328, 373, 465.		
Clerk informs House of unavoidable absence of Speaker, 335.		
Resignation of James Henry Young, Esq., as Speaker announced, 387.		
Joseph Palmer Abbott, Esq., elected Speaker and presented to Governor, 387.		
Speaker having observed grave disorder in Committee resumes Chair, 419.		
Member being adjudged guilty of disorder expelled, 430-1.		
Votes and Proceedings, 1 to 112	1	1
Business undischarged at close of Session	1	563
Attendance of Members in Divisions and Counts-out during the Session	1	567
Business of the Session	1	569
Weekly Reports of Divisions in Committee, Nos. 1 to 18	1	571
Weekly Abstracts of Petitions, Nos. 1 to 34	1	649
Alphabetical Registers of Bills	1	721
Do of Addresses and Orders	1	727
Standing and Select Committees appointed during Session	1	731
Proclamation proroguing	1	561
<b>SMOKING IN THE LIBRARY AND READING-ROOMS:—</b>		
Complaint of Mr. O. O. Dangar against Members, laid on Table, 46		
<b>PRAYER:—</b>		
Motion made ( <i>Mr. Turner</i> ) to open business with on each sitting day, and negatived, 147-8.		
<b>SIR HENRY PARKES:—</b>		
Mr. Speaker informed the House that the head of the Government would resume his duties on 27th August, and asked for permission to depart from certain rules for that purpose, 267.		
<b>STANDING ORDERS:—</b>		
Motion made ( <i>Mr. Alfred Allen</i> ) to refer the Additional Standing Orders to the Standing Orders Committee for consideration as to the expediency of increasing the number of Members required to rise in support of the motion for adjournment from five to twenty, and amendment proposed ( <i>Mr. J. P. Abbott</i> ) to refer the whole of the Standing Orders to the Committee, and amendment carried, 372; Report brought up, 485	1	737
Negatived, 436.		
Suspended, 321, 524, 536, 540.		
Name of Mr. Young added to Committee, 418.		
<b>MR. SPEAKER YOUNG—PRIVILEGE:—</b>		
Mr. Dibbs referred to alleged insolvency of, and drew attention to Constitution and Bankruptcy Acts to show that his seat was vacated; Sir Henry Parkes stated that the Attorney-General's opinion was that Mr. Young had not become a bankrupt within the meaning of the Constitution Act; Mr. Dibbs laid correspondence on Table, 375	1	790
<b>INTENDED RETIREMENT OF MR. SPEAKER:—</b>		
Mr. Young addressed the House in reference to, 393.		
<b>ASSENT TO BILLS (See also "MESSAGES")</b>		
Of previous Session reported, 2 (2).		
<b>ASSURANCE (See "POLICIES OF ASSURANCE BILL").</b>		
<b>ASYLUMS:—</b>		
<b>MRS. CUNYNGHAME, LATE SUPERINTENDENT, PARRAMATTA:—</b>		
Motion made ( <i>Mr. Howe</i> ) for Select Committee to inquire into removal of, and papers referred to Committee, 13; Mr. Hawthorne's name added to, 188; Report brought up, 328	2	367
Petition presented from Mr. Sydney Maxted for leave to appear by Attorney before the Select Committee, and prayer granted, 39	2	455
Petition presented from Sarah Cunyngame for leave to appear before Select Committee, and leave granted, 39	2	453
<b>PARRAMATTA AND NEWINGTON:—</b>		
Information respecting laid on Table, 379	7	305
<b>ATTORNEYS' BILLS OF COSTS AND PRACTICE OF CONVEYANCING ACT AMENDMENT BILL:—</b>		
Received from Council, and on motion ( <i>Mr. McMillan</i> ) read 1 <sup>o</sup> , 516.		
<b>AUSTRALASIAN FEDERATION:—</b>		
Motion made ( <i>Sir Henry Parkes</i> ) that House concurs in Resolutions adopted by the Conference held in Melbourne, Resolutions appointing Delegates to National Australasian Convention, making provision for submitting Constitution to Parliament, and for the appointment of Members of Council to the Convention, and debate adjourned, 33; debate resumed and adjourned, 53, 58; debate resumed, 69; amendment moved ( <i>Mr. Slattery</i> ) to insert Resolutions in place of first Resolution, and debate adjourned, 70; debate resumed and adjourned, 73-74, 79-80; debate resumed; form of amendment amended by concurrence, 83; debate adjourned, 84; debate resumed and adjourned, 95-96, 99-100, 103-109, 281-2, 295-6, 300; debate resumed, 307; amendment negatived, 303, amendment moved ( <i>Mr. Burns</i> ) in Resolution 2 for the appointment of Members by Ballot, and carried, 309; Resolutions, as amended, agreed to, and Ballot taken, 309-10; message, with Resolutions, sent to Council, 312.		
Message from Legislative Council acquainting the Assembly that it had agreed to certain Resolutions and transmitting a copy, 360.		
<b>CONFERENCE:—</b>		
Official Record of the Proceedings and Debates of, held in Parliament House, Melbourne, laid on Table, 25	8	441
<b>CONVENTION:—</b>		
List of Delegates appointed to represent the various Colonies at, laid on Table, 464	8	570
Motion made ( <i>Sir Henry Parkes</i> ) providing for filling vacancy in, Message to Council, 540; Message from Council, concurring, 554.		
<b>AUSTRALIAN BANKING COMPANY OF SYDNEY BILL:—</b>		
Petition presented ( <i>Mr. Dowell</i> ) for leave to bring in, 287; leave given, presented, and read 1 <sup>o</sup> , 329; referred to Select Committee, 332; Report brought up, 353; Order of the day postponed, 410; Motion made ( <i>Mr. Dowell</i> ) for 2 <sup>o</sup> and amendment moved ( <i>Mr. Gould</i> ) to refer to a Second Select Committee, and amendment carried, 436; Report brought up, 436; Order of the Day postponed, 510	2	1-7
<b>AUSTRALIAN MUSEUM:—</b>		
Report of the Trustees for 1889, laid on Table, 334	7	961
<b>AUSTRALIAN MUTUAL PROVIDENT SOCIETY'S OFFICERS' PROVIDENT FUND TRUSTEES BILL:—</b>		
Received from Legislative Council, and on motion ( <i>Mr. Garrard</i> ) read 1 <sup>o</sup> , 310; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 311; read 3 <sup>o</sup> , passed, and returned to Council, 316; assent reported, 340.		

INDEX.

v

REFERENCES TO THE VOLES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.		
		VOL.	PAGE.
<b>B</b>			
BALLINA (See "RAILWAYS").			
BALLOT:—			
Delegates to National Federal Convention appointed by, 310.			
BALLOTING FOR SELECT COMMITTEE:—			
Sessional Order passed, 11.			
BALMAIN (See "WHARVES"; also "ELECTORAL"; also "RAILWAYS"; also "TRAMWAYS").			
BANKING, LAND, BUILDING, AND INVESTMENT COMPANIES (see also "AUSTRALIAN BANKING COMPANY OF SYDNEY BILL"):—			
For Quarter ended 31st December, 1889, laid on Table, 17		3	645
Do 31st March, 1890, laid on Table, 123		3	647
Do 30th June, 1890, laid on Table, 280		3	649
Do 30th September, 1890, laid on Table, 485		3	651
BANK LIABILITIES AND ASSETS:—			
For Quarter ended 31st December, 1889, laid on Table, 17		3	637
Do 31st March, 1890, laid on Table, 45		3	639
Do 30th June, 1890, laid on Table, 234		3	641
Do 30th Sept., 1890, laid on Table, 410		3	643
BANK HOLIDAYS ACT AMENDMENT BILL:—			
Motion made ( <i>Mr. Fivian</i> ) for leave to bring in, 257; presented and read 1 <sup>o</sup> , 268; Order of the Day postponed, 307; motion made for second reading; <i>Point of Order</i> , that Bill was beyond the order of leave, sustained by Mr. Speaker; Order discharged and Bill withdrawn, 423.			
BANK HOLIDAYS ACT AMENDMENT BILL (No. 2):—			
Motion made ( <i>Mr. Fivian</i> ) for leave to bring in, 476; presented and read, 1 <sup>o</sup> , 479.			
BANKRUPTCY ACT:—			
Rules of Supreme Court, laid on Table, 17, 307		3	807, 809
WORKING OF:—			
Motion made ( <i>Mr. Crick</i> ) for return in reference to Official Assignees, 358; Return to Order, laid on Table, 515		3	721
BANKS:—			
Return respecting Government Moneys in various, laid on Table, 410		3	595
BAR OF THE HOUSE:—			
PRIVILEGE—NEWSPAPER ARTICLE:—			
Motion made ( <i>Mr. Trull</i> ) that the editor of <i>Truth</i> be summoned to give evidence at the Bar of the House in reference to statement that bribes had been offered and asked for by Members of Parliament, 291-2; Mr. Adolphus George Taylor summoned and examined, 299.			
BARBOUR, ROBERT, ESQ., M.P.:—			
Motion made ( <i>Mr. Bruce Smith</i> ) to appoint James Patrick Garra, Esquire, to Parliamentary Standing Committee on Public Works, and amendment moved to substitute name of; amendment negatived, motion passed, 415.			
BARRATTA RUN (See "CROWN LANDS").			
BARRIE v. SIMPSON (See "ADMINISTRATION OF JUSTICE").			
BARTON, MR. G. B.:—			
Motion made ( <i>Mr. O'Sullivan</i> ) for copy of terms and conditions of writing the History of New South Wales, 380.			
Correspondence in connection with "History of New South Wales from the Records," showing terms and conditions of contract with, laid on Table, 414		8	655
Return respecting History of New South Wales, laid on Table, 504		8	685
Further Correspondence, &c., "History of New South Wales from the Records," laid on Table, 553.		8	659
BATHURST (See "RAILWAYS"; also "LICENSING").			
BERRY ESTATE:—			
NORTH SHORE:—			
Motion made ( <i>Mr. O'Sullivan</i> ) for papers relating to grants at Crow's Nest and Gore Island, 94.			
SHOALHAVEN:—			
Motion made ( <i>Mr. O'Sullivan</i> ) for papers relating to, 108; Return to Order, laid on Table ( <i>not printed</i> ), 341.			
BERRY MUNICIPAL DISTRICT NAMING BILL (See also "MUNICIPAL DISTRICT OF BROUGHTON CREEK AND BOMADERRY NAMING BILL").			
Motion made ( <i>Mr. Morton</i> ) for leave to bring in, 26; presented and read 1 <sup>o</sup> , 246; Order of the Day postponed, 299; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 423; read 3 <sup>o</sup> , passed, and sent to Council, 428; returned without amendment, 465; Assent reported, 487.			
BILLS (See also "MESSAGES").			
Vote of Chairman of Select Committee on Private, 11.			
Withdrawn, 133, 208, 288 (?), 311, 423, 461, 521 (?), 534, 553 (?).			
Amendment moved to refer to Select Committee, negatived, 505.			
Second reading intercepted by amendment that Bill be read "this day three months," 163.			
Amendment moved to read 2 <sup>o</sup> "this day six months," and negatived, 236.			
Laid aside, 294, 360.			
Motion to lay aside negatived, 348.			
Title amended in Committee, 456.			
Recommitted, 556.			
Alphabetical Registers of		1	721
BINDA (See "ROADS").			
BINGERA (See "CROWN LANDS").			
BISHOP'S CREEK (See "BRIDGES").			
BLACK ROD:—			
Delivers Message, 2.			
BLACKTOWN (See "RAILWAYS").			
BLAYNEY (See "RAILWAYS").			
BLAYNEY MUNICIPAL COUNCIL ENABLING BILL:—			
Petition presented ( <i>Mr. Garland</i> ) for leave to bring in, 371; leave given, presented, and read 1 <sup>o</sup> , 380; referred to Select Committee, 382; Report brought up, 388; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 416; read 3 <sup>o</sup> , passed, and sent to Council, 418; returned with an amendment, 465; amendment agreed to, 473; Assent reported, 510		2	33
BLUE BOOK:—			
For 1889, laid on Table, 107		3	995
BLUE-METAL QUARRIES (See "BOMBO BLUE-METAL QUARRIES AT KIAMA.")			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>B</b>		
<b>BOARD OF WATER SUPPLY AND SEWERAGE OFFICES ERECTION BILL :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 136; Message from Lieutenant-Governor, 154; Order of the Day postponed, 162; House in Committee, resolution agreed to. Bill presented, and read 1 <sup>o</sup> , 168; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 190; read 3 <sup>o</sup> , passed, and sent to Council, 202; returned with an amendment, and laid aside, 294	5	469
<b>BOARD OF WATER SUPPLY AND SEWERAGE OFFICES ERECTION BILL (No. 2) :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 359; Message from Governor, 366; House in Committee, Resolution reported, 368; Resolution agreed to, Bill presented, and read 1 <sup>o</sup> , 412; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 415; read 3 <sup>o</sup> , passed, and sent to Council, 418; returned without amendment, 452; Assent reported, 467.	5	471
<b>BOATS, HIRED (See "HIRED BOATS LICENSING BILL").</b>		
<b>BOATS REGISTRATION AND REGULATION BILL :—</b>		
Motion made ( <i>Mr. Hawken</i> ) for Committee of the Whole, resolution reported, 257; agreed to, Bill presented and read 1 <sup>o</sup> , 258; Order of the Day postponed, 320; Motion ( <i>Mr. Hawken</i> ) for second reading being proceeded with— <i>Point of Order</i> : That Bill was a Money Bill, and should be covered by a Message from the Governor, Speaker overruled the Point of Order, but pointed out that Bill imposed license fees not referred to in order of leave, and therefore was out of order; Order of the Day discharged and Bill withdrawn, 461.		
<b>BOMADERRY (See "MUNICIPAL DISTRICT OF BROUGHTON CREEK AND BOMADERRY NAMING BILL").</b>		
<b>BOMBO BLUE-METAL QUARRIES AT KIAMA :—</b>		
Motion made ( <i>Mr. Lyne</i> ) for papers in reference to purchase of by Government, 483.		
<b>BONDSMEN AND SURETIES LIABILITIES BILL :—</b>		
Motion made ( <i>Mr. Wall</i> ) for leave to bring in, 26; presented and read 1 <sup>o</sup> , 61; Order of the Day postponed, 195.		
<b>BOOK PURCHASERS PROTECTION BILL :—</b>		
Received from Legislative Council, and on motion ( <i>Mr. Stevenson</i> ) read 1 <sup>o</sup> , 200; read 2 <sup>o</sup> , committed, reported with amendments, with an amended Title, Report adopted, 288-9; Order of the Day postponed, 295; read 3 <sup>o</sup> , passed, and returned to Council with amendments, including an amended Title, 298; amendments agreed to, 313; Assent reported, 339.		
<b>BOROUGH OF NEWCASTLE ELECTRIC LIGHTING BILL :—</b>		
Petition presented ( <i>Mr. Fletcher</i> ) for leave to bring in, 136; leave given, 151; presented and read 1 <sup>o</sup> , 152; referred to Select Committee, 159; Report brought up, 182; motion made for 2 <sup>o</sup> , and Point of Order, that Bill was beyond order of leave upheld by Speaker, Order of the Day discharged and Bill withdrawn, 288	2	39
Petition presented from Ratepayers of Newcastle against, 152	2	55
Petition presented from Directors of Newcastle Gas and Coke Company (Limited), praying the House to limit the operations of the Borough Council, 152	2	57
Petition presented from Ratepayers of Newcastle in favour of, 152	2	53
Petition presented from Directors of the Newcastle Gas and Coke Company (Limited), referring to previous Petition, and praying for leave to be heard before the Select Committee or at the Bar of the House, and leave to appear before Select Committee granted, 162	2	59
Petition presented from Ratepayers of the City of Newcastle to be heard by Council before Select Committee, and prayer granted, 162	2	61
<b>BOROUGH OF NEWCASTLE ELECTRIC LIGHTING BILL (No. 2) :—</b>		
Petition presented ( <i>Mr. Alexander Brown</i> ) for leave to bring in, 384; leave given, presented, and read 1 <sup>o</sup> , 393; referred to Select Committee, 414; Report and minutes of evidence of Select Committee of present Session be referred to Select Committee, 418; Report brought up, 428.	2	63
<b>BOROUGH OF WILLOUGHBY NAMING BILL :—</b>		
Petition presented ( <i>Mr. Cullen</i> ) for leave to bring in, 178; leave given, presented, and read 1 <sup>o</sup> , 181; referred to Select Committee, 188; Report brought up, 195; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 227; read 3 <sup>o</sup> , passed, and sent to Council, 232; returned without amendment, 264; assent reported, 268	2	69
<b>BOURKE (See also "CROWN LANDS"; also "STOCK").</b>		
Motion made ( <i>Mr. Waddell</i> ) for £20,000 to be placed on Estimates for Embankment around, and withdrawn, 27.		
Report of Board on Inquiry into Floods in Town and District, laid on Table, 52	8	241
<b>BOVINE TUBERCULOSIS :—</b>		
Report of the Board of Health on, in the South Coast District, laid on Table, 366	5	45
<b>BOWRAL (See "CEMETERIES").</b>		
<b>BRAGG AND ARDILL (See "NAUTICAL SCHOOL-SHIP 'VERNON').</b>		
<b>BRAIDWOOD (See "RAILWAYS").</b>		
<b>BRANDS (See "STOCK").</b>		
<b>BREAKWATER (See "BYRON BAY"; also "SOUTHERN BREAKWATER, NEWCASTLE"; also "TRIAL BAY").</b>		
<b>BRENNING, MISS :—</b>		
Adoption of Report from the Select Committee on case of ( <i>Session 1889</i> ) negatived, 88.		
<b>BREWARRINA (See "RAILWAYS"; also "STOCK").</b>		
<b>BRIBERY (See "PARLIAMENT").</b>		
<b>BRIDGES :—</b>		
<b>BISHOP'S CREEK, FIELD OF MARS :—</b>		
Notification of resumption of land for approaches, under Lands for Public Purposes Acquisition Act, laid on Table, 18	5	817
<b>CONNECTING CARRINGTON WITH THE MAINLAND AT NEWCASTLE :—</b>		
Petitions presented in favour of erecting a permanent structure without delay :—		
From Residents of Newcastle, Hamilton, Wickham, and Carrington, 5 (2)	5	613
Do Newcastle, Hamilton, Wickham, Waratah, and Carrington, 5 (2)	5	613
<b>CONNECTING SYDNEY WITH THE NORTH SHORE :—</b>		
Motion made ( <i>Mr. Slattery</i> ) for papers in reference to, 189; Return to Order, laid on Table, 307	5	797
<b>ERECTION OF, OVER MIHI AND DANGAR CREEKS :—</b>		
Correspondence, reports, &c., respecting, laid on Table, 390; returned to Public Works Department, 541	5	801
<b>HUNTER RIVER AT JERRY'S PLAINS :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plan, from the Parliamentary Standing Committee on Public Works, laid on Table, 52	5	615

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
B		VOL.	PAGE.
<b>BRIDGES (continued) :—</b>			
<b>IRON, AT COWRA (See also "COWRA BRIDGE BILL").</b>			
Report, together with Minutes of Evidence, Appendices, and Plans, from the Parliamentary Standing Committee on Public Works, laid on Table, 87; Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 141.....	5		663
<b>MORFETH AND HINTON :—</b>			
Report by the Examiners of Public Works Proposals on, laid on Table, 465; evidence laid on Table, 469.....	5		773
<b>MURUMBIDGEE RIVER, AT FRESHFORD :—</b>			
Report respecting the proposal to construct, laid on Table, 341.....	5		811
<b>PYRMONT AND GLEBE ISLAND :—</b>			
Report of Board appointed to inquire into the questions of the construction of, together with a line of Tramway to Balmain, laid on Table, 812.....	5		1019
<b>RIVER MURRAY, AT TOCUMWAY :—</b>			
Motion made ( <i>Mr. Chanter</i> ) for papers relating to, 295. Return to Order, laid on Table ( <i>not printed</i> ), 358; returned to Public Works Department, 535.			
<b>TARBAN CREEK, PARRAMATTA RIVER :—</b>			
Report, together with Minutes of Evidence, Appendices, and Plan, from the Parliamentary Standing Committee on Public Works, laid on Table, 25.....	5		741
<b>TARREGANDA :—</b>			
Notification of resumption of land under the Lands for Public Purposes Acquisition Act, for approach to, laid on Table, 129.....	5		557
<b>TO CONNECT BULLOCK ISLAND WITH THE MAINLAND AT NEWCASTLE :—</b>			
Report, together with Minutes of Evidence, Appendices, and Plans from the Parliamentary Standing Committee on Public Works, laid on Table, 32.....	5		563
<b>BRITISH NEW GUINEA :—</b>			
Annual Report on for 1889-90, with Appendices, laid on Table, 485.....	8		257
<b>BROKEN HILL AND PINNACLES TRAMWAY BILL :—</b>			
Petition presented ( <i>Mr. Slattery</i> ) for leave to bring in, 76; presented and read 1 <sup>o</sup> , 79; referred to Select Committee, 88.			
Petition presented from William Peter MacGregor, Jenkyn Collier, and Duncan Grant, against and praying to be heard before the Select Committee, and prayer granted, 124.	2		75
<b>BROKEN HILL WATER SUPPLY BILL :—</b>			
Petition presented ( <i>Mr. J. P. Abbott</i> ) for leave to proceed with under the 65th Standing Order, presented, and read 1 <sup>o</sup> , 2 <sup>o</sup> , 24; Order of the Day postponed, 79; committed, 257; Order of the Day postponed, 324, 341, 353, 372, 405, 410. House in Committee— <i>Disorder</i> . Mr. Speaker resumed the Chair, and expressed astonishment that the Honorable Member for Burrows, Mr. Slattery, did not obey the ruling of the Chairman, and also stated that if the Honorable Member did not do so he would have to take an extreme course; Mr. Slattery explained, Mr. Speaker gave ruling, and Committee resumed—Bill reported with amendments, Report adopted, 419; read 3 <sup>o</sup> , passed, and sent to Council, 423-4; returned with amendments, 492; Order of the Day postponed, 501; amendments agreed to, 512; assent reported, 531.			
Petition presented from Town and surrounding Districts of Broken Hill, urging the passing of without delay, 137.....	2		77
Petition presented from certain Directors of Mining Companies, Broken Hill, in favour of, 245.....	2		79
Petition presented from certain residents on Crown and other Lands, within the area proposed to be submerged by the Company, to delay the passing of the Bill until their claims are satisfied, 261.....	2		81
<b>CHARGES OF BRIBERY IN CONNECTION WITH THE PASSING OF :—</b>			
Motion made ( <i>Mr. Waddell</i> ) for Royal Commission to inquire into— <i>Point of Order</i> .—That motion was substantially the same as an amendment moved the previous night, and therefore could not be put. Speaker ruled motion out of order, 529.			
Adjournment of the House moved to call attention of the Government to the urgent necessity of investigating, 535.			
<b>BROKEN HILL WATER-WORKS BILL :—</b>			
Petition presented ( <i>Mr. Cullen</i> ) for leave to bring in, 261; leave given, presented, and read 1 <sup>o</sup> , 270; referred to Select Committee, 316.			
<b>BROMLEY, MR. SIDNEY N. DE MONTFORT (See "CIVIL SERVICE").</b>			
<b>BROUGHTON CREEK (See "MUNICIPAL DISTRICT OF BROUGHTON CREEK AND BOMADERRY NAMING BILL").</b>			
<b>BROWN'S CREEK (See "FLOODS").</b>			
<b>BRUNSWICK RIVER :—</b>			
Report by Mr. E. B. Price, Temporary Examiner of Public Works Proposals, in regard to improvement of, laid on Table, 465.....	7		169
<b>BRUSHGROVE (See "ROADS").</b>			
<b>BUCKLEY, THOMAS (See "ROADS").</b>			
<b>BUCKNELL AND LOMAX, MESSRS. (See "TELEGRAPHS").</b>			
<b>BUILDINGS RENTED BY GOVERNMENT :—</b>			
Return ( <i>in part</i> ) respecting, Department of Justice, laid on Table, 166.....	8		699
Further return ( <i>in part</i> ) respecting, Public Works Department, laid on Table, 188.....	8		701
Further return ( <i>in part</i> ) respecting, Post and Telegraph Department, laid on Table, 216.....	8		703
Further return ( <i>in part</i> ) respecting, Department of Public Instruction, laid on Table, 216.....	8		705
Further return ( <i>in part</i> ) respecting, Department of Lands, laid on Table, 231.....	8		707
Further return ( <i>in part</i> ) respecting, Treasury Department and Attorney-General's Department, laid on Table, 245.....	8		709
Further return ( <i>in part</i> ) respecting, Colonial Secretary's Department, laid on Table, 293.....	8		711
<b>BULLOCK ISLAND (See "BRIDGES").</b>			
<b>BURROWA (See "RAILWAYS").</b>			
<b>BURSARS (See "EDUCATION").</b>			
<b>BURWOOD ROAD (See "RAILWAYS").</b>			
<b>BUSH, MAURICE (See "CROWN LANDS").</b>			
<b>BUSINESS DAYS :—</b>			
Sessional Order passed, 10.			
Hours of meeting on, Sessional Order negatived, 359.			
<b>BUSINESS OF THE HOUSE :—</b>			
Precedence of Government Business, Sessional Order passed, 10.			
Precedence of General Business, Sessional Order passed, 10.			
Formal Business, Sessional Order passed, 10.			
Sessional Order passed, 11.			
Limitation of Business Hours, Sessional Order passed, 40; Rescinded, 336.			
Fixed for a future day, to take precedence of all other business, 33, 53, 58, 70, 74, 100.			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>B</b>		
<b>BUSINESS OF THE HOUSE</b> ( <i>continued</i> ) :—		
Orders of Day ordered to take precedence of Notices of Motion of General Business on Wednesdays and Thursdays, 253.		
Government, takes precedence on Fridays up to 6 o'clock, and General Business after that hour, and General Orders of the Day takes precedence of Motions, 411.		
<b>BUSINESS OF THE SESSION</b> :—		
Undisposed of at close of Session .....	1	563
Sessional Paper .....	1	569
<b>BY-LAWS</b> :—		
<b>LAYD ON TABLE</b> :—		
<b>Municipalities Act</b> :—		
<b>Borough of Lithgow</b> , 31 .....		619
Do Enfield, 31 .....		587
Do Grafton, 31 .....		605
Do St Leonards, 31 .....		611
Do Wagga Wagga, 31 .....		613
Do Gosford, 31, 366 .....		583, 585
Do Narrandera, 31 .....		617
Do Waterloo, 32 .....		787
Do Newcastle, 32 .....		873
Do Burwood, 151, 245, 293 .....		643, 645, 647
Do Narrabri, 166 .....		649
Do Waverley, 207 .....		799
Do New Lambton, 245 .....		651
<b>Municipal District of Burrows</b> , 31 .....		593
Do Wingham, 31 .....		629
Do Muswellbrook, 31 .....		607
Do Hillston, 31 .....		773
Do Blayney, 31 .....		609
Do Strathfield, 31 .....		615
Do Nowra, 32 .....		735
Do Camden, 32 .....		719
Do Manly, 32 .....		755
Do Silverton, 32 .....		641
Do Dubbo, 32 .....		639
Do Ryde, 34 .....		797
Do Gundagai, 260 .....		656
Do Tenterfield, 293 .....		663
Do Bingara, 293 .....		667
Do Bowral, 293 .....		665
Do Kogarah, 312 .....		801
Do Mittagong, 312, 502 .....		701, 829
Do North Sydney, 312 .....		811
Do Hay, 312 .....		677
Do Walcha, 379 .....		679
Do Port Macquarie, 393 .....		847
Do Murrumbidgee, 485 .....		693
Do Katoomba, 534 .....		855
<b>Nuisances Prevention Act</b> :—		
<b>Borough of Waterloo</b> , 32 .....		787
Do Drummoyne, 234 .....		713
<b>Municipal District of Hillston</b> , 31 .....		773
Do Nowra, 32 .....		735
Do Camden, 32 .....		719
Do Manly, 32 .....		755
Do Parkes, 32 .....		707
Do Adamstown, 32 .....		705
Do Ryde, 34 .....		797
Do Wingham, 166 .....		700
Do Waverley, 207 .....		799
Do Hamilton, 293 .....		715
Do Kogarah, 312 .....		801
Do Cooma, 312 .....		717
Do Mittagong, 312 .....		829
Do North Sydney, 312 .....		811
Do Port Macquarie, 393 .....		847
Do Katoomba, 534 .....		855
<b>Metropolitan Water and Sewerage Acts</b> :—		
Water and Sewerage Board, 25 (?) .....	5	405, 433
Country Districts in the County of Cumberland, 174 .....	5	437
<b>Newcastle Paving and Public Vehicles Regulation Act</b> :—		
<b>Borough of Newcastle</b> , 32 (?) .....	2	871, 873
Silverton Free Public Library, 414 .....	2	703
University of Sydney, 414 .....	7	931
Water Supply, Municipal District of Lismore, 434 .....	5	451
Maitland Cattle Driving Act Amendment Act, 464 .....	2	869
Hurstville Public Library, 534 .....	7	959
<b>BYROCK</b> (See "RAILWAYS").		
<b>BYRON BAY</b> :—		
<b>PROPOSED BREAKWATER</b> :—		
Report, together with Minutes of Evidence, Appendices, and Plan, from the Parliamentary Standing Committee on Public Works, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 130 .....	7	1
<b>LANDHOLDERS NEAR</b> :—		
Motion made ( <i>Mr. Hassall</i> ) for Return showing, 293; Return to Order, laid on Table, 307 .....	8	617
<b>BYRON BAY BREAKWATER BILL</b> :—		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 141; Message from Lieutenant-Governor, 153; House in Committee, resolution reported, 159-60; agreed to, Bill presented and read 1 <sup>o</sup> , 169; read 2 <sup>o</sup> , committed, reported with amendments, Report adopted, 175; read 3 <sup>o</sup> , passed, and sent to Council, 191 .....	7	59

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>C</b>		
CALAGHAN (See "CROWN LANDS").		
CALoola CREEK (See "CHURCH AND SCHOOL LANDS").		
CAMELS (See "AFGHAN CARRIERS").		
CAMP EQUIPMENTS (See "MILITARY").		
CAMPBELL A. (See "CROWN LANDS").		
CAMPBELLTOWN :—		
WATER DISTRICT :—		
Proclamation defining boundaries of, laid on Table, 45	5	429
CAPITAL PUNISHMENT ABOLITION BILL :—		
Motion made ( <i>Mr. Walker</i> ) for leave to bring in, 26.		
CARCOAR ELECTORATE (See "EDUCATION").		
CARRINGTON :—		
PETITIONS PRESENTED IN FAVOUR OF ERRECTING WITHOUT DELAY A PERMANENT STRUCTURE TO CONNECT NEWCASTLE :—		
From residents of Newcastle, Hamilton, Wickham, and Carrington, 5 (2)	5	613
Do of Newcastle, Hamilton, Wickham, Waratah, and Carrington, 5 (2)	5	613
CARTWRIGHT, ELIZABETH ANN (See "CROWN LANDS").		
CASEY, MR. J. B. :—		
Petition presented from, praying that his case may be examined and weighed, and that justice and consideration may be meted out to him, 540	2	489
CASTING VOTE :—		
Given by Mr. Speaker, 164, 342.		
CASWELL, Mr. (See "CIVIL SERVICE").		
CATHERINE HILL BAY (See "ADMINISTRATION OF JUSTICE").		
CEDARS :—		
Information respecting growth of, in Macleay and Bellinger Districts, laid on Table, 324	5	361
CEMETERIES :—		
BOWRAL, GENERAL :—		
Notification of resumption of land under Lands for Public Purposes Acquisition Act, laid on Table, 18	8	687
PUBLIC, SOUTH HEAD :—		
Notification of resumption of land under the Lands for Public Purposes Acquisition Act for extension of, laid on Table, 32	8	689
TERALBA, GENERAL :—		
Notification of resumption of land under Lands for Public Purposes Acquisition Act, laid on Table, 534	8	691
CEMETERIES BILL :—		
Motion made ( <i>Mr. J. P. Abbott</i> ) for leave to bring in, 34; Order of the Day postponed, 133, 137; Order of the Day discharged and Bill withdrawn, 341.		
CENSURE (See "VOTES OF CENSURE").		
CENSUS AND INDUSTRIAL RETURNS BILL :—		
Message from Governor, 467; Motion made ( <i>Sir Henry Parkes</i> ) for Committee of the Whole, 482; House in Committee, resolution agreed to, presented, and read 1 <sup>o</sup> , 490; Order of the Day postponed, 519, 526; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 541; read 3 <sup>o</sup> , passed, and sent to Council, 553; returned without amendment, 556	3	1271
CENTENNIAL INTERNATIONAL EXHIBITION :—		
Report of President of New South Wales Commission on, laid on Table, 166	8	131
Report of the Honorable R. Burdett Smith, M.L.C., Executive Commissioner, laid on Table, 216	8	161
CENTRAL DIVISION (See "CROWN LANDS").		
CHAIRMAN OF COMMITTEES :—		
Mr. Melville elected, 10.		
Mr. Garrard appointed for day only, 162.		
Deputy Speaker's ( <i>Mr. Melville</i> ) Commission to administer the Oath, 21.		
CHATELS (See "POWER OF MORTGAGEES OF CHATELS RESTRICTION BILL").		
CHER HOY, CASE OF (See "ADMINISTRATION OF JUSTICE").		
CHLOROFORM (See "DEATHS UNDER CHLOROFORM").		
CHURCH AND SCHOOL LANDS :—		
Motion made ( <i>Mr. Jones</i> ) for papers in reference to applications of P. J. Glasheen and S. Webb, at Caloola Creek, 132; Return to Order, laid on Table (not printed), 188.		
CIRCULAR QUAY LAND BILL :—		
Message from Governor, 306; Motion made ( <i>Mr. McMullan</i> ) for Committee of the Whole, 314; House in Committee, resolution agreed to, 361; Bill presented and read 1 <sup>o</sup> , 435; read 2 <sup>o</sup> , committed, reported with amendments with an amended Title, Report adopted, 456; read 3 <sup>o</sup> , passed, and sent to Council, 461; returned without amendment, 489; Assent reported, 510.	8	737
CITY OF NEWCASTLE GAS AND COKE COMPANY'S ELECTRIC AND OTHER LIGHT BILL :—		
Petition presented ( <i>Mr. Cullen</i> ) for leave to bring in, 61; presented, and read 1 <sup>o</sup> , 69; referred to Select Committee, 73; Report brought up, 109; Motion made for 2 <sup>o</sup> and negatived, Order of the Day discharged and Bill withdrawn, 287-8.	2	83
Petition presented against, from Municipality of New Lambton, and asking leave to appear before Select Committee, 76	2	119
Petitions presented against, and asking leave to appear before Select Committee, and prayer granted :—		
From Mayor and Alderman of the Municipal District of Waratah, 69		
Do do Municipality of Adamstown, 69		
Do do Municipal District of Hamilton, 69		
Do do Municipality of Carrington, 69	2	121
Do do Municipality of Wallsend, 69		
Do do Borough of Stockton, 69		
Do do Municipality of Plattsburg, 76		
Do do City of Newcastle, 76	2	119
Do do Municipality of Merewether, 87	2	117
CITY OF SYDNEY (See also "RAILWAYS").		
Statement of receipts and expenditure of Corporation for 1889, laid on Table, 32	2	577
IMPROVEMENT BOARD :—		
Annual Report of, for 1890, laid on Table, 306	2	581
CIVIL SERVICE :—		
Blue Book for 1889, laid on Table, 107	3	995
Report of Board of New South Wales for 1889, laid on Table, 121	2	231
ACTING DEPUTY-GOVERNOR OF BERRIMA GAOL :—		
Motion made ( <i>Mr. Edmunds</i> ) for papers in reference to appointment of Mr. Sidney N. De Montfort-Bromley, 76; Return to Order laid on Table, 94	2	467

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>C</b>		
<b>CIVIL SERVICE (continued):—</b>		
AMALGAMATION OF OFFICES OF CLERK OF PETTY SESSIONS AND LAND AGENT AT COONAMBLE:— Motion made ( <i>Mr. Cass</i> ) for papers in reference to, 405; Return to Order, laid on Table, 440	2	275
APPLICATIONS BY "HANSARD" STAFF FOR ADDITIONAL REMUNERATION:— Motion made ( <i>Mr. O'Sullivan</i> ) for copies of, 515.		
APPOINTMENTS IN POSTAL AND TELEGRAPH DEPARTMENTS:— Return showing, made by the Hon. Daniel O'Connor during his tenure of office, laid on Table, 231 Motion made ( <i>Mr. William Stephen</i> ) for return in reference to, 235.	2	350
APPOINTMENT OF DR. C. LEPERVANCHE AS GOVERNMENT MEDICAL OFFICER AT NARRABRI:— Motion made ( <i>Mr. J. P. Abbott</i> ) for papers in reference to, 320; Return to order, laid on Table, 366	2	483
COMPLAINTS AGAINST KRAMBACH POSTMASTER AND HIS WIFE:— Motion made ( <i>Mr. Vivian</i> ) for papers in reference to, 371; Return to Order, laid on Table (not printed), 610.		
CONTROLLER-GENERAL OF PRISONS:— Motion made ( <i>Mr. Alexander Brown</i> ) for papers relating to appointment of Mr. George Miller, 159; Return to Order, laid on Table, 174	2	473
GOVERNMENT PRINTING OFFICE:— Return respecting Compositors, laid on Table, 260	2	479
MR. CASWELL, POLICE MAGISTRATE, DUBBO:— Information respecting salary, fees, &c., laid on Table, 124	2	471
MR. CHARLES EGESON, LATE MAP-COMPILER, OBSERVATORY:— Correspondence respecting charges of insubordination and neglect of duty, and subsequent removal from the Service, laid on Table, 471	2	467
MR. HAMMOND, POSTMASTER, MOAMA:— Return to Order ( <i>Second Session, 1889</i> ), laid on Table (not printed), 18.		
MR. J. B. CASEY:— Petition presented from, praying that his case may be examined and weighed, and that justice and consideration may be meted out to him, 540	2	489
PUBLIC OFFICERS AS SPECIAL CONSTABLES:— Information respecting employment of, laid on Table, 464	7	685
PUBLIC SERVICE INQUIRY COMMISSION:— Report on the General Post Office, Money Order Office, and the Electric Telegraph Department, laid on Table, 430	2	281
REGISTRAR GENERAL'S DEPARTMENT:— Motion made ( <i>Mr. Crick</i> ) for a Select Committee to inquire into working of, and negatived, 303. Report on, by Registrar-General, 245	2	353
REMOVAL OF MR. MIDELTON FROM THE PUBLIC SERVICE:— Motion made ( <i>Mr. Wright</i> ) for papers in connection with, 552.		
SALARIES OF OFFICERS OF THE LEGISLATIVE COUNCIL:— Memorandum by the Clerk of the Parliaments and Minute of President thereon in reference to increases, laid on Table, 504	2	487
SUPERANNUATION FUND:— Motion made ( <i>Mr. Kidd</i> ) for return respecting, 103; Return to Order, laid on Table, 471	2	261
CIVIL SERVICE ACT, 1884:— Return of Pensions granted under, laid on Table, 39	2	255
CLARENCE RIVER (See also "ENTRANCE TO THE CLARENCE RIVER IMPROVEMENTS BILL"):—		
PROPOSED IMPROVEMENTS TO ENTRANCE:— Report, together with Minutes of Evidence, Appendices, and Plan, from the Parliamentary Standing Committee on Public Works, laid on Table, 25; Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 124	7	61
RAILWAY CONSTRUCTION AND HARBOUR IMPROVEMENT:— Petition presented for execution of works, 25	5	1113
CLARENCE TOWN (See "PARKS").		
CLAYTON, EDWARD (See "ADMINISTRATION OF JUSTICE").		
CLERK OF ASSEMBLY:— Reads Proclamation convening Parliament, 1. Reads Address in Reply to Governor's Opening Speech, 3. Swears Members of the Elections and Qualifications Committee, 35 (2), 68 (2), 73, 116, 414. Reads Deputy Speaker's Commission to Administer the Oath, 21. Reads Speaker's ( <i>Mr. J. P. Abbott</i> ) Commission to Administer the Oath of Allegiance. Reads Petition, 25, 124, 325, 384, 399, 415, 461, 489, 497. Reads Newspaper Article reflecting on Members of the House, 291. Swears Witness at Bar of the House, 299. Lays papers on Table, 348 Informs House of the unavoidable absence of the Speaker, 385. Announces receipt of letter from James Henry Young resigning office of Speaker, 357.	8	57
CLERK OF PETTY SESSIONS AND LAND AGENT, COONAMBLE:— Motion made ( <i>Mr. Cass</i> ) for papers in reference to amalgamation of offices, 405,—Return to Order, laid on Table, 449	2	275
CLOSURE OF DEBATE:— Motion made for and passed, 274, 336. Motion made for, and less than forty Members shown in Tellers List in favour of, 275-6.		
COAL:—		
CONVEYANCE OF:— Return respecting, by Railway Commissioners, laid on Table, 166	5	1077
RAILWAY CONTRACTS FOR 1890:— Return respecting, laid on Table, 345	5	1075
COAL MINES REGULATION BILL:— Motion made ( <i>Mr. Sydney Smith</i> ) for Committee of the Whole, 33; Message from Governor, 49; House in Committee, resolution agreed to, 142; Bill presented and read 1 <sup>o</sup> , 143; read 2 <sup>o</sup> , committed, 170; House in Committee, 218, 345; reported with amendments, 349; Report adopted, 412; read 3 <sup>o</sup> , passed, and sent to Council, 414. Message from Council asking leave to examine Mr. Curley, M.L.A., and leave given, 485.	4	1111
COAST HOSPITAL, LITTLE BAY:— Report for 1889, laid on Table, 32	2	493
COBAR (See "MINING"; also "RAILWAYS"; also "NYNGAN TO COBAR RAILWAY BILL").		
COCKBURN (See "RAILWAYS").		
COKES:— Report, &c., on, manufactured in New South Wales, laid on Table, 315	8	423
COLLEGE FOR TRAINING TEACHERS (See "EDUCATION").		
COLLIERIES (See "MINING").		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
C	VOL.	PAGE.
COLLINS, CHARLES, ESQ. :— Issue and return of Writ for The Namoi reported, sworn, 239.		
COLO VALLEY (See "RAILWAYS").		
COLONIAL COURTS OF ADMIRALTY ACT, 1890 :— Despatch respecting, laid on Table, 510 .....	3	849
COMMERCIAL AGREEMENT, PROVISIONAL :— Despatch respecting, between Great Britain and Servia, laid on Table, 136 .....	8	713
COMMERCIAL CONVENTION :— Despatch respecting, between Great Britain and Egypt, laid on Table, 136 .....	8	715
COMMERCIAL TREATIES :— Despatch respecting, between Great Britain and Roumania, laid on Table, 319 .....	8	723
COMMISSIONS :— Progress report of Royal, into schemes for Extermination of Rabbits, laid on Table, 32 .....	5	65
Report of Fisheries to 31st December, 1889, laid on Table, 107 .....	7	1051
Speaker's to administer the Oath of Allegiance, 388. Report of Public Service, General Post Office, Money Order Office, and Electric Telegraph Departments, 430 .....	2	281
COMMONS :— MUDGE TOWN :— Motion made ( <i>Mr. Wall</i> ) for papers in reference to sale of, 19; Return to Order, laid on Table (not printed), 32.		
PERMANENT AND TEMPORARY :— Return to Order ( <i>Session, 1889</i> ), laid on Table, 32 .....	4	749
SYDNEY COMMON AND MOORE PARK :— Notices of dedication and appointment of Trustees, laid on Table, 146 .....	4	747
HAM :— Motion made ( <i>Mr. Frank Farnell</i> ) for papers in reference to a site for Agricultural College, 211.		
COMPANIES ACT AMENDMENT BILL :— Motion made ( <i>Mr. Wall</i> ) for leave to bring in, 202.		
COMPTROLLER-GENERAL OF PRISONS (See "CIVIL SERVICE").		
CONCILIATION, COURTS OF (See "COURTS OF CONCILIATION BILL").		
CONDITIONAL PURCHASES (See "CROWN LANDS"; also "MINING").		
CONDOBOLIN (See "CROWN LANDS").		
CONNELLY, JAMES (See "CROWN LANDS.")		
CONSERVATION OF WATER (See "WATER CONSERVATION").		
CONSOLIDATED RENEUE (See "FINANCE").		
CONSOLIDATED REVENUE FUND BILL :— Message from Governor, 306; Standing Orders suspended, 321; ordered, on motion ( <i>Mr. McMillan</i> ), founded on resolution of Ways and Means (No. 1), presented, read 1 <sup>o</sup> , 2 <sup>o</sup> , committed, reported without amendment, report adopted, read 3 <sup>o</sup> , passed and sent to Council, 337-8; returned without amendment, 345; assent reported, 353 .....	3	593
CONSTITUTION ACT AMENDMENT (LEGISLATIVE COUNCIL QUORUM) BILL :— Received from Legislative Council, read a first time ( <i>Mr. McMillan</i> ), 73; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 142; read 3 <sup>o</sup> , passed, and returned to Council, 151; Assent reported, 173.		
CONTAGIOUS DISEASES (See "STOCK").		
CONTRACTORS DEBT'S ACT AMENDMENT BILL :— Motion made ( <i>Mr. Walker</i> ) for Committee of the Whole, 287.		
CONTRACTORS' LIEN BILL :— Motion made ( <i>Mr. Garrard</i> ) for Committee of the Whole, 345; Order of the Day postponed, 414; House in Committee, resolution agreed to, presented and read 1 <sup>o</sup> , 457; Order of the Day postponed, 510.		
CONVICTIONS UNDER THE LICENSING ACT :— Annual Return to Order, laid on Table, 32, 174 .....	3	935, 939
COOKE, J. H. (See "EDUCATION").		
COOK'S RIVER ROAD :— Return showing expenditure on, laid on Table, 348 .....	5	513
COOK'S RIVER ROAD TRAMWAYS BILL :— Petition presented ( <i>Mr. Melville</i> ) for leave to bring in, 252; leave given, presented, and read 1 <sup>o</sup> , 261; referred to a Select Committee, 264.		
COOLABAH ACCIDENT (See "RAILWAYS").		
COOMA (See "RAILWAYS").		
COONAMBLE (See "CLERK OF PETTY SESSIONS AND LAND AGENT AT COONAMBLE").		
COOTAMUNDRA (See "RAILWAYS").		
COOTAMUNDRA TO TEMORA RAILWAY BILL :— Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 136; Message from Lieutenant- Governor, 154; Order of the Day postponed, 162; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 168; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 189; read 3 <sup>o</sup> , passed, and sent to Council, 201; returned without amendment, 320; Assent reported, 339.	6	953
COROWA (See "RAILWAYS").		
CORPORATION OF THE CITY OF SYDNEY :— Statement of Receipts and Expenditure for 1889, laid on Table, 32 .....	2	577
COUNTS OUT (See also "NO QUORUM"). Attendances of Members in Divisions, and .....	1	567
COUNTRY TOWNS WATER AND SEWERAGE ACT OF 1880 :— Proclamation respecting application of certain sections to Wilcannia, 188 .....	5	447
Notification of completion and transfer of works, Borough of Orange, laid on Table, 210 .....	5	449
By-laws, Borough of Lismore, laid on Table, 434 .....	5	451
COURT-HOUSES (See "ADMINISTRATION OF JUSTICE").		
COURTS OF CONCILIATION BILL :— Motion made ( <i>Mr. Dibbs</i> ) for Committee of the Whole, 295; Order of the Day postponed, 410; House in Committee, resolution agreed to, 457.		
COWRA (See "BRIDGES"; also "RAILWAYS").		
COWRA BRIDGE BILL :— Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 141; Message from Lieutenant- Governor, 154; Order of the Day postponed, 163; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 169; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 190; read 3 <sup>o</sup> , passed, and sent to Council, 202; returned without amendment, 266; assent reported, 268 .....	5	815
CRACE, MR. E. K. (See "CROWN LANDS").		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>C</b>		
<b>CRICK, WILLIAM PATRICK, ESQ., M.P. :—</b>		
Chairman of Committee of Ways and Means reported that the Honorable Member for West Macquarie having refused to obey the Chair, had been removed from the Chamber, and that the Honorable Member had violently resisted the Sergeant-at-Arms; Mr. Crick admitted by direction of Mr. Speaker and invited to explain; Mr. Crick addressed the House, and refusing to obey the Chair, was ordered to be removed from the Chamber, and having used certain disorderly words was adjudged guilty of disorder, &c, and expelled from the House, 430-1; seat declared vacant, 431-2; issue and return of Writ for West Macquarie, reported, 503; sworn, 505.		
<b>PRIVILEGE :—</b>		
Motion made ( <i>Sir Henry Parkes</i> ) instructing Mr. Speaker to require the Honorable Member to state whether he had at Lambton denounced the Parliament as being "rotten and corrupt." Point of Order—That the matter not suddenly arising was not one of Privilege, overruled. Amendment proposed ( <i>Mr. Crick</i> ) for the appointment of a Royal Commission to inquire into charges of "corruption and bribery" in reference to the Broken Hill Water Supply Bill; amendment negatived; original motion passed; Mr. Crick denied having used the specific language as quoted in the resolution, 524-5.		
<b>CRIMINAL LAW AMENDMENT ACT OF 1883 :—</b>		
Regulations in respect to Licenses laid on Table, 231, 348	3	801, 803
<b>CRIMINAL LAW AND EVIDENCE AMENDMENT BILL :—</b>		
Received from Legislative Council, and on motion ( <i>Mr. Gould</i> ) read 1 <sup>o</sup> , 235; Order of Day postponed, 314, 456.		
<b>CRIMINAL LUNATICS AND PRISONERS (See "DESPATCHES").</b>		
<b>CROOKWELL (See "RAILWAYS"; also "ROADS").</b>		
<b>CROWE, HENRY (See "CROWN LANDS").</b>		
<b>CROWN LANDS (See also "COMMONS"; also "LAND COURT") :—</b>		
Ninth Annual Report of the Department of Lands, being for 1889, laid on Table, 414	4	1
<b>ACT OF 1889 :—</b>		
Regulations under, laid on Table, 32, 136, 188, 280, 533 (2)	4	207, 631, 217, 633, 639, 637.
Notification of amendment of Form 11 under, 307	4	635
<b>ALTERATIONS OF NAMES AND DESIGNS OF CITIES, TOWNS, AND VILLAGES :—</b>		
Abstract of, laid on Table, 17, 78, 124, 294, 464, 534	4	641, 643, 645, 647, 649, 651.
<b>DEDICATION TO PUBLIC AND RELIGIOUS PURPOSES :—</b>		
Abstract of, laid on Table, 17, 39, 79, 124, 181, 231, 293, 410, 428, 465, 534	4	653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673.
<b>DEDICATION OF CERTAIN LANDS UNDER THE 105TH SECTION —</b>		
<i>Gazette</i> Notices respecting, laid on Table, 17, 79, 124, 181, 231, 294, 345, 410, 428, 534	4	675, 681, 683, 685, 687, 689, 691, 693.
<b>RESERVED FOR PRESERVATION OF WATER SUPPLY :—</b>		
Abstract of, laid on Table, 17, 78, 123, 180, 231, 294, 315, 410, 465, 534	4	695, 703, 707, 709, 713, 715, 717, 719, 721, 725.
<b>SITES FOR CITIES, TOWNS, AND VILLAGES :—</b>		
Abstract of, laid on Table, 17, 78, 123, 181, 294, 410, 464, 534	4	727, 729, 731, 733, 735, 737, 739, 741.
<b>ADDITIONAL CONDITIONAL PURCHASE OF GEORGE CURRY, AT COOTAMUNDRA :—</b>		
Motion made ( <i>Mr. J. P. Abbott</i> ) for paper forwarded to Land Court in reference to, 69; Return to Order laid on Table, 69	4	349
<b>APPEAL CASE TO THE PRIVY COUNCIL, ALISON v. BURNS :—</b>		
Information respecting, laid on Table, 226	4	219
<b>APPLICATION OF ROBERT LAMROCK FOR A CONDITIONAL PURCHASE AT MUDGEE :—</b>		
Return to Order ( <i>Session</i> , 1889), laid on Table, 32	4	325
<b>APPLICATIONS BY W. SULLY AND OTHERS FOR PORTIONS OF LAND, THACKARINGA :—</b>		
Return to Order ( <i>Session</i> , 1889), laid on Table (not printed), 32.		
<b>CALAGHAN'S CONDITIONAL PURCHASES, BRAIDWOOD AND QUEANBEYAN :—</b>		
Motion made ( <i>Mr. Ball</i> ) for Select Committee to inquire into, 303; report brought up, 399	4	507
<b>CLAIM OF MR. E. K. CRACE TO, ADJOINING GUNGAILEEN ESTATE :—</b>		
Motion made ( <i>Mr. O'Sullivan</i> ) for Select Committee to inquire into, and debate adjourned, 62; debate resumed and motion passed, 133; Report brought up, 373	4	585
Correspondence respecting, laid on Table, 132	4	597
<b>CONDITIONAL PURCHASES AND CONDITIONAL LEASES :—</b>		
Return showing area of land applied for in Central Division during July, August, and September 1890, laid on Table, 353	4	229
Return showing area of land applied for in Eastern Division during July, August, and September, 1890, laid on Table, 410	4	231
<b>CONDITIONAL IMPROVEMENT PURCHASE BY W. H. WILLIAMS, AT ALBERT :—</b>		
Return to Order ( <i>Second Session</i> , 1889), laid on Table, 32	4	303
<b>CONDITIONAL PURCHASES MADE UPON BARRATTA RUN :—</b>		
Motion made ( <i>Mr. Barbour</i> ) for copy of Petition to Governor, and copies of papers received since the adoption of the Report from the Select Committee, 152.		
<b>CONDITIONAL PURCHASES OF J. SMITH, J. M. D. SULLIVAN, AND A. CAMPBELL, LAND DISTRICT OF LISMORE —</b>		
Motion made ( <i>Mr. Nicoll</i> ) for papers in connection with, and House counted out, 211; Motion made and passed, 236; Return to Order, laid on Table, 380	4	495
Motion made ( <i>Mr. Nicoll</i> ) for Select Committee to inquire into, 269; Return to Order, referred, 303.		
<b>CONDITIONAL PURCHASES OF AUGUST MÖLLER AT CONDOBOLIN :—</b>		
Motion made ( <i>Mr. Cooke</i> ) for papers in connection with, 147; Return to Order, laid on Table (not printed), 307.		
<b>CONDITIONAL PURCHASES OF C. H. THATCHER, FORBES LAND DISTRICT :—</b>		
Motion made ( <i>Mr. Greene</i> ) for Select Committee to inquire into forfeiture of, and papers referred to Committee, 13; Report brought up, 328; report adopted, 479	4	517
<b>CONDITIONAL PURCHASE MADE BY MAURICE BUSH, DISTRICT URANA :—</b>		
Motion made ( <i>Mr. Hayes</i> ) for Select Committee, 529.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>C</b>		
<b>CROWN LANDS (continued) :—</b>		
CONDITIONAL PURCHASE MADE BY ANNIE NASH O'BRIEN, AT COROWA :— Motion made ( <i>Mr. Hayes</i> ) for Select Committee, 529.		
CONDONOLIN LAND DISTRICT :—		
Return of unsurveyed land in, laid on Table, 553 .....	4	221
DISTRICTS OF INVERELL, WARRIALDA, BINGERA, AND MOREE :—		
Motion made ( <i>Mr. Cruickshank</i> ) for Returns respecting land revenue, 95.		
ELIZABETH ANN CARTWRIGHT'S ADDITIONAL CONDITIONAL PURCHASES :—		
Motion made ( <i>Mr. Ball</i> ) for Select Committee to inquire into, 303 ; Report brought up, 415. ....	4	531
Petition, presented from Edward Rolfe, praying to be heard before Select Committee, and prayer granted, 367.		
ENCROACHMENTS ON J. PETER'S LAND, URINGALLA, COUNTY OF ARGYLE :—		
Return to Order, ( <i>Session</i> , 1889), laid on Table (not printed), 32.		
FORFEITURE OF HENRY CROWE'S CONDITIONAL PURCHASE, COUNTY OF HARDEN :—		
Motion made ( <i>Mr. Barnes</i> ) for a Select Committee, 406 ; report brought up, 519 .....	4	541
FORFEITED SELECTION OF J. J. RAY :—		
Motion made ( <i>Mr. Gormly</i> ) for a Select Committee, 479.		
IRRIGATION LEASE OF ALBERT STAFFORD, OF NARRABRI. —		
Motion made ( <i>Mr. Lyne</i> ) for papers in connection with, 116 ; Return to Order, laid on Table, 260	4	383
JAMES MAHER'S CONDITIONAL PURCHASE AT BURROWA :—		
Motion made ( <i>Mr. O'Sullivan</i> ) for papers relating to, 159 ; Return to Order, laid on Table, 307...	4	417
J. W. EDWARDS' C.P. 84-13, COOMA :—		
Return showing the instructions given to the Crown Solicitor to employ Counsel before the Land Court, laid on Table ( <i>not printed</i> ), 449.		
LAND BOARD, DISTRICT OF HAY :—		
Return showing the number of cases heard by the Local Land Boards for the Land Districts within, from 1st January, 1885, to 18th April, 1890, laid on Table, 324 .....	4	205
LAND BOARDS, HAY AND DENILIQUIN :—		
Return to Order laid on Table 27th November, 1889 ordered to be printed, 257 ... ..	4	81
LAND COURT :—		
Rules and Regulations, laid on Table, 32, 183.....	4	207, 217
LAND REVENUE :—		
Motion made ( <i>Mr. Garran</i> ) that the present system of treating is unsound, and that a Bill should be introduced to apply a substantial portion for the redemption of Loans and carrying out works which are usually carried out from Loan Funds, and negatived, 302-3.		
M'ILVERN AND CLIFF'S CONDITIONAL PURCHASES :—		
Motion made ( <i>Mr. Turner</i> ) for Select Committee to inquire into, 147 ; Report brought up, 341 ; Motion made ( <i>Mr. Turner</i> ) for adoption of Report, and negatived, 406 .....	4	549
MUNICIPALITY OF BOCREE :—		
Return respecting, laid on Table, 246 .....	4	227
NEWCASTLE PASTURAGE RESERVE :—		
Motion made ( <i>Mr. Melville</i> ) for papers in connection with grant to Primitive Methodist Connection at Adamstown, 428 ; Return to Order, laid on Table, 464 .. ..	4	755
PERMANENT AND TEMPORARY COMMONS :—		
Return to Order ( <i>Session</i> , 1889), laid on Table, 32 .....	4	749
PRE-LEASE BY JOHN M'INNES, PARISH OF TUCKERIMBA, COUNTY OF ROSS :—		
Return to Order ( <i>Session</i> , 1889), laid on Table (not printed), 32.		
RENTS OF PASTORAL LEASES AND RESUMED AREAS :—		
Motion made ( <i>Mr. Copeland</i> ) for return showing respectively those dealt with by Mr. Copeland and Mr. Garrett, 246 ; Return to Order, laid on Table, 260 .. ..	4	269
RESERVE FOR RECREATION, PARISH OF WILLOUGHBY :—		
Motion made ( <i>Mr. Burns</i> ) for papers in reference to, 418 ; Return to Order, laid on Table, 534	4	767
RESERVE KNOWN AS SEVEN-MILE BEACH, SHOALHAVEN RIVER :—		
Motion made ( <i>Mr. O'Sullivan</i> ) for papers in reference to lease and application to purchase, 162 ; Return to Order, laid on Table ( <i>not printed</i> ), 390		
RESERVES IN RESUMED AREAS AND IN PASTORAL HOLDINGS :—		
Return to Order ( <i>Session</i> , 1889), laid on Table, 103 .....	4	233
RESERVES ON RUNS IN GLEN INNES, INVERELL, MOREE, AND WARRIALDA LAND DISTRICTS :—		
Motion made ( <i>Mr. Cruickshank</i> ) for return respecting, 232 ; Return to Order, laid on Table, 328 ; ordered to be printed, 515. ....	4	249
RESERVES IN THE MOLONG DISTRICT :—		
Motion made ( <i>Dr. Ross</i> ) for return in reference to, 393.		
RYANS' CONDITIONAL PURCHASES AT WAGGA WAGGA :—		
Motion made ( <i>Mr. Gormly</i> ) for Select Committee and papers referred, 88 ; Report brought up, 268 ; Motion made ( <i>Mr. Gormly</i> ) for adoption of report, amendment moved ( <i>Mr. Brunker</i> ) to refer back to the Select Committee, amendment carried, 441 ; Second Report brought up, 540	4	557, 571
SELECTION MADE BY JAMES CONNELLY, AT TAMWORTH :—		
Motion made ( <i>Mr. Lerieu</i> ) for Select Committee to inquire into, 19.		
SELECTIONS TAKEN UP IN EASTERN DIVISION. —		
Motion made ( <i>Mr. Rylie</i> ) for return respecting, 222 ; Return to Order, laid on Table, 260.....	4	301
SELECTIONS UNDER CONDITIONAL PURCHASE :—		
Motion made ( <i>Dr. Ross</i> ) for return respecting, 324.		
SPECIAL AREAS :—		
Return showing number of, proclaimed from 1st March to 13th September, 1890, giving price and locality, laid on Table, 323 .....	4	228
THE LAND LAW :—		
Motion ( <i>Mr. Cruickshank</i> ) in reference to, being proceeded with, and House counted out, 353.		
WOOROGWOOLGEN RUN :—		
Return to Order ( <i>Session</i> , 1889), laid on Table, 32 ; ordered to be printed, 169 .....	4	351
<b>CROWN RENTS BILL :—</b>		
Motion made ( <i>Mr. Brunker</i> ) for Committee of the Whole, 69 ; Message from Governor, 77 ; House in Committee, resolution agreed to, Bill presented and read, 1 <sup>o</sup> , 142 ; Order of the Day postponed, 170, 190 ; motion made for 2 <sup>o</sup> , and debate adjourned, 203 ; debate resumed. <i>Point of Order</i> :—That Title of Bill did not contain any reference to that provision in the Bill which repealed existing legislation, and was therefore not in order. Mr. Speaker ruled that such reference was not necessary. <i>Point of Order</i> :—That clause 9, which affected important rights legally acquired, was not in the order of leave. Mr. Speaker ruled that such provisions should be within the order of leave, and that therefore the Bill was improperly before the House ; Order of the Day discharged and Bill withdrawn, 208.	4	627

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>C</b>		
<b>CROWN RENTS BILL (No. 2):—</b>		
Motion made ( <i>Mr. Brunker</i> ) for Committee of the Whole, 216; Message from Governor, 221; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 222; motion made for 2 <sup>o</sup> , and debate adjourned, 232; debate resumed, amendment moved, ( <i>Mr. Miller</i> ), that Bill be read 2 <sup>o</sup> "this day six months" and negatived, and motion passed, read 2 <sup>o</sup> ; motion made ( <i>Mr. O'Sullivan</i> ) to disallow vote of Mr. Walter Hussey Vivian and withdrawn, 236; committed, 237; House in Committee, reported with amendments, 261; report adopted, 265; read 3 <sup>o</sup> , passed; motion made to adopt title and amendment moved and negatived; Title agreed to; Message to Council moved, and amendment to add words negatived; Message agreed to, 274-5-6; returned without amendment, 313; assent reported, 327	4	629
<b>CROW'S NEST (See "BERRY ESTATE, NORTH SHORE").</b>		
<b>CULCAIRN (See "RAILWAYS").</b>		
<b>CULCAIRN TO COROWA RAILWAY BILL:—</b>		
Message from Governor, 15; Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 137; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 159; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 170; read 3 <sup>o</sup> , passed, and sent to Council, 174; returned without amendment, 222; assent reported, 231	6	1341
<b>CULLEN, JOHN:—</b>		
Motion made ( <i>Mr. Ewing</i> ) for papers in connection with dismissal from Dredge Service, 237, Return to Order, laid on Table ( <i>not printed</i> ), 410		
<b>CUNYNGHAME, MRS., LATE SUPERINTENDENT OF PARRAMATTA ASYLUM:—</b>		
Motion made ( <i>Mr. Howe</i> ) for Select Committee to inquire into removal of, and papers referred to Committee, 13; Mr. Hawthorne's name added to, 188; Report brought up, 328	2	367
Petition presented from Sydney Maxted for leave to be represented by Attorney before the Select Committee, and leave granted, 39	2	455
Petition presented, Sarah Cunyngame, for leave to be heard by Counsel or Attorney before the Select Committee, and leave granted, 39	2	453
<b>CURLEY JAMES, ESQUIRE, M.P.:—</b>		
Message from Legislative Council requesting leave to examine before Select Committee, and leave given, 455.		
<b>CURRY, GEORGE (See "CROWN LANDS").</b>		
<b>CUSTOMS:—</b>		
<b>DUTY ON TEA:—</b>		
Motion made ( <i>Mr. Willis</i> ) for removal of, and intercepted by Previous Question, 89.		
Motion made ( <i>Mr. Willis</i> ) for removal of, and negatived, 406.		
<b>IMPORT DUTIES UPON AGRICULTURAL PRODUCE:—</b>		
Motion made ( <i>Mr. McFarlane</i> ) in favour of, on certain produce, and debate adjourned, 443.		
<b>INTERNATIONAL TARIFF CONFERENCE HELD AT BRUSSELS:—</b>		
Documents relating to, laid on Table, 553	8	51
<b>D</b>		
<b>DAIRIES SUPERVISION BILL:—</b>		
Report on administration of, during 1887-8-9, laid on Table, 151	2	533
<b>DANGAR, THOMAS GORDON GIBBONS, Esq., M.P.</b>		
Death of the Honorable Member for The Namoi reported, Seat declared vacant, 161.		
<b>DANGAR CREEK (See "BRIDGES").</b>		
<b>DARLING RIVER:—</b>		
Motion made ( <i>Mr. J. P. Abbott</i> ) for papers and plans relative to locking of, 46; Return to Order, laid on Table, 534	8	623
<b>DARLINGHURST (See "GAOLS").</b>		
<b>DEATH OF MEMBER:—</b>		
Reported, 161, 223, 375.		
Motion made ( <i>Sir Henry Parkes</i> ) to express regret at, 373.		
<b>DEATHS UNDER CHLOROFORM:—</b>		
Return of, in the Sydney and Prince Alfred Hospitals since 1 January, 1885, laid on Table, 94	7	333
<b>DEBATE (See "ADJOURNMENT").</b>		
<b>DEBTORS BILL (See also "IMPRISONMENT FOR DEBT AMENDMENT BILL"):—</b>		
Motion made ( <i>Mr. Gould</i> ) for leave to bring in, 359.		
<b>DEBTS (See "IMPRISONMENT FOR DEBT ABOLITION BILL"; also "CONTRACTORS' DEBTS ACT AMENDMENT BILL").</b>		
<b>DECLARATION OF IMPERIAL ENACTMENTS BILL:—</b>		
Motion made ( <i>Mr. Goodchap</i> ) for leave to bring in, 87.		
<b>DEDICATION OF CERTAIN LANDS (See "CROWN LANDS").</b>		
<b>DENILQUIN (See "HAY AND DENILQUIN TRAMWAY BILL").</b>		
<b>DEPUTY SPEAKER (See "CHAIRMAN OF COMMITTEES").</b>		
<b>DESIGNS FOR CITIES, TOWNS, AND VILLAGES (See "CROWN LANDS").</b>		
<b>DESPATCHES:—</b>		
<b>LAI D ON TABLE:—</b>		
Extradition of Fugitive Criminals, 17, 345	3	821, 829
Regulations as to removal and return of Prisoners and Criminal Lunatics, 17	3	845
Commercial Convention between Great Britain and Egypt, 136	8	715
Provisional Commercial Agreement between Great Britain and Servia, 136	8	713
Sydney Branch Royal Mint, 151, 540	8	725, 727
Convention between Her Majesty and the United States of America as to the Extradition of Fugitive Criminals, 200	3	827
Commercial Treaties between Great Britain and Roumania, 319	8	723
Procedure in Extradition Cases and Cases under the Fugitive Offenders Act, 1881, 345	3	831
Merchant Shipping Acts, 410	7	195
Colonial Courts of Admiralty Act, 1890, 510	3	849
Foreign Jurisdiction Act, 1890, 510	3	817
<b>DIFFERENTIAL RATES (See "RAILWAYS").</b>		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>D</b>			
<b>DISORDER :—</b>			
Mr. A. G. Taylor, removed from Chamber by Sergeant-at-Arms, by direction of the Speaker, for refusing to obey the Chair, Mr. Speaker gave reasons for his action in removing Mr. Taylor; motion made, ( <i>Mr. Garvan</i> ), that House disapproves of action of Speaker and amendment proposed, ( <i>Mr. Willis</i> ), that Mr. Taylor be heard in his place, and negatived; Mr. Garvan's motion negatived, 395-6.			
The Chairman reported disorder from the Committee of Ways and Means; and also that he had directed the removal from the Chamber of the Member for West Macquarie ( <i>Mr. Crick</i> ); Mr. Crick admitted by direction of Mr. Speaker, and invited to explain; Mr. Crick addressed the House, and refusing to obey the Chair, was ordered to be removed from the Chamber; and having used certain disorderly words, was adjudged guilty of disorder, &c., and was expelled from the House, 430-1.			
<b>ARISING WHILE THE HOUSE IS IN COMMITTEE :—</b>			
Mr. Speaker, having observed grave disorder when the House was in Committee on the Broken Hill Water Supply Bill, resumed the Chair, and expressed astonishment that the Honorable Member for Burrows ( <i>Mr. Slattery</i> ) did not obey the ruling of the Chairman; and also stated that if the Honorable Member did not do so he would have to take an extreme course; Mr. Slattery explained, Speaker gave ruling, and Committee resumed, 419.			
Motion made ( <i>Mr. Dibbs</i> ) that when any Member refuses to obey the Chairman the case shall be reported without debate to the House, to be dealt with after explanation from the offending Member; and amendment moved ( <i>Mr. Garrard</i> ) to give the Chairman the right to make an explanation—amendment and original motion negatived, 436.			
<b>DISTRESS FOR RENT BILL :—</b>			
Motion made ( <i>Mr. Walker</i> ) for leave to bring in, presented and read 1°, 26; Order of the Day postponed, 76, 195; Order of the Day discharged and Bill withdrawn, 553.			
<b>DISTRESS FOR RENT ABOLITION BILL :—</b>			
Motion made ( <i>Mr. Walker</i> ) for leave to bring in, presented, and read 1°, 208; Order of the Day postponed, 400, 504.			
<b>DISTRICT COURTS ACT OF 1858 :—</b>			
Annual Returns under 103rd section, laid on Table, 166 .....		3	723
<b>DISTRICT GOVERNMENT BILL :—</b>			
Motion made ( <i>Sir Henry Parker</i> ) for Committee of the Whole, 18; House in Committee, Resolution agreed to, Bill presented, and read 1°, 33; Message from Governor, 49; Order of the Day postponed, 341.		8	581
<b>DIVISIONS :—</b>			
No Tellers, 313, 357 (*), 358 (*), 407, 554.			
Tellers not agreeing, 482.			
Attendance of Members in, and Counts out .....			
Weekly Report of in Committee of the Whole, Nos. 1 to 18 .....		1	567
.....		1	571
<b>IN THE HOUSE :—</b>			
Printing Petitions ( <i>Sessional Order</i> ), 12.			
Public Tolls, 19.			
Privilege—Seat of Honorable Sydney Smith, 27.			
Limitation of Business hours ( <i>Sessional Order</i> ), 40.			
Smoking in the Library and Reading-rooms ( <i>Printing Documents</i> ), 46.			
Illawarra Harbour and Land Corporation Bill, 46, 482.			
Absentee Tax, 62.			
Claim of Mr. E. K. Grace to Crown Land adjoining Gungahleen Estate, 62.			
Land, corner Pitt and Bridge Streets, 63.			
Case of Miss Brenning, 88.			
Conservation of Water in Lake Albert, near Wagga Wagga, 88.			
Ryans' Conditional Purchases at Wagga Wagga, 89.			
Duty on Tea, 89, 406.			
Railway from Marrickville to the Burwood Road, 117.			
Railway from Grafton to the Tweed, 125.			
Reception of Petitions, Sunday Laws Amendment Bill, 357 (*), 360.			
Hour of Meeting on Business Days— <i>Sessional Order</i> , 369.			
Standing Orders, 372 (*).			
Adjournment—Ministerial Statement of the Premier, 373.			
Privilege—Seat of J. H. Young, Esquire, 380.			
Fiscal policy of the Government—Vote of Censure, 396 (*), 400 (*), 401.			
Breakwater at Byron Bay, 130.			
Law Vacations Abolition Bill, 133.			
Ministerial Election Bill, 134.			
Railway from Molong to Parkes and Forbes, 138 (*).			
Postponement of Orders of the Day of Government Business, 143.			
Railways to connect towns with existing lines, 147.			
Prayer, 148.			
Byron Bay Breakwater Bill, 159, 169, 175, 191.			
Electoral Act (Plural Vote Abolition) Amendment Bill, 163 (*), 341.			
Parliamentary Standing Committee on Public Works, 182 (*), 415.			
Molong to Parkes and Forbes Railway Bill, 189.			
Marrickville to Burwood Road Railway Bill, 190, 349, 360.			
Imprisonment for Debt Abolition Bill, 228.			
Nautical School-ship "Vernon," 235.			
Crown Rents Bill (No. 2); 236 (*), 265, 274, 275*, 276*.			
Railway from Tarago to Braidwood, 241.			
Precedence of Orders of the Day of General Business, 252, 253.			
Adjournment—The Government and its broken pledges, 253.			
Railway accident near Bathurst ( <i>printing document</i> ), 273.			
City of Newcastle Gas and Coke Company's Electric and other Light Bill, 288 (*).			
Book Purchasers Protection Bill, 288.			
Privilege—Newspaper article, 292, 299.			
Land Revenue, 308.			
Registrar-General's Department, 303.			
Australasian Federation, 308, 309, 310.			
Suspension of Standing Orders, 321 (*).			
Rescission of <i>Sessional Order</i> for Limitation of Business Hours, 335 (*), 336 (*).			
Adjournment—Unsatisfactory State of Public Business, 336, 337.			



REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
	VOL.	PAGE.	
<b>D</b>			
<b>DIVORCE AMENDMENT AND EXTENSION BILL :—</b>			
Received from Legislative Council, read 1 <sup>o</sup> ( <i>Mr. McMillan</i> ), 160; Order of the Day postponed, 162, 320, 341, 353, 372, 422; Motion made ( <i>Mr. Frank Smith</i> ), for second reading; Motion for adjournment of Debate negatived; House counted out, 498-9.			
Petition presented from Clergy of the Diocese of Sydney and Lay Representatives of the Synod against, 287 .....	8	753	
Petition presented from the Bishop of the Diocese of Sydney against, 371 .....	8	755	
Petition presented from Members of the Synod of the Diocese of Grafton and Armidale against, and read by the Clerk, 489.....	8	759	
Petition presented from Ministers of the various Christian Churches of New South Wales against, 489.....	8	759	
Petition presented from Members of the Synod of the Diocese of Newcastle against, 489 .....	8	759	
Petition presented from Members of the Synod of the Diocese of Bathurst against, 489.....	8	759	
Petition presented from Members of the Synod of the Diocese of Goulburn against, 489.....	8	759	
Petition presented from Members of the Synod of the Diocese of Riverina against, and read by the Clerk, 497.....	8	759	
Petition presented from Edgar F. Tye, President, and A. Maclaren, Secretary of the Australian Secular Association of New South Wales, in favour of, 395.....	8	757	
<b>DIVORCE AND MATRIMONIAL CAUSES :—</b>			
Rule of Supreme Court, laid on Table, 324.....	3	815	
<b>DOG TAX :—</b>			
Petition presented from Farmers of Bungawalbin, Richmond River, praying for repeal of, 76 .....	8	739	
<b>DRAINAGE :—</b>			
<b>APPLICATION FOR UNION AT NOWRA :—</b>			
Motion made ( <i>Mr. Morton</i> ) for papers and plans relating to, 130; Return to Order, laid on Table, 231 .....	5	495	
<b>WESTERN SUBURBS RETICULATION SCHEME (See also "WESTERN SUBURBS, CITY OF SYDNEY, SEWERAGE SCHEME RETICULATION AND COMPLETION BILL") :—</b>			
Report, together with Minutes of Evidence, from the Parliamentary Standing Committee on Public Works, laid on Table, 25; Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 124 ..	5	511	
<b>DREDGES :—</b>			
<b>DISMISSAL OF JOHN CULLEN :—</b>			
Motion made ( <i>Mr. Ewing</i> ) for papers, 287; Return to Order, laid on Table (not printed), 410.			
<b>SYDNEY HARBOUR :—</b>			
Report, Minutes of Evidence, and Appendix, from the Parliamentary Standing Committee on Public Works, laid on Table, 25 .....	7	157	
<b>DUTIES (See "CUSTOMS").</b>			
<b>E</b>			
<b>EARLY CLOSING BILL :—</b>			
Motion made ( <i>Mr. Alfred Allen</i> ) for Committee of the Whole, 320; Order of the Day postponed, 329, 368; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 423.			
Motion made ( <i>Mr. Alfred Allen</i> ) for 2 <sup>o</sup> ; Point of Order, "That Bill involved expenditure and should be covered by a Message," ruled against by Mr. Speaker; amendment moved to refer to Select Committee, and amendment carried, 436-7.			
<b>EASTERN DIVISION (See "CROWN LANDS"; also "STOCK").</b>			
<b>EDDY VERSUS MARTIN, CASE OF (See "ADMINISTRATION OF JUSTICE").</b>			
<b>EDUCATION (See also "CHURCH AND SCHOOL LANDS") :—</b>			
Report of Minister of Public Instruction for 1889, laid on Table, 39 .....	7	651	
Report of University of Sydney for 1889, laid on Table, 52 .....	7	917	
<b>AGRICULTURAL COLLEGES :—</b>			
Return respecting establishment of, laid on Table, 99 .....	5	55	
<b>CASE OF MISS BRENNING :—</b>			
Report of Select Committee ( <i>Session 1889</i> ) negatived, 86.			
<b>CONDUCT OF TEACHER AT AMEROO PUBLIC SCHOOL :—</b>			
Motion made ( <i>Dr. Ross</i> ) for papers in reference to, 175; Return to Order, laid on Table, 216.....	7	1007	
<b>DISMISSAL OF J. H. COOKE FROM THE DEPARTMENT :—</b>			
Motion made ( <i>Mr. Cruickshank</i> ) for Committee to inquire into claims of, and negatived, 210.			
<b>HIGH SCHOOLS :—</b>			
Return to Order ( <i>Session 1889</i> ), laid on Table (not printed), 246			
<b>INDUSTRIAL SCHOOLS ACT OF 1866 :—</b>			
Regulations under, laid on Table, 174 .....	7	1003	
<b>MR. WILLIAM NEWBERRY, LATE MATHEMATICAL MASTER, SYDNEY GRAMMAR SCHOOL :—</b>			
Motion made ( <i>Mr. Alison</i> ) for papers in connection with dismissal of, 460; Return to Order, laid on Table (not printed), 461.			
<b>PUBLIC INSTRUCTION ACT OF 1880 :—</b>			
Regulations under, laid on Table, 17 .....	7	1001	
<b>PUBLIC SCHOOLS IN THE CARCOAR ELECTORATE :—</b>			
Motion made ( <i>Mr. Garland</i> ) for Return respecting, 241; Return to Order, laid on Table, 302 ..	7	1021	
<b>PUBLIC, HIGH, AND SUPERIOR SCHOOLS :—</b>			
Motion made ( <i>Dr. Ross</i> ) for return respecting, 320; Summary of Return to Order, laid on Table, 393 .....	7	1023	
Return to Order, laid on Table (not printed), 393.			
<b>RESUMPTION OF LAND FOR SCHOOL PURPOSES :—</b>			
Notification of, laid on Table, 17, 79, 129, 174 (?), 324 .....	7	{ 1025, 1029 1031, 1033 1037, 1029	
<b>STATE SCHOOL AND UNIVERSITY BURSARIES :—</b>			
Regulation respecting, laid on Table, 393 .....	7	933	

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. 1—14TH PARLIAMENT—SESSION 1890.	PAGES.	
	VOL.	PAGE.
<b>E</b>		
<b>EDUCATION (continued):—</b>		
<b>SYDNEY FREE PUBLIC LIBRARY:—</b>		
Report from Trustees for 1889-90, laid on Table, 17 .....	7	945
<b>SYDNEY GRAMMAR SCHOOL:—</b>		
Annual Report for 1889, laid on Table, 216 .....	7	937
<b>TRAINING COLLEGE FOR TEACHERS OF PUBLIC SCHOOLS:—</b>		
Explanation, Estimate, and Plans, in accordance with the 13th section of the Public Works Act of 1888, laid on Table, 456 .....	7	915
Motion made ( <i>Mr. Carruthers</i> ) to refer to the Parliamentary Standing Committee on Public Works the matter of the erection of, 456.		
<b>UNIVERSITY AND STATE SCHOOL BURSARS:—</b>		
Return showing names of, and occupations of Parents, 39 .....	7	935
<b>EDWARDS, MAJOR-GENERAL:—</b>		
Letter from Principal Under Secretary to Mr. Dibbs, forwarding extracts from private letter to Sir Henry Parkes, from, laid on Table, 58 .....	8	729
<b>EDWARDS, J. W. (See "CROWN LANDS").</b>		
<b>EGESON, MR. CHARLES:—</b>		
Correspondence respecting charges of insubordination and neglect of duty against, and his removal from the position of Map-compiler, Observatory, laid on Table, 471 .....	2	457
<b>EGYPT (See "DESPATCHES").</b>		
<b>EIGHT HOURS BILL:—</b>		
Motion made ( <i>Mr. Schey</i> ) for Committee of the Whole, 26; Order of the Day postponed, 88; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 227; Order of the Day postponed, 435; Speaker ruled that the Bill was beyond the Order of leave; Order of the Day discharged and Bill withdrawn, 521.		
<b>ELECTIONS AND QUALIFICATIONS COMMITTEE (See "ELECTORAL").</b>		
<b>ELECTORAL (See also "MINISTERIAL ELECTION BILL").</b>		
<b>ELECTIONS AND QUALIFICATIONS COMMITTEE:—</b>		
Speaker's Warrant laid on Table, 7 ( <i>Mr. Young</i> ), 391 ( <i>Mr. J. P. Abbott</i> ); Maturity reported, 35; 411; Members sworn, 35 (2), 68 (3), 73, 116, 414.		
Resignation of the Hon. J. P. Abbott as Member of, reported, 391.		
<i>Privilege—Seat of the Honorable Sydney Smith, Esquire:—</i>		
Motion made ( <i>Mr. Crick</i> ) to refer to, and negatived, 27.		
<i>Privilege—Seat of J. H. Young, Esquire:—</i>		
Motion made ( <i>Mr. Crick</i> ) to refer to, and negatived, 380.		
<b>BALMAIN:—</b>		
Resignation of John Stuart Hawthorne, Esq., reported; Seat declared vacant, 139; issue and return of Writ reported, sworn, 171.		
<b>GOULBURN:—</b>		
Death of William Teece, Junior, Esquire, reported, and seat declared vacant, 223; issue and return of Writ reported, 255; Cecil Bedford Teece, Esquire, sworn, 257.		
<b>HASTINGS AND MANNING:—</b>		
Resignation of Charles James Roberts, Esquire, C.M.G., and issue and return of Writ reported, Walter Hussey Vivian, Esquire, sworn, 1.		
<b>MONARO:—</b>		
Issue and return of Writ reported; Gustave Thomas Carlisle Miller, Esquire, sworn, 1.		
<b>ROLLS FOR 1880 TO 1890:—</b>		
Showing the past operation of the expansive clauses of Act of 1880, laid on Table, 32 .....	1	801
<b>ROLLS FOR 1880 TO 1891:—</b>		
Showing the past operation of the expansive clauses of the Electoral Act, 293; Return ( <i>in substitution</i> ) laid on Table, 324 .....	1	805
<b>HARTLEY:—</b>		
Resignation of John Hurley, Esq., reported; Seat declared vacant, 157; issue and return of Writ reported, 213; sworn, 217.		
<b>THE NAMOI:—</b>		
Death of Thomas Gordon Gibbons Dangar reported and Seat declared vacant, 161; issue and return of Writ reported, Charles Collins, Esquire, sworn, 239.		
<b>WEST SYDNEY:—</b>		
Death of Alfred Lamb, Esquire, reported and seat declared vacant, 375; issue and return of Writ reported, 395.		
<b>WEST MACQUARIE:—</b>		
Seat of William Patrick Crick, Esq., declared vacant, 431-2; issue and return of Writ reported, 503; sworn, 505.		
<b>ELECTORAL ACT (PLURAL VOTE ABOLITION) AMENDMENT BILL:—</b>		
Motion made ( <i>Mr. Traill</i> ) for leave to bring in, presented and read 1 <sup>o</sup> , 27; motion made ( <i>Mr. Traill</i> ) that Bill be read 2 <sup>o</sup> , amendment moved ( <i>Mr. Garrard</i> ) that Bill be read 2 <sup>o</sup> "this day three months," and amendment carried, 163-4; motion made ( <i>Mr. Traill</i> ) for second reading, and Nos., on division, being equal, Speaker gave casting vote for the ayes; read 2 <sup>o</sup> , committed, 341-2; House in Committee, 461.		
<b>ELECTORAL BILL:—</b>		
Motion made ( <i>Sir Henry Parkes</i> ) for Committee of the Whole, 380; Order of the Day postponed, 412; Message from Lieutenant-Governor, 417; House in Committee, 419, 429; Resolution reported and agreed to, 429-30; presented and read 1 <sup>o</sup> , 430; Order of the Day postponed, 464, 489, 519 .....	1	809
<b>ELECTRIC LIGHTING (See "STOCKTON GAS AND ELECTRICITY BILL"; also "CITY OF NEWCASTLE GAS AND COKE COMPANY'S ELECTRIC AND OTHER LIGHT BILL"; also "BOROUGH OF NEWCASTLE ELECTRIC LIGHTING BILL"; also "BOROUGH OF NEWCASTLE ELECTRIC LIGHTING BILL (No. 2)").</b>		
<b>EMBANKMENT AROUND BOURKE:—</b>		
Motion made ( <i>Mr. Waddell</i> ) for £20,000 to be placed on Estimates for, and by leave with drawn, 27.		
<b>EMPLOYERS LIABILITY ACT AMENDMENT BILL:—</b>		
Motion made ( <i>Mr. Garrard</i> ) for leave to bring in, 12; presented and read 1 <sup>o</sup> , 24; Order of the Day postponed, 79; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 287; Order of the Day postponed, 295; read 3 <sup>o</sup> , passed, and sent to Council, 298.		
<b>EMPLOYERS LIABILITY ACT EXTENSION BILL:—</b>		
Motion made ( <i>Mr. Edmunds</i> ) for Committee of the Whole, 26; Order of the Day postponed, 46, 195, 227, 287, 317; Order of the Day discharged, 553.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>E</b>		
<b>ENTRANCE TO THE CLARENCE RIVER IMPROVEMENTS BILL:—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 136; Message from Lieutenant-Governor, 154; Order of the Day postponed, 162; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 168; read 2 <sup>o</sup> , committed, reported with amendments, report adopted, 189; read 3 <sup>o</sup> , passed, and sent to Council, 202; returned without amendment, 321; assent reported, 340.....	7	153
<b>ENTRANCE TO THE RICHMOND RIVER IMPROVEMENTS BILL:—</b>		
Message from Governor, 115; Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 137; Order of the Day postponed, 162; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 168; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 189; read 3 <sup>o</sup> , passed, and sent to Council, 202; returned without amendment, 282; assent reported, 286 ...	7	155
<b>EQUIPMENTS</b> (See "MILITARY").		
<b>ESTIMATES</b> (See "FINANCE").		
<b>EVELEIGH</b> (See "RAILWAYS").		
<b>EVIDENCE</b> (See "LAW OF EVIDENCE AMENDMENT BILL").		
<b>EXCLUSION OF STRANGERS:—</b>		
Sessional Order passed, 12.		
<b>EXHIBITION</b> (See "CENTENNIAL INTERNATIONAL EXHIBITION").		
<b>EXPLANATORY ABSTRACTS:—</b>		
Of sums Estimated and Voted .....	3	509
<b>EXTRADITION</b> (See "DESPATCHES").		
<b>F</b>		
<b>FARLEY ACCIDENT</b> (See "RAILWAYS").		
<b>FEDERATION</b> (See "AUSTRALASIAN FEDERATION").		
<b>FERRY:—</b>		
<b>MUEWILLUMBAH:</b>		
Motion made ( <i>Mr. Ewing</i> ) for papers in connection with, 435.		
<b>FEVER</b> (See "TYPHOID FEVER").		
<b>FINANCE</b> (See also "FISCAL POLICY OF THE GOVERNMENT—VOTE OF CENSURE"):—		
<b>BANK LIABILITIES AND ASSETS:—</b>		
For quarter ended 31st December, 1889, laid on Table, 17 .....	3	C37
Do 31st March, 1890, do 45 .....	3	639
Do 30th June, 1890, do 234 .....	3	641
Do 30th September, 1890 do 410 .....	3	643
<b>BANKING, LAND, BUILDING, AND INVESTMENT COMPANIES:—</b>		
For quarter ended 31st December, 1889, laid on Table, 17 .....	3	645
Do 31st March, 1890, laid on Table, 123 .....	3	647
Do 30th June, 1890, laid on Table, 280 .....	3	649
Do 30th September, 1890, laid on Table, 435 .....	3	651
<b>ESTIMATES:—</b>		
Message No. 59 ( <i>Mr. McMillan</i> ) recommending accompanying for 1891 and Supplementary for 1890 and Previous Years, 379 .....	3	189, 191, 455
Ways and Means for 1890, laid on Table, 382 .....	3	517
Schedule to, for 1891, showing moneys received by Public Officers during 1890, laid on Table, 342 .....	3	357
Schedule A to F, Public Works Department, including Schedules for Subordinate Roads, laid on Table, 465 .....	3	605
Message No. 79 ( <i>Mr. McMillan</i> ), recommending Additional for 1891, 531 .....	3	491, 493
Message No. 80 ( <i>Mr. McMillan</i> ), recommending Further Supplementary for 1890, 531.....	3	485, 487
Message No. 81 ( <i>Mr. McMillan</i> ), recommending Loan for 1891, 531 .....	3	499, 501
<b>GOVERNMENT MONIES IN VARIOUS BANKS:—</b>		
Return respecting, laid on Table, 410 .....	3	595
<b>GOVERNMENT RAILWAYS:—</b>		
Return showing Receipts on, for month of August, 1889, laid on Table, 107 .....	5	1,081
<b>GOVERNMENT SAVINGS BANK:—</b>		
Statement of Accounts for the year 1889, laid on Table, 18 .....	3	603
<b>INSCRIBED STOCK ACT OF 1883:—</b>		
Seventh Report of the Creation, Inscription, and Issue of Stock under, laid on Table, 17 .....	3	177
<b>LAND REVENUE:—</b>		
Motion made ( <i>Mr. Garvan</i> ) that the present system of treating, is unsound, and that a Bill should be introduced to apply a substantial portion for the redemption of Loans, and carrying out works which are usually carried out from Loan Funds, and negatived, 302-3.		
<b>OLD LOANS ACCOUNT:—</b>		
Minute of Auditor-General respecting credit balances, with remarks by Consulting Accountant and decision of the Colonial Treasurer, laid on Table, 207; further correspondence respecting, laid on Table, 231 .....	3	597
<b>RABBIT NUISANCE ACT:—</b>		
Return showing the Annual Expenditure at the present time under, laid on Table, 379 .....	5	325
Motion made ( <i>Mr. J. P. Abbott</i> ) for Return of Receipts and Expenditure under, 107; Return to Order, laid on Table, 379 .....	5	327
<b>RECEIPTS AND EXPENDITURE OF THE CONSOLIDATED REVENUE:—</b>		
Copy of Colonial Treasurer's Statement with Auditor-General's report, laid upon the Table by Mr. Speaker, 193 .....	3	1
<b>SUPPLY:—</b>		
Committee of, Sessional Order passed, 11.		
Motion made ( <i>Mr. McMillan</i> ) to enable House to go into Committee, 313.		
House in Committee, 325, 382, 466, 470, 476, 486, 490, 502, 511, 517 (2), 526, 542.		
Resolution reported, 325, 382, 542 (154).		
Resolution agreed to, 325, 382, 549 (154).		
<b>TRUST MONIES DEPOSIT ACCOUNT:—</b>		
From 1st April, 1889, to 31st March, 1890, laid on Table, 17 .....	3	601
<b>VOTE OF CREDIT:—</b>		
Message from the Governor, recommending, 306 .....	3	593

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>F</b>		
FINANCE ( <i>continued</i> ):—		
WAYS AND MEANS:—		
Committee of, Sessional Order passed, 11.		
Motion made ( <i>Mr. McMillan</i> ) to enable House to go into Committee, 313.		
House in Committee, 337, 382 ( <i>Financial Statement</i> ), 390, 430, 434, 440, 452, 549.		
Resolutions reported, 337, 453, 549 (?).		
Resolutions agreed to, 337, 453, 510 (?).		
EXPLANATORY ABSTRACT:—		
Of sums estimated and voted .....	3	509
FINCH, JAMES (See "LABOUR STRIKE").		
FIRE BRIGADES ACT OF 1884:—		
Report of the Metropolitan Board for 1883, laid on Table, 107 .....	3	653
Report of Wollongong Board, laid on Table, 207 .....	3	683
Report of Goulburn Board laid on Table, 32 .....	3	681
FIRE IN PITT-STREET:—		
Motion made ( <i>Mr. Lees</i> ) for copies of depositions taken at the Coronial inquiry on, 434; Return to Order laid on Table, 535 .....	8	583
FISCAL POLICY OF THE GOVERNMENT—VOTE OF CENSURE:—		
Motion made ( <i>Mr. Dibbs</i> ) condemning postponement of, and in favour of a Protective Policy.— <i>Disorder</i> , Mr. A. G. Taylor removed from the Chamber for refusing to obey the Chair, Mr. Speaker explained reasons for directing Mr. Taylor's removal, and motion made ( <i>Mr. Garvan</i> ) to disapprove of Mr. Speaker's action; amendment proposed ( <i>Mr. Willis</i> ) that Mr. Taylor be heard in his place, and negatived; Mr. Garvan's motion negatived.—Debate adjourned, 395-6-7. Debate resumed, amendment moved ( <i>Mr. Ewing</i> ) approving of the action of the Government, original motion negatived, and amendment carried, 400-1.		
FISHERIES:—		
Report of the Commissioners to 31st December, 1889, laid on Table, 107.....	7	1051
Petition from Fishermen and others for repeal of Fishing in Port Hacking Prohibition Act, 317 ...	7	1083
ADMINISTRATION OF ACT:—		
Motion made ( <i>Mr. Frank Farnell</i> ) for return in reference to, 480.		
NET FISHING:—		
Return respecting Tidal Waters closed against, laid on Table, 534.....	7	1081
FISHERIES AND OYSTER FISHERIES ACTS FURTHER AMENDMENT BILL:—		
Motion made ( <i>Mr. Frank Farnell</i> ) for leave to bring in, Bill presented and read 1 <sup>o</sup> , 13; Order of the Day postponed, 88, 317; motion made for 2 <sup>o</sup> , and debate adjourned, 317; Order of the Day postponed, 345, 355, 405, 423, 441, 524.		
FLOODS (See also "STOCK"):—		
BOURKE:—		
Report of Board of Inquiry into, laid on Table, 52 .....	8	241
HUNTER RIVER:—		
Report of Mr. George Gordon, C.E., respecting, laid on Table, 252; returned to Public Works Department, 541.....	8	245
GATE AT BROWN'S CREEK, LISMORE:—		
Motion made ( <i>Mr. Nicoll</i> ) for vote for, and withdrawn, 269.		
FORBES (See "RAILWAYS").		
FOREIGN JURISDICTION ACT, 1890:—		
Despatch respecting, laid on Table, 510 .....	3	817
FORESTS:—		
CONSERVANCY BRANCH:—		
Annual Report for 1889, laid on Table, 207 .....	5	333
FORMAL BUSINESS:—		
Sessional Order passed, 10.		
FRESHFORD (See "BRIDGES").		
FRUIT PROTECTION BILL:—		
Motion made ( <i>Mr. Nobbs</i> ) for leave to bring in, 469; presented and read 1 <sup>o</sup> , 511.		
FUGITIVE CRIMINALS:—		
Despatch respecting Extradition of, laid on Table, 17, 345.....	3	821, 829
Despatch respecting the Extradition of, between Her Majesty and Columbia, 17.....	3	821
Despatch respecting convention between Her Majesty and the United States of America, as to the Extradition of, laid on Table, 200 .....	3	827
FUGITIVE OFFENDERS:—		
Despatch respecting Procedure in Extradition Cases and cases under the Fugitive Offenders Act, 1881, laid on Table, 345.....	3	831
<b>G</b>		
GALONG (See "RAILWAYS").		
GAOLS:—		
DARLINGHURST:—		
Information respecting Committals to, of men belonging to the Imperial Navy, laid on Table, 87.	2	227
GARBAGE, DEPOSIT OF:—		
Report of the Board of Health on, in the Borough of Redfern, on a site for building purposes, laid on Table, 379 .....	2	503
GARRARD, JACOB, ESQ., M.P.:—		
Appointed Chairman of Committees for day only, 162.		
GARRETT, THOMAS, ESQ., M.P.:—		
Leave of absence granted to, 316.		
GARVAN, JAMES PATRICK, ESQ., M.P.:—		
Appointed Member of the Parliamentary Standing Committee on Public Works, 415.		
GAS (See "STOCKTON GAS AND ELECTRICITY BILL"; also "CITY OF NEWCASTLE GAS AND COKE COMPANY'S ELECTRIC AND OTHER LIGHT BILL").		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>G</b>			
<b>GENERAL BUSINESS :—</b>			
Precedence of, Sessional Order passed, 10.			
Precedence of Orders of the Day on Wednesdays and Thursdays, 253.			
Orders of the Day take precedence at 6 o'clock on Friday, 410, 419, 436, 457, 472, 498, 521.			
Precedence of at 2 o'clock until half-past 6, and Orders to take precedence of Motions, 536.			
Order of the Day intercepted by Government Business being called on at half-past 6 o'clock, 555.			
<b>GENERAL POST OFFICE :—</b>			
Album containing congratulatory cards from Post Offices in other parts of the world, laid on Table ( <i>as exhibit only</i> ), 82.			
<b>CONVEYANCE OF MAILS TO AND FROM GENERAL POST OFFICE, SYDNEY :—</b>			
Motion made ( <i>Mr. William Stephen</i> ) for Select Committee, 441-2; Report brought up, 553	7	529	
<b>GIBBS, CASE OF (See "ADMINISTRATION OF JUSTICE").</b>			
<b>GLASHEEN, P. J. (See "CHURCH AND SCHOOL LANDS").</b>			
<b>GLEBE ISLAND (See "BRIDGES").</b>			
<b>GLEN INNES (See "RAILWAYS"; also "CROWN LANDS").</b>			
<b>GOLD DISCOVERY :—</b>			
<b>CLAIM OF WILLIAM TOM, JAMES TOM, AND J. H. A. LISTER :—</b>			
Motion made ( <i>Mr. Dalton</i> ) for Select Committee to inquire into, 269; leave given to make visits and hold inquiries, 348; Report brought up, 540	4	1053	
Petition presented from Wm. Tom, for leave to appear before Select Committee, read by the Clerk, and prayer granted, 384	4	1087	
<b>GOLD LEASES (See "MINING").</b>			
<b>GORDON, MR. GEORGE, C.E. (See "HUNTER RIVER FLOODS").</b>			
<b>GORE ISLAND (See "BERRY ESTATE, NORTH SHORE").</b>			
<b>GOULBURN (See also "RAILWAYS"; also "ELECTORAL") :—</b>			
<b>FIRE BRIGADES BOARD :—</b>			
Fifth Annual Report, laid on Table, 32	3	681	
<b>GOULBURN TO CROOKWELL RAILWAY BILL :—</b>			
Message from Governor, 115; Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 137; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 159; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 170; read 3 <sup>o</sup> , passed, and sent to Council, 175	6	1339	
<b>GOULBURN WATER SUPPLY CHARGES BILL :—</b>			
Petition presented ( <i>Mr. Teece</i> ) for leave to bring in, 58; leave given, presented, and read 1 <sup>o</sup> , 62; referred to Select Committee, 69; Report brought up, 99; read 2 <sup>o</sup> ; committed; reported without amendment, Report adopted, 133; read 3 <sup>o</sup> , passed, and sent to Council, 141; returned without amendment, 200; Assent reported, 226	2	123	
<b>GOVERNMENT :—</b>			
<b>ADVERTISEMENTS IN "MAITLAND MERCURY" NEWSPAPER :—</b>			
Motion made ( <i>Mr. O'Sullivan</i> ) for return of, 371; Return to Order, laid on Table, 410	8	621	
<b>AND ITS BROKEN PLEDGES :—</b>			
Adjournment moved to bring forward subject of, and negatived, 253.			
<b>BUSINESS :—</b>			
Precedence of, Sessional Order passed, 10.			
Orders of the Day postponed in a bunch, 143, 266, 282, 314, 416, 512, 549.			
Postponed in a bunch, 400.			
Order of the Day intercepted by General Business being called on at 6 o'clock, 419.			
To take precedence on Additional Sitting Day, 469, 552.			
Takes precedence after half-past 6 o'clock, 555.			
<b>BUILDINGS RENTED BY :—</b>			
Return ( <i>in part</i> ), Department of Justice, laid on Table, 166	8	699	
Further Return ( <i>in part</i> ) respecting, Public Works Department, laid on Table, 188	8	701	
" " " Post and Telegraph Departments, laid on Table, 216	8	703	
" " " Department of Public Instruction, laid on Table, 216	8	705	
" " " Department of Lands, laid on Table, 231	8	707	
" " " Treasury Department and Attorney-General's Department, laid on Table, 245	8	709	
" " " Colonial Secretary's Department, laid on Table, 293	8	711	
<b>PRINTING OFFICE :—</b>			
Return respecting Compositors, laid on Table, 260	2	479	
Annual Return to Order ( <i>Session 1883-4</i> ), laid on Table, 151	8	607	
<b>GOODS SUPPLIED BY M'ARTHUR &amp; CO. :—</b>			
Return showing amount paid for, during present Administration, laid on Table, 504	8	735	
<b>LOANS TO TRADES AND LABOUR UNIONS :—</b>			
Motion made ( <i>Mr. Walker</i> ) for Committee of the Whole to bring in a Bill for, and negatived, 442-3.			
<b>MONEYS IN VARIOUS BANKS :—</b>			
Return respecting, laid on Table, 410	3	595	
<b>SAVINGS BANK :—</b>			
Statement of accounts for the year 1889, laid on Table, 18	3	603	
<b>GOVERNOR (See also "MESSAGES").</b>			
Messages from, 1; Opening Speech, 2; Address in Reply, 3, 14; answer to Address, 15.			
Instrument empowering the Lieutenant-Governor to act during the absence of, laid on Table, 166.			
<b>GRABHEN GULLEN (See "ROADS").</b>			
<b>GRAFTON (See "RAILWAYS").</b>			
<b>GRAFTON TO THE TWEED RAILWAY BILL (See also "LISMORE TO THE TWEED RAILWAY BILL") :—</b>			
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 142; Message from Lieutenant Governor, 153; Order of the Day postponed, 162; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 167	6	503	
<b>GRANTING OF PROBATE OF WILLS AND LETTERS OF ADMINISTRATION FACILITATION BILL :—</b>			
Motion made ( <i>Mr. Walker</i> ) for leave to bring in, presented and read 1 <sup>o</sup> , 26; Order of the Day postponed, 104, 132; read 2 <sup>o</sup> , committed, reported without amendment, and Report adopted, 258; read 3 <sup>o</sup> , passed, and sent to Council, 261.			
<b>GREAT WESTERN LINE (See "RAILWAYS").</b>			
<b>GULGONG (See "RAILWAYS").</b>			
<b>GUNNING (See "ROADS").</b>			
<b>GUYRA (See "RAILWAYS").</b>			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>H</b>		
HAM COMMON (See "COMMONS").		
HANMOND, MR. (See "CIVIL SERVICE").		
"HANSARD" STAFF :—		
Motion made ( <i>Mr. O'Sullivan</i> ) for copies of all applications for additional remuneration by, 515.		
HARBOURS (See also "ILLAWARRA HARBOUR AND LAND CORPORATION BILL") :—		
CONTRACT OF MR. WILLIAM WAKEFORD AT KIAMA :—		
Motion made ( <i>Mr. J. P. Abbott</i> ) for papers in reference to, 264; Return to Order, laid on Table (not printed), 343		
IMPROVEMENTS, CLARENCE RIVER :—		
Petition presented for Execution of Works and for Railway Construction, 25	5	1113
SOUTHERN BREAKWATER, NEWCASTLE :—		
Report of the Engineer-in-Chief respecting condition of, laid on Table, 234	7	171
SYDNEY, DREDGE AND PLANT :—		
Report, together with Minutes of Evidence, and Appendix from the Parliamentary Standing Committee on Public Works, laid on Table, 25	7	157
HARTLEY (See "ELECTORAL").		
HASTINGS AND MANNING, THE (See "ELECTORAL").		
HAWKERS ON RIVERS BILL :—		
Motion made ( <i>Mr. J. P. Abbott</i> ) for Committee of the Whole, 108; House in Committee, resolution reported, 133; Order of the Day postponed, 137, 152; Resolution agreed to, 341.		
HAWKESBURY RACECOURSE BILL :—		
Received from Legislative Council, and on motion ( <i>Mr. J. P. Abbott</i> ) read 1 <sup>o</sup> , 294; Order of the Day postponed, 307, 400; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 505; read 3 <sup>o</sup> , passed, and returned to Council, 503-9; assent reported, 554.		
HAWTHORNE, JOHN STUART, ESQ., M.P. :—		
Resignation of, as a Member for Balmain reported and seat declared vacant, 130; issue and return of Writ reported, sworn, 171.		
Name of, added to Select Committee on Mrs. Cunynghame, late Superintendent of Macquarie-street Asylum for Infirm and Destitute, Parramatta, 188.		
HAY AND DENILQUIN LAND BOARDS :—		
Return to Order, laid on Table 27 November, 1889, ordered to be printed, 257	4	81
HAY AND DENILQUIN TRAMWAY BILL :—		
Petition presented ( <i>Mr. R. B. Wilkinson</i> ) for leave to bring in, 232; leave given, 235.		
Petition presented ( <i>Mr. R. B. Wilkinson</i> ) for leave to bring in, 269; leave given, 316; presented and read 1 <sup>o</sup> , 316; referred to Select Committee, 321; Report brought up, 434; Motion made for 2 <sup>o</sup> and debate adjourned, 458; Order of the Day postponed, 501; Debate resumed, Amendment moved that Bill be read 2 <sup>o</sup> "this day six months"; debate interrupted by Government Business having precedence at 6 o'clock, 555.	2	129
HAY ATHENÆUM TRUSTEES ENABLING BILL :—		
Petition presented ( <i>Mr. Lakeman</i> ) for leave to bring in, 528; leave given, presented, and read 1 <sup>o</sup> , 534; referred to Select Committee, 540; Report brought up, 553	2	137
HEALTH (See "PUBLIC HEALTH").		
HIGH SCHOOLS (See "EDUCATION").		
HILLGROVE (See "MINING").		
HINTON (See "BRIDGES").		
HINTON PUNT :—		
Petition from certain persons for abolition of tolls on, 216	5	819
HIRED BOATS LICENSING BILL :—		
Motion made ( <i>Mr. Hawken</i> ) for leave to bring in, 26.		
HIRED BOATS LICENSING BILL (No. 2) :—		
Motion made ( <i>Mr. Hawken</i> ) for Committee of the Whole, 62; Order of the Day postponed, 79.		
HISTORY OF NEW SOUTH WALES :—		
Motion made ( <i>Mr. O'Sullivan</i> ) for copy of terms and conditions made with Mr. G. B. Barton in reference to, 380.		
Correspondence in connection with, showing terms and conditions of contract with Mr. G. B. Barton, laid on Table, 414	8	655
Return respecting, laid on Table, 504	8	685
Further correspondence, &c., laid on Table, 553	8	659
HOLIDAYS (See "BANK HOLIDAYS ACT AMENDMENT BILL"; also "BANK HOLIDAYS ACT AMENDMENT BILL (No. 2)").		
HOMES PRESERVATION BILL :—		
Motion made ( <i>Mr. Traill</i> ) for leave to bring in, 27.		
HORNSBY (See "RAILWAYS").		
HOSPITAL ELECTIONS BILL :—		
Motion made ( <i>Mr. Lee</i> ) for leave to bring in, presented and read 1 <sup>o</sup> , 216; Order of the Day postponed, 274, 341, 372, 422, 464; read 2 <sup>o</sup> , committed, reported with amendments, report adopted, 472; read 3 <sup>o</sup> , passed, and sent to Council, 479; returned with amendments, 516; Order of the Day postponed, 519; amendments agreed to, 550.		
HOSPITALS :—		
BUILDINGS, MACQUARIE-STREET :—		
Motion made ( <i>Sir Henry Parkes</i> ) to refer original plans and specification, and those on a reduced scale, to the Public Works Committee, and Amendment moved that Committee report forthwith, amendment and motion carried, 455-6.		
INSANE, UPON THE KENMORE ESTATE, NEAR GOULBURN :—		
Motion made ( <i>Mr. Bruce Smith</i> ) to rescind motion ( <i>Session 1889</i> ) to refer to Parliamentary Standing Committee on Public Works, 151.		
ORANGE :—		
Motion made ( <i>Mr. Walker</i> ) for papers in reference to inquiry into management of, 52; Return to Order laid on Table, 379	7	313
Petition presented from residents of town and district, for a Select Committee to inquire into Dr. Goode's charges, 178	7	331
Motion ( <i>Mr. Walker</i> ) for Select Committee being proceeded with, House counted out, 178.		
Motion made ( <i>Mr. Walker</i> ) for Select Committee to inquire into management of, 385; leave given to make visits of inspection to Orange Hospital, 392, 443; leave given to make Special Report, 552; Special Report brought up, 553	7	309

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>H</b>		
<b>HOSPITALS (continued) :—</b>		
<b>SYDNEY :—</b>		
Motion made ( <i>Sir Henry Parkes</i> ) to proceed with the completion of the building now partially erected in Macquarie-street, and amendment moved ( <i>Mr. Edmunds</i> ) that the grant to the Trustees be revoked, and that the land be reconveyed to the Crown for hospital purposes, and withdrawn, motion carried, 410-11.		
Particulars respecting Buildings, laid on Table, 485. ....	7	307
<b>SYDNEY AND PRINCE ALBERT :—</b>		
Return of Deaths under Chloroform at, since 1st January, 1885, laid on Table, 94.....	7	333
<b>HOUR OF MEETING ON BUSINESS DAYS :—</b>		
Sessional Order negatived, 359.		
<b>HULBERT, REV. DANIEL P. M. :—</b>		
Motion made ( <i>Mr. Burns</i> ) for Select Committee to inquire into claims of, 269.		
<b>HUNTER RIVER FLOODS :—</b>		
Report of Mr. George Gordon, C.E., respecting, laid on Table, 252; returned to Public Works Department, 541.....	8	245
<b>HUNTER'S HILL (See "MUNICIPALITIES OF RYDE AND HUNTER'S HILL BILL").</b>		
<b>HURLEY, JOHN, ESQ., M.P. :—</b>		
Resignation as Member for Hartley reported, Seat declared vacant, 157; issue and return of Writ reported, 213; sworn, 217.		
Name added to Select Committee on "Land, corner of Pitt and Bridge Streets," 231.		
Motion of censure on, 352.		
<b>HURSTVILLE (See "WATER SUPPLY").</b>		
<b>FREE PUBLIC LIBRARY :—</b>		
By-laws of, laid on Table, 534 .....	7	959
<b>I</b>		
<b>IOELY, MR. T. R. (See "LORD HOWE ISLAND").</b>		
<b>ILLAWARRA HARBOUR AND LAND CORPORATION BILL :—</b>		
Petition presented ( <i>Mr. Chapman</i> ) to proceed with, under the 65th Standing Order, presented, and read 1 <sup>o</sup> , 4; read 2 <sup>o</sup> , committed, 47; House in Committee, 195; Order of the Day postponed, 269, 302, 320, 334, 385, 405, 414; reported with amendments, Report adopted, 472; read 3 <sup>o</sup> , passed, and sent to Council, 483; returned with amendments, 535; amendments agreed to, 549.		
Petition presented from persons interested in coal, &c., to westward of harbour, in-favour of, 40...	2	143
Petition presented, Commissioners of Wollongong Harbour Trust, against, 152 .....	2	147
Petition presented from residents of Wollongong and Illawarra Electorate, against, 181 .....	2	149
Petition, inhabitants of Illawarra District, in favour of, 195 .....	2	145
<b>IMMIGRATION :—</b>		
Report for 1889, laid on Table, 32 .....	8	47
<b>IMPERIAL ENACTMENTS (See "DECLARATION OF IMPERIAL ENACTMENTS BILL").</b>		
<b>IMPERIAL NAVY :—</b>		
Amended replies to Questions respecting imprisonment of men, laid on Table, 299 .....	2	229
Information respecting Commitments to Darlinghurst Gaol of men belonging to, laid on Table, 87...	2	227
<b>IMPORT DUTIES (See "CUSTOMS").</b>		
<b>IMPORTED STOCK ACTS, 1871-1884 :—</b>		
Regulations under, laid on Table, 25, 260 .....	5	37, 39
<b>IMPRISONMENT FOR DEBT :—</b>		
Adjournment moved to consider abolition of, and cases of Ray and Chee Hoy, 76.		
<b>IMPRISONMENT FOR DEBT ABOLITION BILL :—</b>		
Motion made ( <i>Mr. Dibbs</i> ) for leave to bring in, presented, and read 1 <sup>o</sup> , 222; Motion made ( <i>Mr. Dibbs</i> ) for second reading— <i>Point of Order</i> , That Bill was beyond order of leave, as clause 2 would operate as retrospective legislation and interfere with judgments already obtained of which the order of leave contained no reference—Speaker ruled order of leave to be sufficiently comprehensive to cover the Bill, 227; motion for 2 <sup>o</sup> passed, Bill read 2 <sup>o</sup> , committed, reported with an amendment, 229; Order of the Day discharged and Bill withdrawn, 534.		
<b>IMPRISONMENT FOR DEBT AMENDMENT BILL (See also "DEBTOR'S BILL") :—</b>		
Motion made ( <i>Mr. Gould</i> ) for leave to bring in, 359; presented and read 1 <sup>o</sup> , 429; motion made for 2 <sup>o</sup> and Debate adjourned, 520.		
<b>INDUSTRIAL SCHOOL ACT OF 1866 :—</b>		
Regulations under, laid on Table, 174.....	7	1003
<b>INFLUENZA EPIDEMIC :—</b>		
Report of Chief Medical Inspector, for 1890, laid on Table, 534 .....	2	551
<b>INGLIS, JAMES, ESQUIRE, M.P. :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to appoint to Parliamentary Standing Committee on Public Works, and amendment, carried, to substitute name of William McCourt, Esq., 181-2.		
<b>INSANE (See also "HOSPITALS") :—</b>		
Report of the Inspector-General of, for 1889, laid on Table, 32 .....	7	217
<b>INSCRIBED STOCK ACT OF 1883 :—</b>		
Seventh Report on the Creation, Inscription, and Issue of Stock, laid on Table, 17 .....	3	177
<b>INSTRUMENT :—</b>		
Empowering the Lieutenant-Governor to act during absence of the Governor, laid on Table, 166...	8	731
<b>INTERNATIONAL EXHIBITION (See "CENTENNIAL INTERNATIONAL EXHIBITION").</b>		
<b>INTERRUPTION :—</b>		
To proceedings of the House, 217, 239, 395.		
<b>INVERELL (See "CROWN LANDS," also "RAILWAYS").</b>		
<b>IRRELEVANCE, OR TEDIOUS REPETITION :—</b>		
Member directed by Mr. Speaker to discontinue his speech on the ground of, 399, 407.		
<b>IRRIGATION (See "WENTWORTH IRRIGATION BILL"; also "CROWN LANDS").</b>		
"MULGOA IRRIGATION BILL"; also "SEGENHOE ESTATE IRRIGATION BILL."		
<b>ITALIAN SETTLEMENT, RICHMOND RIVER :—</b>		
Report by Director-General of Forests on, laid on Table, 404.....	5	59

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>J</b>			
JERRY'S PLAINS (See "BRIDGES").			
JODJA CREEK RAILWAY TRANSFER BILL.— Received from Legislative Council and read 1 <sup>o</sup> ( <i>Mr. Garrard</i> ), 415; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 457; read 3 <sup>o</sup> , passed, and returned to Council, 460; assent reported, 487.			
JUVENILE OFFENDERS BILL:— Motion made ( <i>Mr. Crick</i> ) for leave to bring in, 12.			
<b>K</b>			
KATOOMBA LIGHTING BILL.— Petition presented ( <i>Mr. Hurley</i> ) for leave to proceed with under the 65th Standing Order, presented and read 1 <sup>o</sup> , 32; Order of the Day postponed, 226, 414; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 472; read 3 <sup>o</sup> , passed, and sent to Council, 476; returned with amendments 535; amendments agreed to, 550.			
KENMORE ESTATE, NEAR GOULBURN (See "HOSPITALS").			
KIAMA (See "RAILWAYS"; also "HARBOURS").			
KIAMA TO NOWRA RAILWAY BILL:— Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 136; Message from Lieutenant-Governor, 153; House in Committee, resolution agreed to, Bill presented, and read 1 <sup>o</sup> , 155; Order of the Day postponed, 163; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 169; read 3 <sup>o</sup> , passed, and sent to Council, 174; returned without amendment, 235; assent reported, 239.			
		6	297
KRAMBACH (See "POSTAL").			
<b>L</b>			
LABOUR STRIKE:— Petition presented from James Finch, Chairman of the Labour Defence Committee, alleging that at a Meeting of Citizens of Sydney, attended by 32,000 persons, it was resolved to petition to be heard at the Bar of the House in reference to the great distress consequent thereon, read by the Clerk, 399			
		8	745
Petition presented from James Finch, Chairman of the Labour Defence Committee, as chairman of a public meeting of citizens of Sydney, submitting that trade organizations have a right to combine and affiliate, a right which has been assailed by a numerically small section of the community; that those whom the petition represents are in no way blamable for the serious consequences that have befallen the country through the attitude of the employers during the present great crisis; and praying that for these and other reasons in the Petition set forth the House will take the premises into favourable consideration and grant such redress as shall seem meet and proper, and read by the Clerk, 415.			
		8	747
Adjournment moved to call attention to the proposed labour, constitution, and general character of the Royal Commission appointed to inquire into the cause of Strikes and the Labour Question, 489.			
Report of the Inspector-General of Police on occurrences coming specially under the notice of the Police during, laid on Table, 502			
		7	627
LAKE ALBERT:— Motion made ( <i>Mr. Gormly</i> ) for Conservation of Water in, and negatived, 88.			
LAMB, ALFRED, ESQUIRE:— Motion made ( <i>Sir Henry Parkes</i> ) to place on record the sense of the House of its loss at the death of the Hon. Member for West Sydney, 373. Death of the Honorable Member for West Sydney reported, seat declared vacant, 375.			
LAMROCK, ROBERT (See "CROWN LANDS").			
LAND BOARDS (See "CROWN LANDS").			
LAND COMPANY OF AUSTRALASIA BILL:— Received from Legislative Council, and on motion ( <i>Mr. Garrard</i> ) read 1 <sup>o</sup> , 493; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 553.			
LAND CORNER OF PITT AND BRIDGE STREETS:— Motion made ( <i>Mr. Hurley</i> ) for Select Committee to inquire into, 62; and Debate adjourned, 63; Debate resumed and Motion passed, 133; <i>Mr. Hurley</i> appointed a member of the Committee, 231; Progress Report of Session 1887-8 referred to Committee, 246.			
LAND COURT (See also "CROWN LANDS"):— Rules and regulations, laid on Table, 32, 138			
		4	207, 217
LANDHOLDERS (See "BYRON BAY").			
LAND REVENUE (See "FINANCE").			
LANDS FOR PUBLIC PURPOSES ACQUISITION ACT:— NOTIFICATION OF RESUMPTION UNDER, LAID ON TABLE:— Public School Purposes, 17, 79, 129, 174(?), 324			
		7	{ 1025, 1029, 1031, 1033, 1037, 1039
		7	189
		5	455, 457
		7	187
		8	693
		5	453
		5	487, 489, 491
		4	785
		5	817
		3	855
		4	783
		8	687
		7	Wharf Accommodation for traffic between Sydney and Balmain, 18
		5	North Shore Water Supply, 18 (?)
		7	Additional Wharf Accommodation, Woolloomooloo Bay, 18
		8	Buildings for Public Offices, Phillip-street, Sydney, 18
		5	Manly Water Supply, 18
		5	Sewerage of the Western Suburbs, 18, 226, 358
		4	Public Recreation, Balmain, 18
		5	Bridge over Bishop's Creek, Field of Mars, 18
		3	Court-house, Glebe, 18
		4	Public Park at Clarence Town, 18
		8	General Cemetery at Bowral, 18

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. 1—14TH PARLIAMENT—SESSION 1890.	PAGES.
	VOL. PAGE.
<b>L</b>	
<b>LANDS FOR PUBLIC PURPOSES ACQUISITION ACT</b> <i>continued</i> :—	
<b>NOTIFICATION OF RESUMPTION UNDER, LAID ON TABLE</b> <i>(continued)</i> :—	
Public Cemetery at South Head, 32.....	8 689
Water Supply for Town of Richmond, 32.....	5 459
Wharf Accommodation at Woodville, Paterson River, 32.....	7 191
Tarreganda Bridge Approach, 129.....	5 557
Court-house at Redfern, 273.....	3 857
Public Offices, Sydney, 273.....	8 695
Water Supply, Sydney, 273.....	5 461
Sewerage of the City of Sydney and Suburbs, 390.....	5 493
Enlargement of the Post Office, West Maitland, 390.....	7 607
Conservation of Water, Paterson, 390.....	5 463
Wharf accommodation, Oxley Island, Manning River, 390.....	7 193
Post and Telegraph Office at Picton, 410.....	7 609
General Cemetery at Teralba, 534.....	8 691
<b>LAND LAW</b> (See "CROWN LANDS").	
<b>LAW OF EVIDENCE AMENDMENT BILL</b> :—	
Motion made ( <i>Mr. Crick</i> ) for leave to bring in, presented and read 1 <sup>o</sup> , 19; Order of the Day postponed, 52; read 2 <sup>o</sup> , committed, 227; Order of the Day postponed, 353, 395.	
<b>LAW REFORM</b> :—	
Motion made ( <i>Mr. Reid</i> ) in reference to Legal Procedure and urging on the Government the necessity of inquiry with a view to, 479.	
<b>LAW VACATIONS ABOLITION BILL</b> :—	
Motion made ( <i>Mr. Walker</i> ) for leave to bring in, presented and read 1 <sup>o</sup> , 26; Order of the Day postponed, 104; Motion made for 2 <sup>o</sup> , and negatived, Order discharged and Bill withdrawn, 133.	
<b>LEAVE OF ABSENCE</b> :—	
To Members of the Legislative Assembly, 18, 83, 316, 332.	
<b>LEGAL PRACTITIONERS BILL</b> :—	
Motion made ( <i>Mr. Crick</i> ) for leave to bring in, presented and read 1 <sup>o</sup> , 19; Order of the Day postponed, 52, 226, 353, 395.	
<b>LEGISLATIVE COUNCIL QUORUM</b> (See "CONSTITUTION ACT AMENDMENT (LEGISLATIVE COUNCIL QUORUM) BILL").	
<b>LEGISLATIVE COUNCIL</b> :—	
Memorandum by Clerk of the Parliaments and President's minute thereon in reference to increases to salaries of officers, laid on Table, 50.....	2 487
<b>LEPERVANCHE, DR. C.</b> (See "CIVIL SERVICE").	
<b>LEPROSY</b> :—	
Report on, in Australasian Colonies, laid on Table, 32.....	2 527
<b>LEPROSY BILL</b> :—	
Motion made ( <i>Mr. McMillan</i> ) for Committee of the Whole, 295; Message from the Governor, 306; House in Committee, Resolution agreed to, 314; Bill presented and read 1 <sup>o</sup> , 324; read 2 <sup>o</sup> , committed, reported with an amendment, report adopted, 300; read 3 <sup>o</sup> , passed and sent to Council, 367; returned with amendments, 390; amendments agreed to, Message to Council, 430; assent reported, 467.....	2 531
<b>LETTERS OF ADMINISTRATION</b> (See "GRANTING OF PROBATE OF WILLS AND LETTERS OF ADMINISTRATION FACILITATION BILL").	
<b>LEVEL CROSSINGS ON RAILWAYS BILL</b> :—	
Motion made ( <i>Mr. McMillan</i> ) for Committee of the Whole, 174; Message from Governor, 180; House in Committee, resolution agreed to, Bill presented, and read 1 <sup>o</sup> , 203; Order of the Day postponed, 295; read 2 <sup>o</sup> , committed, reported without amendment, Report adopted, 457; recommitted, 556.....	5 1107
Motion made ( <i>Mr. McMillan</i> ) for third reading, and Debate adjourned, 466; debate resumed, and it being 6 o'clock General Business takes precedence, 472.	
<b>LIABILITIES OF SURETIES</b> (See "BONDSMEN AND SURETIES LIABILITIES BILL").	
<b>LIBRARY COMMITTEE</b> :—	
Sessional Order passed, 11.	
<b>LICENSING</b> (See also "HIRED BOATS LICENSING BILL;" also "HIRED BOATS LICENSING BILL NO. 2;" also "PUBLICANS LICENSES FURTHER RESTRICTION BILL").	
<b>MR. MANNING, CHAIRMAN OF BENCH AT RYDE</b> :—	
Motion made ( <i>Mr. Crick</i> ) for Select Committee to inquire into charges made against, by Mr. O'Maley, and papers referred to Committee, 13; report brought up, 369; motion ( <i>Mr. Crick</i> ) for adoption of Report being proceeded with, House counted out, 530.....	3 871
Petition presented from, to be heard before the Select Committee into charges against, and prayer granted, 24.....	3 927
<b>LIQUOR TRAFFIC</b> :—	
Petitions presented in favour of Local Option without compensation from,—	
Mass Meeting of Citizens of Sydney, held in Domain, 124.....	3 951
Citizens of Sydney, 147.....	3 953
Public Meeting of Residents of St. Peters, 208.....	3 955
Public Meeting of Citizens of Sydney, 217.....	3 957
Public Meeting, Summerhill, 226.....	3 961
General Havelock Tent, Independent Order of Rechabites, at Auburn, 226.....	3 959
Australasian Wesleyan Methodist Conference, 252.....	3 968
Public Meeting, Citizens of Sydney, 257.....	3 967
Public Meeting, convened by the Women's Christian Temperance Union, 261.....	3 965
Meeting of Residents of Newtown and Eamore, 293.....	3 973
Meeting, Borough of Granville, 329.....	3 979
Public Meeting Orange, 332.....	3 981
Public Meeting, Ryde, 345.....	3 983
Public Meeting, Castle Hill, 345.....	3 983
Public Meeting of the Citizens and Residents of Marrickville, 348.....	3 983
Public Meeting, Citizens of Sydney, 358.....	3 935
Public Meeting of the Residents of Woolloomooloo, and against employment of Barmaids, 405.....	3 987
Bishop of Sydney, and Primate of Australia and Tasmania, submitting a Resolution of the Synod, 441.....	3 989
Public Meeting of Residents of South Sydney, and against the employment of Barmaids, 466.....	3 991

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>L</b>		
<b>LICENSING (continued):—</b>		
<b>LIQUOR TRAFFIC (continued):—</b>		
Petitions presented against extension of principle of Local Option.—		
Public Meeting at New Masonic Hall, Sydney, 269 .....	3	969
Public Meeting at Balmain, 272 .....		
Public Meeting at the Town Hall, Sydney, 280 .....		
Public Meeting at the Town Hall, Rodfern, 281 .....		
Public Meeting, Protestant Hall, Sydney, 286 .....	3	971
Petitions presented against extending the present hours, extending the Sunday traffic, reducing the duty on spirits, and in favour of the retention of the restrictions as to refreshments to travellers, from—		
Superintendent and Teachers of the Wesleyan Sabbath School, Parramatta, 307 .....	3	975
James J. Jennings, Minister of St. Andrew's Presbyterian Church, Parramatta, 307 .....		
President and Officers of "Olive Branch" Lodge, I.O.G.T., Fairfield, 307 .....		
The Clergy, Churchwardens, Superintendent of the Sunday School, Teachers, and Members of the Church of England Mission Church of Prospect, 307 .....		
The President and Officers of the Members of the "Riverview" Lodge, I.O.G.T., Ermington, 307 .....		
The President and Officers of the "Star of the East" Lodge, I.O.G.T., Carlingford, 307 .....		
The President and Officers of the "Prince Alfred Division" of the Sons of Temperance, Granville, 307 .....		
The Superintendent and Teachers of the Wesleyan Factory-street Mission Sabbath School, Parramatta, 307 .....		
The President and Officers of the Baptist "Band of Hope," Parramatta, 307 .....		
The President and Officers of the "Women's Christian Temperance Union," Parramatta, 307 .....		
The Superintendent and Teachers of St. Andrew's Presbyterian Sabbath School, Parramatta, 307 .....		
The President and Office-bearers of the Wesleyan Factory-street Mission, Parramatta, 307 .....		
The President and Officers of the "Universal" Lodge, I.O.G.T., Castle Hill, 307 .....		
The President and Officers of the "Light on the Hill" Lodge, I.O.G.T., Bankstown, 307 .....		
The Officiating Minister and Office-bearers of the Baptist Church, Parramatta, 313 .....		
The President and Officers of the "Happy Thought" Lodge, I.O.G.T., Parramatta South, 313 .....		
The President and Secretary of the "Carrington Tent" Independent Order of Rechabites at Parramatta, 313 .....		
The President and Officers of the "Home of Peace" Lodge, I.O.G.T., Granville, 313 .....		
The President and Officers of the "Mutual" Lodge, I.O.G.T., Seven Hills, 313 .....		
The President and Officers of the "Sunshine" Lodge, I.O.G.T., Bankham Hills, 313 .....		
The President and Officers of the "Church of England Temperance Society" at Castle Hill, 313 .....		
The Officiating Minister and Office-bearers of the Church of England, Rookwood, 313 .....		
The President of St. John's Church of England Temperance Society at Parramatta, 313 .....		
The Officiating Minister and Office-bearers of the Congregational Church, Granville, 313 .....		
The President and Officers of the "Orange Blossom" Lodge, I.O.G.T., Pennant Hills, 316 .....		
The President and Officers of the "Light of Dural" Lodge, I.O.G.T., Dural, 316 .....		
The Officiating Minister and Office-bearers of the Congregational Church, Rookwood, 316 .....		
The President and Officers of the "Sherwood Rangers" Lodge, I.O.G.T., Goughtown, 316 .....		
The President and Officers of the Wesleyan "Band of Hope," at Castle Hill, 316 .....		
The Minister and Office-bearers of the Primitive Methodist Church of Granville, 316 .....		
The President and Officers of the "Hope of Auburn" Lodge, I.O.G.T., Auburn, 316 .....		
The Captain of the Salvation Army, Parramatta, 316 .....		
The Superintendent and Teachers of the Wesleyan Centenary Sabbath School, Parramatta, 316 .....		
<b>SPIRITS, WINKS, AND BEER—CONVICTIONS UNDER ACT:—</b>		
Annual Return to Order, laid on Table, 32, 174 .....	3	935, 939
<b>CRIMINAL LAW AMENDMENT ACT, 1883:—</b>		
Regulations under, laid on Table, 231, 348 .....	3	801, 803
<b>ADMINISTRATION OF LAW AT BATHURST:—</b>		
Motion made ( <i>Mr. Paul</i> ) for papers in reference to, 231, 269; Return to Order, laid on Table, 273 .....	3	929
<b>LICENSING ACT AMENDMENT BILL:—</b>		
Motion made ( <i>Mr. Greer</i> ) for Committee of the Whole, 226; Order of the Day postponed, 287; House in Committee, resolution reported and agreed to, Bill presented and read 1 <sup>o</sup> , 317; Order of the Day postponed, 410, 436, 464, 472, 501.		
Petition presented from J. Straughen, as Chairman of Baptist Union, New South Wales, against more than one bar in houses licensed to sell liquor, and against female labour, and in favour of Bill, 332 .....	3	945
Petition from certain Mothers and Daughters residing at Teralba, Greta, and Minmi in favour of, 345 .....	3	947
Petition of Caleb Gambling, as Chairman of a Public Meeting of Residents of Castle Hill, against Private Bars and the employment of females in public-houses, and in favour of the Bill, 345 .....	3	947
Petition from certain Members of the Committee appointed by the Congregational Union of New South Wales against Private Bars and the employment of females in public-houses, and in favour of the Bill, 371 .....	3	371
<b>LIENS ON WOOL BILL:—</b>		
Motion made ( <i>Mr. J. P. Abbott</i> ) for leave to bring in, 52.		
<b>LIEUTENANT-GOVERNOR (See also "MESSAGES").</b>		
Instrument empowering, to act during absence of Governor, laid on Table, 166 .....	8	731
<b>LIMITATION OF BUSINESS HOURS —</b>		
Sessional Order passed, 40.		
Motion made ( <i>Mr. Morton</i> ) to rescind Sessional Order and amendment moved ( <i>Mr. Dibbs</i> ) to apply only to Tuesdays;—Speaker called attention to continued irrelevance or tedious repetition on the part of Mr. Willis, 334; motion that Member be further heard negatived,—motion for adjournment of Debate moved,—Speaker called attention to continued irrelevance and tedious repetition on the part of Mr. Schey, motion that Member be further heard negatived,—motion for adjournment of Debate negatived, 335; amendment negatived, original question carried, 336.		
<b>LINWOOD COLLIERY:—</b>		
Motion made ( <i>Mr. Burns</i> ) for Reports on subsidence at, 52; Return to Order, laid on Table, 72 .....	4	1107

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>L</b>			
<b>LIQUOR TRAFFIC (See also "LICENSING ACT AMENDMENT BILL") :—</b>			
<b>LOCAL OPTION :—</b>			
Petitions presented in favour of, without compensation—			
From Mass Meeting of Citizens of Sydney, held in the Domain, 124 .....			951
From Citizens of Sydney, 147 .....			953
From C. Willings, Chairman of Meeting of Residents of St. Peters, 208 .....			955
From J. Garrard, Chairman of Public Meeting of Citizens of Sydney, 217 .....			957
From Robert R. Jack, Chairman of a Public Meeting, Summerhill, 226 .....			961
From General Havoclock Tent, Independent Order of Rechabites, at Auburn, 226 .....			959
From Australasian Wesleyan Methodist Conference, 252 .....			963
From Public Meeting, Citizens of Sydney, 257 .....			967
From Public Meeting, convened by the Women's Christian Temperance Union, 261 .....			965
From Charles J. Lane, as Chairman of a Meeting of Residents of Newtown and Enmore, 293 .....			973
From Robert Alexander Withers, 329 .....			979
From James Cox, as Chairman of a Public Meeting at Orange, 332 .....			981
From Public Meeting, Residents of Ryde, 345 .....			983
From Public Meeting, Residents of Castle Hill, 345 .....			983
From Public Meeting, Citizens and Residents of Marrickville, 348 .....			983
From Public Meeting, Citizens of Sydney, 358 .....			985
From Public Meeting of the Residents of Woolloomooloo, and against the employment of Barmaids, 405 .....			987
From Bishop of Sydney and Primate of Australia and Tasmania, submitting a Resolution of the Synod, 441 .....			959
From Public Meeting of the Residents of South Sydney, and against the employment of Barmaids, 467 .....			991
Petitions presented against extension of principle of—			
From Public Meeting at New Masonic Hall, Sydney, 269 .....			969
From Public Meeting at Balmain, 272 .....			969
From Public Meeting at the Town Hall, Sydney, 280 .....			969
From Public Meeting at the Town Hall, Redfern, 281 .....			969
From Frederick Albert Allen, Chairman of a Public Meeting at the Protestant Hall, Sydney, 286 .....			971
<b>PETITIONS PRESENTED against extending the present hours, extending the Sunday traffic, reducing the duty on spirits, and in favour of the retention of the restrictions as to refreshments to travellers from,--</b>			
Superintendent and Teachers of the Wesleyan Sabbath School, Parramatta, 307 .....			
James J. Jennings, Minister of St. Andrew's Presbyterian Church, Parramatta, 307 .....			
President and Officers of the "Olive Branch" Lodge, I.O.G.T., Fairfield, 307 .....			
The Clergy, Churchwardens, Superintendent of the Sunday School, Teachers, and Members of the Church of England Mission Church of Prospect, 307 .....	8		
The President and Officers of the Members of the "Riverview" Lodge, I.O.G.T., Ermington, 307 .....			
The President and Officers of the "Star of the East" Lodge, I.O.G.T., Carlingsford, 307 .....			
The President and Officers of the "Prince Alfred Division" of the Sons of Temperance, Granville, 307 .....			
The Superintendent and Teachers of the Wesleyan Factory-street Mission Sabbath School, Parramatta, 307 .....			975
The President and Officers of the Baptist "Band of Hope," Parramatta, 307 .....			
The President and Officers of the "Women's Christian Temperance Union," Parramatta, 307 .....			
The Superintendent and Teachers of St. Andrew's Presbyterian Sabbath School, Parramatta, 307 .....			
The President and Office-bearers of the Wesleyan Factory-street Mission, Parramatta, 307 .....			
The President and Officers of the "Universal" Lodge, I.O.G.T., Castle Hill, 307 .....			
The President and Officers of the "Light on the Hill" Lodge, I.O.G.T., Bankstown, 307 .....			
The Officiating Minister and Office-bearers of the Baptist Church, Parramatta, 313 .....			
The President and Officers of the "Happy Thought" Lodge, I.O.G.T., Parramatta South, 313 .....			
The President and Secretary of the "Carrington Tent," Independent Order of Rechabites, at Parramatta, 313 .....			
The President and Officers of the "Home of Peace" Lodge, I.O.G.T., Granville, 313 .....			
The President and Officers of the "Mutual" Lodge, I.O.G.T., Seven Hills, 313 .....			
The President and Officers of the "Sunshine" Lodge, I.O.G.T., Baulkham Hills, 313 .....			
The President and Officers of the "Church of England Temperance Society" at Castle Hill, 313 .....			976
The Officiating Minister and Office-bearers of the Church of England, Rookwood, 313 .....			
The President of St. John's Church of England Temperance Society at Parramatta, 313 .....			
The Officiating Minister and Office-bearers of the Congregational Church, Granville, 313 .....			
The President and Officers of the "Orange Blossom" Lodge, I.O.G.T., Pennant Hills, 316 .....			
The President and Officers of the "Light of Dural" Lodge, I.O.G.T., Dural, 316 .....			
The Officiating Minister and Office-bearers of the Congregational Church, Rookwood, 316 .....			
The President and Officers of the "Sherwood Rangers" Lodge, I.O.G.T., Goughtown, 316 .....			
The President and Officers of the Wesleyan "Band of Hope" at Castle Hill, 316 .....			
The Minister and Office-bearers of the Primitive Methodist Church of Granville, 316 .....			977
The President and Officers of the "Hope of Auburn" Lodge, I.O.G.T., Auburn, 316 .....			
The Captain of the Salvation Army, Parramatta, 316 .....			
The Superintendent and Teachers of the Wesleyan Centenary Sabbath School, Parramatta, 316 .....			
<b>BAR IN PARLIAMENTARY REFRESHMENT ROOM :—</b>			
Petition from N.S.W. Local Option League for abolition of, and to prohibit sale of intoxicants in, and motion to receive Petition negatived, 469.			
<b>LISMORE (See "RAILWAYS"; also "MOLESWORTH-STREET, LISMORE"; "COUNTRY TOWNS WATER AND SEWERAGE ACT OF 1890").</b>			
<b>LISMORE TO THE TWEED RAILWAY BILL [Heretofore GRAFTON TO THE TWEED RAILWAY BILL].</b>			
Motion made ( <i>Mr. Bruce Smith</i> ), to read 2 <sup>o</sup> , read 2 <sup>o</sup> , committed, reported with amendments, report adopted, 183; read 3 <sup>o</sup> , passed, and sent to Council, 191; returned without amendments, 310; assent reported, 327.			
<b>LISTER, J. H. A. (See "GOLD DISCOVERY").</b>			
<b>LITIGATION (See "REDUCTION OF COST OF LITIGATION BILL").</b>			
<b>LIVERPOOL :—</b>			
<b>WATER DISTRICT :—</b>			
Proclamation defining boundaries of, laid on Table, 45 .....	5		427

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>L</b>		
<b>LOAN BILL:—</b>		
Standing Orders suspended, 540; Ordered ( <i>Sir Henry Parkes</i> ), founded on Resolution of Ways and Means, No. 6, presented and read 1°, 2°, Committee report without amendment, report adopted, 549; read 3°, passed, and sent to Council, 555; returned without amendment, 556; Speaker authorised to present to Governor for assent, 558.		
<b>LOAN ESTIMATES</b> (See "FINANCE").		
<b>LOANS ACCOUNT</b> (See "FINANCE").		
<b>LOCAL GOVERNMENT</b> (See "DISTRICT GOVERNMENT BILL").		
<b>LOCAL OPTION</b> (See "LICENSING").		
<b>LOCKING</b> (See "DARLING RIVER").		
<b>LOCOMOTIVES</b> (See "RAILWAYS").		
<b>LONG COVE:—</b>		
Notification of resumption of land under the Public Works Act, for reclamation of certain low-lying mud flats in vicinity of, laid on Table, 358 .....	4	787
<b>LORD HOWE ISLAND:—</b>		
Motion made ( <i>Mr. Traill</i> ) for copies of complaints against Mr. T. R. Icely, Visiting Magistrate to Lord Howe Island, 380; Return to Order, laid on Table, 471 .....	3	718
<b>LUCKNOW</b> (See "ROADS").		
<b>LYNE, WILLIAM JOHN, ESQ.:—</b>		
Speaker's Warrant appointing, as member of the Elections and Qualifications Committee, laid on Table, 391, maturity reported, 411; Mr. Lyne sworn, 414.		
<b>M</b>		
<b>MACLEAN</b> (See "ROADS.")		
<b>MACLEAY AND BELLINGER DISTRICTS:—</b>		
Information respecting growth of cedars in, laid on Table, 324 .....	5	361
<b>MACLEAY RIVER DISTRICT:—</b>		
Reports, letters, &c., respecting the question of draining Swamps in, laid on Table (not printed), 392		
<b>MAGISTRATES</b> (See "METROPOLITAN MAGISTRATES ACT, 1881").		
<b>MAHER, JAMES</b> (See "CROWN LANDS").		
<b>MAIL SERVICE</b> (See "POSTAL").		
<b>MAINTENANCE OF PRISONERS:—</b>		
Return showing cost to the State, laid on Table, 380 .....	7	649
<b>MAITLAND CATTLE-DRIVING ACT AMENDMENT ACT</b> (See "BY-LAWS").		
<b>MAITLAND MERCURY NEWSPAPER:—</b>		
Motion made ( <i>Mr. O'Sullivan</i> ) for return respecting Government Advertisements, 371; Return to Order, laid on Table, 410 .....	8	621
<b>MANLY</b> ("See "WATER SUPPLY").		
<b>MANNING, MR.:—</b>		
<b>CHAIRMAN OF LICENSING BENCH, RYDE:—</b>		
Motion made ( <i>Mr. Crick</i> ) for Select Committee to inquire into charges made against, by Mr O'Maley, and papers referred to Committee, 13; Report brought up, 369; Motion ( <i>Mr. Crick</i> ) for adoption of Report being proceeded with, House counted out, 530 .....	3	871
Petition presented from, for leave to appear before Select Committee inquiring into charges against, and prayer granted, 24 .....	3	927
<b>MARRICKVILLE</b> (See "RAILWAYS").		
<b>MARRICKVILLE TO BURWOOD ROAD RAILWAY BILL:—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 142; Message from Lieutenant-Governor, 153; Order of the Day postponed, 162; House in Committee, resolution reported, 167, agreed to, Bill presented, and read 1°, 175; read 2°, committed, reported without amendment, and Report adopted, 183; read 3°, passed, and sent to Council, 190, returned with amendments, Motion made that Bill be laid aside and negatived, 348-9; Order of Day read for consideration of Council's amendments, and attention called to the nature of the amendments, 359; Bill laid aside, 360.	6	603
<b>MARRICKVILLE TO BURWOOD ROAD RAILWAY BILL (No. 2):—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 411; Message from Lieutenant-Governor, 416; House in Committee, resolution reported, 429; agreed to, Bill presented and read 1°, 434; Motion made ( <i>Mr. Bruce Smith</i> ) for second reading; Point of Order that provision in Bill was not covered by order of leave, ruled against; read 2°, committed, reported without amendment, Report adopted, 511; read 3°, passed, and sent to Council, 516-7; returned without amendment, 540.	6	605
<b>MARRIED WOMEN'S PROPERTY BILL:—</b>		
Received from Legislative Council, and on motion ( <i>Mr. Frank Farnell</i> ) read 1°, 423; Order of the Day postponed, 505.		
<b>M'ARTHUR &amp; CO.:—</b>		
Return showing the amount of money paid to, for goods supplied to the Government during present Administration; laid on Table, 504. ....	8	735
<b>MCCOURT, WILLIAM, ESQUIRE:—</b>		
Appointed member of the Parliamentary Standing Committee on Public Works, 182.		
<b>MILVEEN AND CLIFT</b> (See "CROWN LANDS").		
<b>M'INNES, JOHN</b> (See "CROWN LANDS").		
<b>MEADOW BANK</b> (See "RAILWAYS").		
<b>MEDICAL BILL:—</b>		
Received from Legislative Council, and on motion ( <i>Mr. Frank Farnell</i> ) read 1°, 516.		
<b>MEETING OF THE HOUSE:—</b>		
Sessional Order passed, 10.		
Hour of, Sessional Order negatived, 359.		
<b>MELVILLE, NINIAN, ESQ., M.P.:—</b>		
Elected Chairman of Committees, 10.		
Commission to, as Deputy Speaker, to administer Oath of Allegiance, 21.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>M</b>			
<b>MEMBERS :—</b>			
Sworn, 1 <sup>(2)</sup> , 171, 217, 239, 257, 395, 505.			
Leave of absence granted to, 18, 83, 316, 332.			
Of Elections and Qualifications Committee, sworn, 35 <sup>(2)</sup> , 68 <sup>(3)</sup> , 73, 116, 414.			
Death of, reported, 161, 223, 375.			
Motion made expressing regret at Death of, 373.			
Name added to Select Committee, 198, 231.			
Vote of, challenged, 236.			
Makes personal explanation, 327, 399.			
Motion made that Members be further heard, 335 <sup>(2)</sup> .			
Speaker calls attention to continued irrelevance or tedious repetition on part of, and directs Member to discontinue his Speech, 334, 335, 399, 407.			
Censured by the House, 352.			
Removed from Chamber by direction of Mr. Speaker, 395, 430.			
Adjudged guilty of disorder, and expelled from the House, 430-1.			
Leave given to, to be examined before Select Committee of Council, 485.			
Swearing in of, not to interrupt business, 505.			
Attendance of, in Divisions and Counts-out .....	1		567
<b>MERCHANT SHIPPING ACTS :—</b>			
Despatch respecting, laid on Table, 410 .....	7		195
<b>MESSAGES :—</b>			
<b>TRANSMISSION OF, BETWEEN THE TWO HOUSES :—</b>			
Sessional Order passed, 11.			
<b>FROM THE GOVERNOR :—</b>			
Delivered by Usher of Black Rod, 2.			
1. Assent to Vine Diseases Acts Continuation Bill, 2.			
2. Do Redhead Coal-mine Railway Act Amending Bill, 2.			
3. Do Appropriation Bill, 2.			
4. District Government Bill, 49 .....	8		581
5. Coal-mines Regulation Bill, 49 .....	4		1111
6. Probate Bill, 68 .....	3		863
7. Crown Rents Bill, 77 .....	4		627
8. Goulburn to Crookwell Railway Bill, 115 .....	6		1339
9. Culcairn to Corowa Railway Bill, 115 .....	6		1341
10. Entrance to Richmond River Improvements Bill, 115 .....	7		155
<b>FROM THE LIEUTENANT-GOVERNOR :—</b>			
11. Nyngan to Cobar Railway Bill, 153 .....	6		203
12. Kiama to Nowra Railway Bill, 153 .....	6		237
13. Byron Bay Breakwater Bill, 153 .....	7		59
14. Grafton to The Tweed Railway Bill, 153 .....	6		503
15. Murrumbidgee to Burwood Road Railway Bill, 153 .....	6		603
16. Molong to Parkes and Forbes Railway Bill, 153 .....	6		857
17. Cootamundra to Temora Railway Bill, 154 .....	6		953
18. Entrance to Clarence River Improvements Bill, 154 .....	7		155
19. Board of Water Supply and Sewerage Offices Erection Bill, 154 .....	5		469
20. Western Suburbs (City of Sydney) Sewerage Scheme Reticulation and Completion Bill, 154 .....	5		511
21. Cowra Bridge Bill, 154 .....	5		815
68. Assent to Joadja Creek Railway Transfer Bill, 487.			
69. Do Berry Municipal District Naming Bill, 487.			
70. Newcastle Sand-drift Reclamation Amendment Bill, 497 .....	4		795
71. Vine Diseases Acts Further Continuation Bill, 498 .....	5		63
72. Assent to Blayney Municipal Council Enabling Bill, 510.			
73. Do Circular Quay Land Bill, 510.			
74. Metropolitan Street Improvements Bill, 515 .....	2		875
75. Water Conservation Bill, 515 .....	5		467
76. Assent to Tumut School of Arts Site Sale Bill, 527.			
77. Do Probate Bill, 527.			
78. Do Vine Diseases Acts Further Continuation Bill, 527.			
79. Additional Estimates for 1891, 531 .....	3		491
80. Further Supplementary Estimates for 1890, 531 .....	3		485
81. Loan Estimates for 1891, 531 .....	3		499
82. Assent to Broken Hill Water Supply Bill, 531.			
83. Do Mulgoa Irrigation Bill, 534.			
84. Do Hawkesbury Racecourse Bill, 534.			
<b>FROM THE GOVERNOR :—</b>			
22. Postage Acts Amendment Bill, 167 .....	7		613
23. Assent to Constitution Act Amendment (Legislative Council Quorum) Bill, 173.			
24. Do to West Wallsend Coal Company (Limited) Bill, 174.			
25. Level Crossings on Railways Bill, 180 .....	5		1107
26. Assent to Nyngan to Cobar Railway Bill, 200.			
27. Crown Rents Bill (No. 2), 221 .....	4		629
28. Assent to Goulburn Water Supply Charges Bill, 226.			
29. Do Culcairn to Corowa Railway Bill, 231.			
30. Do Toronto Tramway Act Amendment Bill, 239.			
31. Do Kiama to Nowra Railway Bill, 239.			
32. Do Molong to Parkes and Forbes Railway Bill, 268.			
33. Do Cowra Bridge Bill, 268.			
34. Do Borough of Willoughby Naming Bill, 268.			
35. Do Remission of Penalties Bill, 286.			
36. Do Entrance to the Richmond River Improvements Bill, 286.			
37. Do Wentworth Irrigation Bill, 287.			
38. Do Tarrawingee Tramway Bill, 287.			
39. Vote of Credit, 306 .....	3		593
40. Railway Employees Provident and Pension Fund, 306 .....	5		1109
41. Circular Quay Land Bill, 306 .....	8		737
42. Leprosy Bill, 306 .....	2		531
43. Assent to Willoughby and Gordon Tramway Act Amending Bill, 319.			
44. Rabbit Bill, 324 .....	5		331
45. Assent to Crown Rents Bill (No. 2), 327.			

	VOL.	PAGE.
<b>M</b>		
<b>MESSAGES (continued) :—</b>		
46. Assent to Lismore to the Tweed Railway Bill, 327.		
47. Do St. Leonards School of Arts Enabling Bill, 327.		
48. Do Mount Keira Tramway Acquisition Act Amendment Bill, 330.		
49. Do Cootamundra to Temora Railway Bill, 339.		
50. Do Transfer of Mining Stock Stamp Duty Exemption Bill, 339.		
51. Do Book Purchasers' Protection Bill, 339.		
52. Do Entrance to the Clarence River Improvements Bill, 340.		
53. Do Australian Mutual Provident Society's Officers' Provident Fund Trustees Bill, 340.		
54. Do Western Suburbs (City of Sydney) Sewerage Scheme Reticulation and Completion Bill, 352.		
55. Do Public Vehicles Regulation Acts Amendment Bill (No. 2), 352.		
56. Do Consolidated Revenue Fund Bill, 353.		
57. Board of Water Supply and Sewerage Offices Erection Bill (No. 2), 365	5	471
58. Milson's Point Extension Railway Bill, 366	6	1181
59. Estimates of Expenditure for 1891, and Supplementary Estimates for 1890 and previous years, 379	3	189
60. Assent to Municipalities of Ryde and Hunter's Hill Bill, 399.		
<b>FROM THE LIEUTENANT-GOVERNOR :—</b>		
61. Marrickville to Burwood Road Railway Bill (No. 2), 416	6	605
62. Electoral Bill, 417	1	809
63. Publicans' Licenses Further Restriction Bill, 425	3	993
64. Assent to Board of Water Supply and Sewerage Offices Erection Bill (No. 2), 467.		
65. Do Milson's Point Extension Railway Bill, 467.		
66. Do Leprosy Bill, 467.		
67. Census and Industrial Returns Bill, 467	3	1271
<b>FROM ASSEMBLY TO COUNCIL :—</b>		
Transmitting Party Processions Act Repeal Bill, 79		
" Mortgages Act Amendment Bill, 116.		
" West Wallsend Coal Company (Limited) Bill, 116.		
" Wentworth Irrigation Bill, 137.		
" Toronto Tramway Act Amendment Bill, 141.		
" Goulburn Water Supply Charges Bill, 141.		
" Nyngan to Cobar Railway Bill, 174.		
" Kiama to Nowra Railway Bill, 174.		
" Culcairn to Corowa Railway Bill, 174.		
" Goulburn to Crookwell Railway Bill, 175.		
" Marrickville to Burwood Road Railway Bill, 190.		
" Lismore to The Tweed Railway Bill, 191.		
" Byron Bay Breakwater Bill, 191.		
" Molong to Parkes and Forbes Railway Bill, 201.		
" Cootamundra to Temora Railway Bill, 201.		
" Entrance to Clarence River Improvements Bill, 202.		
" Entrance to Richmond River Improvements Bill, 202.		
" Board of Water Supply and Sewerage Offices Erection Bill, 202.		
" Western Suburbs (City of Sydney) Sewerage Scheme Reticulation and Completion Bill, 202.		
" Cowra Bridge Bill, 202.		
" Tarrawingee Tramway Bill, 203.		
" Willoughby and Gordon Tramway Act Amending Bill, 232.		
" St. Leonards School of Arts Enabling Bill, 232.		
" Borough of Willoughby Naming Bill, 232.		
" Granting of Probate of Wills and Letters of Administration Facilitation Bill, 261.		
" Crown Rents Bill (No. 2), 276.		
" Transfer of Mining Stock Stamp Duty Exemption Bill, 281.		
" Mount Keira Tramway Acquisition Act Amendment Bill, 281.		
" Employers Liability Act Amendment, 298.		
" Australasian Federation Resolutions, 312.		
" Probate Bill, 316.		
" Public Vehicles Regulation Acts Amendment Bill (No. 2), 320.		
" Municipalities of Ryde and Hunter's Hill Bill, 320.		
" Consolidated Revenue Fund Bill, 338.		
" Leprosy Bill, 367.		
" Coal Mines Regulation Bill, 414		
" Board of Water Supply and Sewerage Offices Erection Bill (No. 2), 418.		
" Blayney Municipal Council Enabling Bill, 418.		
" Broken Hill Water Supply Bill, 424.		
" Wagga Wagga Cattle Sale-yards Bill, 427.		
" Tumut School of Arts Site Sale Bill, 428.		
" Berry Municipal District Naming Bill, 428.		
" Milson's Point Extension Railway Bill, 429.		
" Circular Quay Land Bill, 461.		
" Katoomba Lighting Bill, 476.		
" Hospital Elections Bill, 479.		
" Illawarra Harbour and Land Corporation Bill, 483.		
" Vine Diseases Acts Further Continuation Bill, 501.		
" Marrickville to Burwood Road Railway Bill (No. 2), 517.		
" Metropolitan Street Improvements Bill, 524.		
" Rabbit Bill, 541.		
" Census and Industrial Returns Bill, 553.		
" Loan Bill, 555.		
" Appropriation Bill, 555.		
Returning Constitution Act Amendment (Legislative Council Quorum) Bill, without amendment, 151.		
" Remission of Penalties Bill, 277.		
" Book Purchasers' Protection Bill, with amendments, including amendment in the Title, 298.		
" Australian Mutual Provident Society's Officers' Provident Fund Trustees Bill, 316.		
" Jondja Creek Railway Transfer Bill without amendment, 460.		
" Hawkesbury Racecourse Bill, without amendment, 509.		
" Mulgon Irrigation Bill with amendments, 509.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>M</b>			
MESSAGES (continued):—			
FROM ASSEMBLY TO COUNCIL (continued):—			
Agreeing to Amendments made in the	Toronto Tramway Act Amendment Bill, 227.		
Do	Willoughby and Gordon Tramway Act Amending Bill, 282.		
Do	Tarrawingee Tramway Bill, 266.		
Do	Wentworth Irrigation Bill, 206.		
Do	St. Leonards School of Arts Enabling Bill, 314.		
Do	Blayney Municipal Council Enabling Bill, 473.		
Do	Leprosy Bill, 430.		
Do	Probate Bill, 498.		
Do	Broken Hill Water Supply Bill, 512.		
Do	Tumut School of Arts Site Sale Bill, 512.		
Do	Illawarra Harbour and Land Corporation Bill, 549.		
Do	Katoomba Lighting Bill, 550.		
Do	Hospital Elections Bill, 550.		
Do	Wagga Wagga Cattle Sale-yards Bill, 554.		
Do	Moore Street Improvement Bill ( <i>changed from</i> ) Metropolitan Street Improvements Bill, 557.		
Do	Rabbit Bill, 558.		
Granting leave to Member of the Assembly to be examined before a Select Committee of the Council,	485.		
Forwarding Resolution providing for the filling up of any vacancy in the Australasian Federation Convention,	540.		
FROM COUNCIL TO ASSEMBLY:—			
Transmitting Constitution Act Amendment (Legislative Council Quorum) Bill,	73.		
„	Divorce Amendment and Extension Bill, 160.		
„	Book Purchasers Protection Bill, 200.		
„	Remission of Penalties Bill, 222.		
„	Criminal Law and Evidence Amendment Bill, 235.		
„	Mulgoa Irrigation Bill, 274.		
„	Hawkesbury Racecourse Bill, 294.		
„	Solicitors' Right of Audience Bill, 299.		
„	Australian Mutual Provident Society's Officers' Provident Fund Trustees Bill, 310.		
„	Australasian Federation Resolutions, 360.		
„	Joadja Creek Railway Transfer Bill, 415.		
„	Married Women's Property Bill, 428.		
„	Policies of Assurance Bill, 428.		
„	Land Company of Australasia Bill, 483.		
„	Attorneys Bills of Costs and Practice of Conveyancing Act Amendment Bill, 516.		
„	Medical Bill, 516.		
Returning	West Wallsend Coal Company (Limited) Bill, without amendment, 152.		
„	Nyugan to Cobar Railway Bill, without amendment, 189.		
„	Toronto Tramway Act Amendment Bill, with amendments, 200.		
„	Goulburn Water Supply Charges Bill, without amendment, 200.		
„	Wentworth Irrigation Bill, with amendments, 201.		
„	Culcairn to Corowa Railway Bill, 222.		
„	Kiama to Nowra Railway Bill, without amendment, 235.		
„	Tarrawingee Tramway Bill, with amendments, 246.		
„	Borough of Willoughby Naming Bill, without amendment, 264.		
„	Molong to Parkes and Forbes Railway Bill, without amendment, 265.		
„	Cowra Bridge Bill, without amendment, 266.		
„	Willoughby and Gordon Tramway Act Amending Bill, with amendments, 273.		
„	Entrance to the Richmond River Improvements Bill, 282.		
„	St. Leonards School of Arts Enabling Bill, with amendments, 294.		
„	Board of Water Supply and Sewerage Offices Erection Bill, with amendments, 294.		
„	Lismore to the Tweed Railway Bill, without amendment, 310.		
„	Crown Rents Bill (No. 2), without amendment, 313.		
„	Transfer of Mining Stock Stamp Duty Exemption Bill, without amendment, 320.		
„	Cootamundra to Temora Railway Bill, without amendment, 320.		
„	Mount Keira Tramway Acquisition Act Amendment Bill, without amendment, 325.		
„	Clarence River Improvements Bill, without amendment, 321.		
„	Public Vehicles Regulation Acts Amendment Bill (No. 2), without amendment, 332.		
„	Western Suburbs (City of Sydney) Sewerage Scheme Reticulation and Completion Bill, without amendment, 332.		
„	Consolidated Revenue Fund Bill, without amendment, 345.		
„	Marrickville to Burwood Railway Bill, with amendments, 348.		
„	Municipalities of Ryde and Hunter's Hill Bill, without amendment, 375.		
„	Leprosy Bill, with amendments, 390.		
„	Milson's Point Extension Railway Bill, without amendment, 452.		
„	Board of Water Supply and Sewerage Offices Erection Bill (No. 2), without amendment, 452.		
„	Blayney Municipal Council Enabling Bill, with an amendment, 465.		
„	Berry Municipal (District Naming) Bill, without amendment, 465.		
„	Wagga Wagga Cattle Sale-yards Bill, with amendments, 483.		
„	Tumut School of Arts Site Sale Bill, with amendments, 484.		
„	Circular Quay Land Bill, without amendment, 489.		
„	Probate Bill, with amendments, 490.		
„	Broken Hill Water Supply Bill, with amendments, 492.		
„	Vine Diseases Acts Further Continuation Bill, without amendment, 511.		
„	Hospital Elections Bill, with amendments, 516.		
„	Illawarra Harbour and Land Corporation Bill, with amendments, 535.		
„	Katoomba Lighting Bill, with amendments, 535.		
„	Marrickville to Burwood Road Railway Bill (No. 2), without amendment, 540.		
„	Census and Industrial Returns Bill, without amendment, 556.		
„	Loan Bill, without amendment, 556.		
„	Moore-street Improvement Bill ( <i>changed from</i> ) Metropolitan Street Improvements Bill, with amendments, 556.		
„	Rabbit Bill, with amendments, 557.		
„	Appropriation Bill, without amendment, 558.		
Agreeing to Amendments made in the	Mulgoa Irrigation Bill, 517.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>M</b>		
<b>MESSAGES (continued):—</b>		
<b>FROM COUNCIL TO ASSEMBLY (continued):—</b>		
Asking leave to examine a Member of the Assembly before a Select Committee, 485.		
Concurring in Resolution in reference to filling vacancy in the Australasian Federation Convention, 554.		
Agreeing to amendments made in the Book Purchasers' Protection Bill, including an amendment in the Title, 313.		
<b>METROPOLITAN MAGISTRATES ACT, 1881.—</b>		
Correspondence respecting Rules under Section 8, laid on Table, 287	3	805
<b>METROPOLITAN WATER AND SEWERAGE ACTS, 1880-1889.</b>		
Amended By-laws of Board, laid on Table, 25 (2), 174	5	405, 433, 437
<b>METROPOLITAN WATER DISTRICT:—</b>		
Proclamation defining boundary, laid on Table, 45	5	431
<b>METROPOLITAN MUNICIPALITIES CATTLE AND SHEEP DRIVING BILL:—</b>		
Motion made ( <i>Mr. Hawthorne</i> ) for leave to bring in, 476; presented and read 1 <sup>o</sup> , 479.		
<b>METROPOLITAN STREET IMPROVEMENTS BILL (changed to) "MOORE STREET IMPROVEMENT BILL":—</b>		
Motion made ( <i>Mr. Henry Parkes</i> ) for Committee of the Whole, 452; House in Committee, Resolution agreed to, presented and read 1 <sup>o</sup> , 502; Message from Governor, 515, read 2 <sup>o</sup> , committed, reported with amendments Report adopted, 520; read 3 <sup>o</sup> , passed and sent to Council, 524; returned with amendments, 556; amendments agreed to, 557.	2	875
<b>MEYER, MR. OSCAR:—</b>		
Motion made ( <i>Mr. Chick</i> ) for Return showing amount paid to, 99; Return to Order, laid on Table, 115	8	235
Return showing statutory, &c., purchased from or through the agency of, laid on Table, 200	8	237
<b>MIDDLE HARBOUR:—</b>		
<b>TRAFFIC ACROSS SPIT FERRY:—</b>		
Return showing for periods of six months ending 31 December, 1889, and 30 June, 1890, laid on Table, 188	5	821
<b>MIDELTON, MR. THOMAS (See "CIVIL SERVICE").</b>		
<b>MIDNIGHT:—</b>		
Sittings after, 14, 41, 76, 84, 89, 100, 104, 117, 125, 138, 159, 163, 170, 183, 191, 228, 232, 236, 247, 261, 289, 321, 334, 342, 368, 373, 382, 401, 406, 412, 419, 430, 452, 461, 466, 470, 476, 486, 490, 502, 506, 511, 517, 526, 536, 542, 556.		
<b>MIMI AND DANGAR CREEKS (See "BRIDGES").</b>		
<b>MILITARY:—</b>		
Report on Forces of the Colony for 1889, laid on Table, 129	2	207
<b>CARTAGE ON CAMP EQUIPMENTS:—</b>		
Motion made ( <i>Mr. Molesworth</i> ) for papers in reference to contracts for, 124; Return to Order, laid on Table, 166	2	215
<b>VOLUNTEER FORCE REGULATION ACT:—</b>		
Regulations under, laid on Table, 32	2	225
<b>MILLER, GEORGE, MR. (See "CIVIL SERVICE").</b>		
<b>MILLER, GUSTAVE THOMAS CARLISLE, ESQUIRE:—</b>		
Return of Writ for Monaco reported, sworn, 1.		
<b>MILLTHORPE (See "ROADS").</b>		
<b>MILSON'S POINT EXTENSION RAILWAY BILL:—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 359; Message from Governor, 366; House in Committee, resolution reported, 368; Resolution agreed to, Bill presented and read 1 <sup>o</sup> , 412; read 2 <sup>o</sup> , committed, reported with amendments, 416; Report adopted, 419; read 3 <sup>o</sup> , passed, and sent to Council, 429; returned without amendments, 452; assent reported, 467	6	1181
<b>MINERALOGY (See "MINING").</b>		
<b>MINING (See also "WEST WALLSEND COAL COMPANY (LIMITED) BILL"; also "COAL MINES REGULATION BILL"):—</b>		
Annual Report of the Department of Mines, for 1889, laid on Table, 18	4	797
<b>CLAIM OF JOHN O'BRIEN, TYAGONG GOLD-FIELD:—</b>		
Motion made ( <i>Mr. Greene</i> ) for Select Committee to inquire into, 13; Return to Order ( <i>Session 1879-80</i> ), referred to the Select Committee, 103.		
<b>CLAIMS OF WILLIAM TOM, JAMES TOM, AND J. H. A. LISTER, AS THE FIRST DISCOVERERS OF GOLD IN AUSTRALIA:—</b>		
Motion made ( <i>Mr. Dalton</i> ) for Select Committee to inquire into, 269; leave given to make visits and hold inquiries, 348; Report brought up, 540	4	1053
Petition presented from William Tom, praying for leave to be heard before the Select Committee, read by the Clerk, and prayer granted, 384	4	1057
<b>GOLD LEASE, PARISH ETTRINA, COUNTY ST. VINCENT:—</b>		
Motion made ( <i>Mr. Morton</i> ) for papers in reference to, 231.		
<b>GOLD LEASES AT COBAR:—</b>		
Return to Order ( <i>Session 1889</i> ), laid on Table, 18	4	1089
<b>GOLD LEASES AT HILGROVE:—</b>		
Motion made ( <i>Mr. Fletcher</i> ) for papers relative to Applications of D. Anderson, G. Quinnell, and J. Bourke, 115.		
Motion made ( <i>Mr. Fletcher</i> ) for papers relative to Applications of Stevenson, Moore, and others, 115.		
Motion made ( <i>Mr. Fletcher</i> ) for papers relative to Applications of Thomas E. Mills, 116.		
Motion made ( <i>Mr. Fletcher</i> ) for papers relative to Application of J. C. Hogan, 116.		
<b>LINWOOD COLLIERY:—</b>		
Motion made ( <i>Mr. Burns</i> ) for Reports in reference to subsidence at, 52; Return to Order, laid on Table, 72	4	1107
<b>MINERAL APPLICATION BY MR. J. F. O'DONOHUE:—</b>		
Return to Order ( <i>Second Session 1889</i> ), laid on Table (not printed), 32.		
<b>PEAK HILL GOLD-FIELD:—</b>		
Report of Mr. Geological-Surveyor David, laid on Table, 147	4	1049
<b>VALIDATED CONDITIONAL PURCHASES:—</b>		
Motion made ( <i>Mr. Wall</i> ) for a return respecting, 181; Return to Order, laid on Table, 181	4	1109
<b>APPOINTMENT OF LECTURERS ON MINERALOGY:—</b>		
Motion made ( <i>Mr. O'Sullivan</i> ) in favour of, 211.		

	VOL.	PAGE.
<b>M</b>		
MINING STOCK (See "TRANSFER OF MINING STOCK STAMP DUTY EXEMPTION BILL").		
MINISTERIAL ELECTION BILL:— Motion made ( <i>Mr. Hurley</i> ) for leave to bring in, 13; presented and read 1°, 17; Order of the Day postponed, 134, 226, 414, 471, 472.		
MINISTERIAL STATEMENT:— Made by Sir Henry Parkes, 328, 373, 465. Adjournment moved to call attention to, 373.		
MINT (See "SYDNEY BRANCH ROYAL MINT").		
MITCHELL, JOSEPH, ESQUIRE, M.P.:— Leave of absence granted to, 83.		
MOLESWORTH-STREET, LISMORE:— Motion made ( <i>Mr. Ewing</i> ) for Papers in reference to Resumption, 103; Return to Order, laid on Table, 210	5	523
MÖLLER, AUGUST (See "CROWN LANDS").		
MOLONG (See "RAILWAYS;" also "CROWN LANDS").		
MOLONG TO PARKES AND FORBES RAILWAY BILL:— Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 141; Message from Lieutenant-Governor, 153; Point of Order as to whether it was competent for the Lieutenant-Governor to act in the matter, not having been sworn in, overuled by Mr. Speaker, 154; Order of the Day postponed, 162; House in Committee, resolution agreed to, Bill presented and read 1°, 167; read 2°, committed, reported without amendment, report adopted, 189; read 3°, passed, and sent to Council, 201; returned without amendment, 265; Assent reported, 268	6	857
MONARO (See "ELECTORAL").		
MONEY ORDER OFFICE:— Report of the Public Service Inquiry Commission on, laid on Table, 430	2	281
MOORE PARK:— Notices of dedication and appointment of Trustees, laid on Table, 146	4	747
MOORE-STREET IMPROVEMENT BILL (CHANGED FROM METROPOLITAN-STREET IMPROVEMENTS BILL) (See "METROPOLITAN-STREET IMPROVEMENTS BILL").		
MOORE-STREET PROPOSED WIDENING:— Petition presented for public meeting of Citizens of Sydney, in favour of, 335	2	877
MOREE (See "CROWN LANDS").		
MORPETH (See "BRIDGES").		
MORTGAGEES (See "POWER OF MORTGAGEES OF CHATELS RESTRICTION BILL.")		
MORTGAGES ACT AMENDMENT BILL:— Motion made ( <i>Mr. Alfred Allen</i> ) for leave to bring in, 12; presented and read 1°, 18; read 2°, committed, reported with an amendment, report adopted, 104; read 3°, passed, and sent to Council, 116.		
MOSS VALE (See "RAILWAYS").		
MOTIONS:— Rescinded, 151. House counted out on Member proceeding to move, 121, 178.		
MOUNT KEIRA TRAMWAY ACQUISITION ACT AMENDMENT BILL:— Motion made ( <i>Mr. McMillan</i> ) for Committee of the Whole, 207; House in Committee, resolution agreed to, Bill presented and read 1°, 217-8; read 2°, committed, reported without amendment, report adopted, 277; read 3°, passed, and sent to Council, 281; returned without amendment, 325; Assent reported, 339.		
MOUNT RENNIE CRIME:— IMPRISONMENT OF CABMAN SWEETMAN:— Motion made ( <i>Mr. Crick</i> ) for papers in connection with, 162; Return to Address, laid on Table (not printed), 380.		
MUDGE (See also "RAILWAYS"):— TOWN COMMON:— Motion made ( <i>Mr. Wall</i> ) for papers relating to sale of, 19; Return to Order, laid on Table (not printed), 32.		
MULGOA IRRIGATION BILL:— Received from Legislative Council and on motion ( <i>Mr. Dibbs</i> ) read 1°, 274; Order of the Day postponed, 410, 428, 464; motion made ( <i>Mr. Dibbs</i> ) for 2°, and amendment moved ( <i>Mr. Plumb</i> ) to refer to a Select Committee, and amendment negatived; read 2°, committed, reported with amendments, report adopted, 5C5-6; read 3°, passed and returned to Council, 509; amendments agreed to by Council, 517; assent reported, 554. Petition presented from Inhabitants of Town and District of Penrith, in favour of, and read by the Clerk, 461	2	151
MUNICIPAL (See also "BY-LAWS"; also "BLAYNEY MUNICIPAL COUNCIL ENABLING BILL").		
CORPORATION OF THE CITY OF SYDNEY:— Statement of Receipts and Expenditure for 1889, laid on Table, 32	2	577
SPECIAL GRANTS TO MUNICIPALITIES:— Motion made ( <i>Mr. Joseph Abbott</i> ) for Committee of the Whole to consider a further additional grant of five shillings in the pound, 385; Order of the Day postponed, 418; House in Committee, Resolution agreed to, 457.		
MUNICIPAL DISTRICT OF BROUGHTON CREEK AND BOMADERRY NAMING BILL (See "BERRY MUNICIPAL DISTRICT NAMING BILL").		
MUNICIPALITIES OF RYDE AND HUNTER'S HILL BILL:— Petition presented ( <i>Mr. Frank Farnell</i> ) for leave to proceed with under the 65th Standing Order, presented and read 1°, 24; Order of the Day postponed, 88; read 2°, committed, reported with amendments, Report adopted, 317; read 3°, passed and sent to Council, 319; returned without amendment, 375; assent reported, 399.		
MURDOCH, D. (See "POSTAL").		
MURWILLUMBAH FERRY:— Motion made ( <i>Mr. Ewing</i> ) for papers in connection with, 435.		
MUSEUM (See "AUSTRALIAN MUSEUM").		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>N</b>			
NAMOI, THE (See "ELECTORAL").			
NARRABRI (See "ROADS").			
NATIONAL ART GALLERY :—			
Report of, for 1889, laid on Table, 79 .....	7		999
NAUTICAL SCHOOL-SHIP "VERNON" :—			
Adjournment moved to call attention to pamphlet making charges against the management of, 175.			
Annual Report for year ending 30 April, 1890, laid on Table, 260 .....	7		259
ARTICLE IN DAILY TELEGRAPH NEWSPAPER :—			
Motion made ( <i>Mr. Copeland</i> ) that article headed "The 'Vernon' Boys" was a breach of privilege, 177.			
CHARGES MADE BY MRSERS. BRAGG AND ARDILL :—			
Minute by the Minister for Public Instruction after inquiry into, laid on Table and motion made ( <i>Mr. Carruthers</i> ) that document be printed, and amendment moved to omit names of boys from the evidence and withdrawn; amendment moved to omit evidence, carried; motion as amended agreed to, 235 .....	7		265
NAVAL FORCES OF THE COLONY :—			
Report for 1889, laid on Table, 32 .....	2		213
NAVY (See "IMPERIAL NAVY") :—			
NAVY, IMPERIAL :—			
Information respecting Commitments to Darlinghurst Gaol of Men belonging to, 87 .....	2		227
NECROPOLIS (ADDITIONAL AREAS) BILL :—			
Motion made ( <i>Mr. Gould</i> ) for leave to bring in, 208; presented and read 1 <sup>o</sup> , 216.			
NEILD, MR. JOHN CASH :—			
Petition presented from, in reference to his appointment as Executive Commissioner at Adelaide Exhibition, and the disbursement of certain moneys; also calling attention to Notice of Motion of <i>Mr. J. P. Abbott</i> , and asking leave to appear before Select Committee, 45 .....	8		127
ADELAIDE JUBILEE INTERNATIONAL EXHIBITION :—			
Motion made ( <i>Mr. Fletcher</i> ) for Select Committee to inquire into representation of Colony at, and expenditure of Public Money in connection therewith, 353; Report brought up, 520; adopted, 540 .....	8		73
Petition presented from, praying to be heard before the Select Committee, and prayer granted, 414.	8		129
NET-FISHING IN PORT HACKING PROHIBITION ACT :—			
Petition presented from certain Licensed Fishermen praying for repeal of, 317 .....			
NET-FISHING IN PORT HACKING PROHIBITION ACT AMENDMENT BILL :—			
Motion made ( <i>Mr. Frank Farnell</i> ) for leave to bring in, 18; presented and read 1 <sup>o</sup> , 25; Order of the Day postponed, 79, 316, 324, 385, 405, 441; on Order of the Day being read <i>Mr. Speaker</i> ruled that Bill was beyond the Order of leave; Order discharged and Bill withdrawn, 521.			
NET-FISHING :—			
Return respecting Tidal Waters closed against, laid on Table, 534 .....	7		1081
NEW GUINEA (See "BRITISH NEW GUINEA").			
NEWBERRY, MR. WILLIAM (See "EDUCATION").			
NEWCASTLE (See "TRAMWAYS"; also "CITY OF NEWCASTLE GAS AND COKE COMPANY'S ELECTRIC AND OTHER LIGHT BILL"; also "SOUTHERN BREAKWATER, NEWCASTLE"; also "BOROUGH OF NEWCASTLE ELECTRIC LIGHTING BILL"; also "BOROUGH OF NEWCASTLE ELECTRIC LIGHTING BILL (No. 2)").			
NEWCASTLE PASTURAGE RESERVE :—			
Motion made ( <i>Mr. Melville</i> ) for papers in connection with grant to the Primitive Methodist Connection at Adamstown, 428; Return to Order, laid on Table, 464 .....	4		755
NEWCASTLE PAVING AND PUBLIC VEHICLES REGULATION ACT (See "BY-LAWS").			
NEWCASTLE SAND-DRIFT RECLAMATION AMENDMENT BILL :—			
Motion made ( <i>Mr. Sydney Smith</i> ) for Committee of the Whole, 490; Message from Governor, 497; House in Committee, resolution agreed to, 498 .....	4		705
NEW ENGLAND (See "RAILWAYS").			
NEWINGTON (See "ASYLUMS").			
NEW POSTAL PILLARS (See "POSTAL").			
NEWSPAPER ARTICLE (See "PRIVILEGE").			
NEWTOWN (See "RAILWAYS").			
NO QUORUM :—			
In House before commencement of Business, 559.			
In House after the commencement of Business, 104, 121, 134, 178, 195, 211, 253, 320, 343, 345, 349, 353, 449, 458, 486, 499, 521, 530.			
Reported from Committee of the Whole, 104.			
Reported from Committee of Supply, 486.			
In House on Member proceeding to move Motion, 121.			
NO TELLERS :—			
In Division, 313, 357 <sup>(*)</sup> , 358 <sup>(*)</sup> , 407, 554.			
NORTH COAST (See "RAILWAYS").			
NORTH-SHORE (See "WATER SUPPLY"; also "RAILWAYS"; also "BRIDGES").			
NORTHERN DISTRICTS (See also "RAILWAY") :—			
Particulars respecting Police, laid on Table, 216 .....	7		637
NOTIFICATIONS (See "RESUMPTION OF LANDS"; also "REGULATIONS"; also "WATER SUPPLY"; also "SEWERAGE"; also "CROWN LANDS").			
NOWRA (See "RAILWAYS"; also "DRAINAGE").			
NUISANCES PREVENTION ACT (See "BY-LAWS").			
NYNGAN (See "RAILWAYS").			
NYNGAN TO COBAR RAILWAY BILL :—			
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 136; Message from Lieutenant-Governor, 153; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 155; Order of the Day postponed, 163; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 169; read 3 <sup>o</sup> , passed and sent to Council, 174; returned without amendment, 189; Assent reported, 200 .....	6		203

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>O</b>			
OATH OF ALLEGIANCE :—			
Speaker's Commission to Administer, 388.			
OBERON (See "ROADS").			
O'BRIEN, ANNIE NASH (See "CROWN LANDS").			
O'BRIEN, JOHN (See "MINING").			
O'CONNOR, THE HONORABLE DANIEL :—			
Return showing appointments made in Postal and Telegraph Departments during tenure of office as Postmaster-General, laid on Table, 231	2	359	
O'DONOHUE, MR. J. F. (See "MINING").			
OFFICIAL ASSIGNEES (See "BANKRUPTCY ACT").			
OLD LOANS ACCOUNT (See "FINANCE").			
OPENING OF THE SESSION :—			
Proclamation read by the Clerk, 1.			
Governor's Opening Speech, 2, 14.			
ORANGE (See also "WATER SUPPLY") :—			
HOSPITAL :—			
Motion made ( <i>Mr. Walker</i> ) for papers in reference to inquiry into management of, 52; Return to Order, laid on Table, 379	7	313	
Motion ( <i>Mr. Walker</i> ) for Select Committee being proceeded with, House counted out, 178.			
Motion made ( <i>Mr. Walker</i> ) for Select Committee to inquire into management of, 385; leave given to make visits of inspection to Orange Hospital, 392, 443; leave given to make Special Report, 552; Special Report brought up, 553	7	309	
Petition presented from Town and District for a Select Committee to enquire into Dr. Goode's charges, 179	7	381	
ORDER OF JUDGES (See "PAYMENT OF MONEY UNDER ORDERS OF JUDGES FACILITATION BILL").			
ORDERS AND ADDRESSES :—			
Alphabetical Registers of,	1	727	
ORDERS OF THE DAY :—			
Discharged, 133, 208, 288 (?), 341, 423, 461, 521 (?), 524, 534, 553 (?).			
Of Government Business postponed in a bunch, 143, 266, 282, 314, 416, 512, 549.			
Restored to Paper, 246.			
General Business, precedence of, over Notices of Motions on Wednesdays and Thursdays, 253.			
General Business takes precedence on Fridays, after 6 o'clock, 411.			
Of General Business postponed till after subsequent Order, 423, 471, 504, 550, 553.			
Government intercepted by General Business being called on at 6 o'clock, 419.			
General intercepted by Government Business being called on at half-past Six o'clock, 555.			
ORDNANCE LAND TRANSFER BILL :—			
Presented and read 1 <sup>o</sup> <i>pro forma</i> , 2.			
OURIMBAH CREEK (See "RAILWAYS").			
OXLEY ISLAND (See "WHARF ACCOMMODATION").			
OYSTER FISHERIES (See "FISHERIES AND OYSTER FISHERIES ACTS FURTHER AMENDMENT BILL").			
<b>P</b>			
PARKES, THE HON. SIR HENRY, G.C.M.G., M.P. :—			
Makes Ministerial Statement, 328, 373, 465.			
Adjournment moved in reference to Ministerial Statement made by, 373.			
Letter from the Principal Under Secretary, to Mr. Dibbs, enclosing an extract from a private letter from Major-General Edwards, laid on Table, 58	8	729	
Mr. Speaker informed the House that the head of the Government would resume his duties on 27 August, and asked the House to concur in the departure from ordinary rules for that purpose, 267.			
PARKES (See "RAILWAYS").			
PARKS :—			
CLARENCE TOWN PUBLIC :—			
Notification of resumption of land under the Lands for Public Purposes Acquisition Act, laid on Table, 18	4	783	
PUBLIC, BALMAIN :—			
Notification of resumption of land for Public Purposes Acquisition Act, laid on Table, 18	4	785	
PARLIAMENT :—			
Opening of Session, 1.			
Proclamation proroguing Council and Assembly			
CHARGES OF BRIBERY IN CONNECTION WITH THE PASSING OF THE BROKEN HILL WATER SUPPLY BILL :—			
Motion made ( <i>Mr. Waddell</i> ) for Royal Commission to inquire into. Point of Order :—That motion was substantially the same as an amendment moved the previous night, and could not be put; Speaker ruled motion out of order, 529.			
Adjournment of the House moved, to show the urgent necessity of the Government investigating, 534.			
PARLIAMENTARY REFRESHMENT ROOM :—			
Petition presented from New South Wales Local Option League to against Bar of, and to prohibit the Supply of Intoxicating Liquor within the Parliamentary Buildings; motion made ( <i>Mr. Alfred Allen</i> ) that Petition be received and negatived, 469.			
PARLIAMENTARY SESSIONS BILL :—			
Motion made ( <i>Mr. Copeland</i> ) for leave to bring in, presented and read 1 <sup>o</sup> , 181; Order of the Day postponed, 269; motion made for 2 <sup>o</sup> , and debate adjourned, 342; Order of the Day postponed, 464, 501.			
PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS :—			
General Report, together with Minutes of Proceedings, laid on Table, 25	1	741	
Further Returns respecting payments to, laid on Table, 39, 129	1	795, 797	
Motion made ( <i>Mr. Waddell</i> ) for correspondence in reference to reporting proceedings of, 489.			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>P</b>		
<b>PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS (continued) :—</b>		
<b>APPOINTMENT OF MEMBER :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to appoint James Inglis, Esquire, and amendment proposed ( <i>Mr. Frank Farnell</i> ) to substitute the name of William McCourt. <i>Point of Order</i> .—As to whether amendment was in order, and whether a ballot could be demanded. Mr. Speaker ruled the amendment in order, and against the demand for a ballot, amendment carried, 181-2.		
Motion made ( <i>Mr. Bruce Smith</i> ) to appoint James Patrick Garvan, Esquire, and amendment proposed ( <i>Mr. Frank Farnell</i> ) to substitute the name of Robert Barbour; amendment negatived, motion carried, 415.		
<b>COBAR TO COCKBURN RAILWAY :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to refer, 555.		
<b>COLLEGE FOR TRAINING TEACHERS OF PUBLIC SCHOOLS :—</b>		
Motion made ( <i>Mr. Carruthers</i> ) to refer the matter of the creation of, 456.		
<b>GLEN INNES TO INVERELL RAILWAY :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to refer, 555.		
<b>HOSPITAL BUILDINGS, MACQUARIE-STREET :—</b>		
Motion made ( <i>Sir Henry Parkes</i> ) to refer the original plans and estimates, and those on a reduced scale, amendment moved that Committee report forthwith, amendment and motion carried, 485-6.		
<b>HOSPITAL FOR THE INSANE UPON THE KENMORE ESTATE, NEAR GOULBURN :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) that motion ( <i>Session 1889</i> ) to refer to, be rescinded, 151.		
<b>IMPROVEMENTS TO THE ENTRANCE OF THE RICHMOND RIVER (See also "ENTRANCE TO THE RICHMOND RIVER IMPROVEMENTS BILL") :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 40.		
<b>IRON BRIDGE AT COWRA (See also "COWRA BRIDGE BILL.")</b>		
Report together with Minutes of Evidence, Appendices, and Plans, laid on Table, 87; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 141	5	663
<b>KIAMA TO NOWRA RAILWAY :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to refer matter of extension of, into the town of Nowra, 555.		
<b>PROPOSED IMPROVEMENTS TO THE ENTRANCE OF THE CLARENCE RIVER (See also "ENTRANCE TO CLARENCE RIVER IMPROVEMENTS BILL") :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plan, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 124	7	61
<b>PROPOSED RAILWAY FROM GRAFTON TO THE TWEED (See also "GRAFTON TO THE TWEED RAILWAY BILL") :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 125	6	299
<b>PROPOSED BREAKWATER, BYRON BAY (See also "BYRON BAY BREAKWATER BILL") :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plan, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 130	7	1
<b>PROPOSED RAILWAY FROM NYNGAN TO COBAR (See also "NYNGAN TO COBAR RAILWAY BILL.")</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 116	6	1
<b>PROPOSED RAILWAY FROM MARRICKVILLE TO THE BURWOOD ROAD (See also "MARRICKVILLE TO BURWOOD ROAD, RAILWAY BILL.")</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 117	6	505
<b>PROPOSED EXTENSION OF SYDNEY WATER SUPPLY TO SOUTHERN SUBURBS—HURSTVILLE AND ROCKDALE :—</b>		
Report, together with Minutes of Evidence and Plan, laid on Table, 25	5	415
<b>PROPOSED DREDGE AND PLANT FOR SYDNEY HARBOUR :—</b>		
Report, together with Minutes of Evidence and Appendix, laid on Table, 25	7	157
<b>PROPOSED RETICULATION OF THE WESTERN SUBURBS DRAINAGE SCHEME (See also "WESTERN SUBURBS (CITY OF SYDNEY) SEWERAGE SCHEME RETICULATION AND COMPLETION BILL.")</b>		
Report, together with Minutes of Evidence, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 124	5	473
<b>PROPOSED BRIDGE OVER THE HUNTER RIVER AT JERRY'S PLAINS :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plan, laid on Table, 25	5	615
<b>PROPOSED OFFICES FOR BOARD OF WATER SUPPLY AND SEWERAGE (See also "BOARD OF WATER SUPPLY AND SEWERAGE OFFICES ERECTION BILL.")</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 124	5	393
<b>PROPOSED BRIDGE OVER TABBAN CREEK, PARRAMATTA RIVER :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 25	5	741
<b>PROPOSED RAILWAY FROM MOSS VALE TO ROBERTSON :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 25	6	1183
<b>PROPOSED RAILWAY FROM KIAMA TO NOWRA (See also "KIAMA TO NOWRA RAILWAY BILL").</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 116	6	205
<b>PROPOSED RAILWAY FROM COOTAMUNDBA TO TEMORA (See also "COOTAMUNDBA TO TEMORA RAILWAY BILL").</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 32; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 116	6	859
<b>PROPOSED BRIDGE TO CONNECT BULLOCK ISLAND WITH THE MAINLAND AT NEWCASTLE :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 32	5	563
<b>PROPOSED RAILWAY FROM MUDGEE TO GULGONG :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans, laid on Table, 68	6	1255
<b>RAILWAY FROM BYROCK TO BREWARRINA :—</b>		
Motion made ( <i>Mr. Waddell</i> ) in favour of line, and amendment moved to refer to, and negatived, 405.		
<b>RAILWAY FROM CULCAIRN TO COROWA (See also "CULCAIRN TO COROWA RAILWAY BILL").</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 40.		
<b>RAILWAY FROM GOULBURN TO CROOKWELL (See also "GOULBURN TO CROOKWELL RAILWAY BILL.")</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 40.		
<b>RAILWAY FROM MOLONG TO PARKES AND FORBES (See also "MOLONG TO PARKES AND FORBES RAILWAY BILL"; also "RAILWAYS").</b>		
Report together with Minutes of Evidence, Appendices, and Plan, laid on Table, 87; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out; amendment moved ( <i>Mr. Wright</i> ) to re-submit to Committee on Public Works, negatived; motion put and passed, 137-8	6	607

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>P</b>		
PARLIAMENTARY STANDING ON PUBLIC WORKS ( <i>continued</i> ):—		
RAILWAY TO CONNECT NORTH SHORE RAILWAY WITH PORT JACKSON, AT MILSON'S POINT:—		
Motion made ( <i>Mr. Bruce Smith</i> ) to remit to, 40-1; Second Report brought up, 273; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 314	6	655
RIVAL ROUTES OF RAILWAY FROM TOWNS TO EXISTING RAILWAYS:—		
Motion made ( <i>Mr. Waddell</i> ) to submit, where trial surveys have been made, and negatived, 147.		
PARRAMATTA (See "ASYLUMS").		
PARRAMATTA ROAD:—		
Notification for resumption of land under the Public Works Act, at University Cutting for improvement of, laid on Table, 324	5	559
PARTY PROCESSIONS ACT REPEAL BILL:—		
Motion made ( <i>Mr. William Stephen</i> ) for leave to bring in, presented, and read 1 <sup>o</sup> , 13; read 2 <sup>o</sup> committed, reported, report adopted, 76; read 3 <sup>o</sup> , passed, and sent to Council, 79.		
PASTORAL HOLDINGS (See "CROWN LANDS").		
PAUPERS (See "SICK PAUPERS").		
PAYMENT OF MONEY UNDER ORDERS OF JUDGES FACILITATION BILL:—		
Motion made ( <i>Mr. Finlay</i> ) for leave to bring in, 257; presented and read 1 <sup>o</sup> , 268; Order of the Day postponed, 295, 299, 422.		
PEAK HILL GOLD-FIELD:—		
Report of Mr. Geological-Surveyor David on, laid on Table, 147	4	1019
Motion made ( <i>Dr. Ross</i> ) for papers in reference to roads to, 167.		
PEDLERS (See "HAWKERS ON RIVERS BILL").		
PENSION FUND (See "RAILWAY EMPLOYEES' PROVIDENT AND PENSION FUND BILL").		
PENSIONS (See "CIVIL SERVICE ACT, 1884").		
PERMANENT AND TEMPORARY COMMONS:—		
Return to Order ( <i>Session, 1889</i> ), laid on Table, 32	4	749
PERSONAL EXPLANATION:—		
Mr. Bruce Smith proceeded to make an explanation, and objection being taken, motion made ( <i>Mr. Copeland</i> ) That the Honorable Member be heard, and withdrawn, explanation continued and concluded, 327.		
Mr. A. G. Taylor proceeding to make, repeated language which had been ruled out of order, and was ordered by Mr. Speaker to discontinue his speech, 399.		
PETERS, J. (See "CROWN LANDS").		
PETERSHAM:—		
PUBLIC RECREATION:—		
Notification of resumption of land under the Public Works Act, 18	4	787
PETITIONS:—		
Printing of, Sessional Order passed, 12.		
To be heard in person or by Counsel before Select Committee, 21, 39, 87 (?) 124, 367, 414.		
Read by the Clerk, 25, 124, 325, 384, 399, 415, 461, 489, 497.		
Petitions presented from Sydney Typewriting Association in favour of legalising typewriting for, 490.	8	751
Weekly Abstract of, Nos. 1 to 34	1	640
PILOTAGE RATES:—		
Motion made ( <i>Mr. Molesworth</i> ) for reduction of, at Sydney and Newcastle, 385.		
PITT-STREET FIRE:—		
Motion made ( <i>Mr. Lees</i> ) for Depositions of Coronial Inquiry on, 434; Return to Order, laid on Table, 535	8	583
PITT AND BRIDGE STREETS (See "LAND CORNER OF PITT AND BRIDGE STREETS").		
PLURAL VOTE (See "ELECTORAL ACT (PLURAL VOTE ABOLITION) AMENDMENT BILL").		
POINTS OF ORDER:—		
Arising in the House, 104, 125, 154, 181, 208 (?), 227, 247, 265 (?), 272, 288, 337, 423, 431, 436, 461, 465, 511, 524, 529.		
Reported from Committee of Supply, 517 (?).		
POLICE:—		
Report of Inspector-General for 1889, laid on Table, 32	7	617
Report of Inspector-General, on occurrences coming specially under the notice of the Police during the late Strike, laid on Table, 502	7	627
NORTHERN DISTRICT:—		
Particulars respecting, laid on Table, 216	7	637
WILLIAM STAFFORD, EX-MOUNTED SERGEANT:—		
Petition from presented, praying the House to immediately grant the inquiry into his case, 210	7	639
Motion made ( <i>Mr. Hawthorne</i> ) for Select Committee to inquire into case of, 211.		
Petition in reference to his dismissal from the Police Force, laid on Table, 121	7	641
OFFICERS IN CIVIL SERVICE EMPLOYED AS SPECIAL CONSTABLES:—		
Information respecting, laid on Table, 464	7	635
POLICIES OF ASSURANCE BILL:—		
Received from the Legislative Council, and on motion ( <i>Mr. Frank Farnell</i> ) read 1 <sup>o</sup> , 428; Order of the Day postponed, 505.		
PORT HACKING (See "NET-FISHING IN PORT HACKING PROHIBITION ACT AMENDMENT BILL"; also "NET-FISHING IN PORT HACKING PROHIBITION ACT").		
PORTLAND-PLACE (See "TRAMWAYS").		
POST OFFICE (See "GENERAL POST OFFICE").		
POSTAGE ACTS AMENDMENT BILL:—		
Motion made ( <i>Mr. O'Connor</i> ) for Committee of the Whole, 166; Message from the Governor, 167; House in Committee, resolution agreed to, Bill presented, and read 1 <sup>o</sup> , 217	7	613
Petition presented from Committee appointed at a Conference of Provincial Newspaper Proprietors held in Sydney against, 280	7	611
POSTAL:—		
Report of the Postmaster-General for 1889, laid on Table, 141	7	335
Adjournment of the House moved to call attention to administration of Department, 152.		
AND TELEGRAPH CONFERENCE:—		
Report and Proceedings of, held in Adelaide, May, 1890, laid on Table, 180	7	453
AND TELEGRAPH OFFICE, PICTON:—		
Notification of Resumption under the Lands for Public Purposes Acquisition Act for, laid on Table, 410	7	609

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>P</b>		
POSTAL— <i>continued</i> .		
COMPLAINTS AGAINST KRAMBACH POSTMASTER AND HIS WIFE:—		
Motion made ( <i>Mr. Vivian</i> ) for Papers in reference to, 371; Return to Order, laid on Table (not printed), 510 .....		
CONVEYANCE OF MAILS TO AND FROM GENERAL POST OFFICE, SYDNEY:—		
Motion made ( <i>Mr. William Stephen</i> ) for Select Committee, 441-2; Report brought up, 553 .....	7	529
GENERAL POST OFFICE, MONEY ORDER OFFICE, AND THE ELECTRIC TELEGRAPH DEPARTMENT:—		
Report of Public Service Inquiry Commission upon, laid on Table, 430 .....	2	281
MAIL CONTRACT BETWEEN SYDNEY AND SAN FRANCISCO <i>via</i> AUCKLAND AND HONOLULU:—		
Further correspondence respecting, laid on Table, 18, 502 .....	7	553
Renewal by the New Zealand Government of, from November, 1890, to November, 1891, 502 .....	7	563
MAIL SUBSIDIES:—		
Particulars of contracts with lines of steamers and sailing vessels, laid on Table, 147 .....	7	571
WEST MAITLAND OFFICE:—		
Notification of resumption of land under Lands for Public Purposes Acquisition Act, For enlargement of, laid on Table, 390 .....	7	607
NEW POSTAL PILLARS:—		
Motion made ( <i>Mr. Molesworth</i> ) for papers relating to contract for, 493; Return to Order laid on Table, 502 .....	7	573
Adjournment moved ( <i>Mr. Lyne</i> ) to call attention to unsafe state of, 498.		
CHARGES AGAINST MAIL-GUARD D. MURDOCH:—		
Motion made ( <i>Mr. Dowell</i> ) for papers in reference to, 552.		
POST-OFFICE CARVINGS:—		
Motion made ( <i>Mr. Hawken</i> ) against removal of, 529.		
POSTPONEMENTS:—		
Government Orders of the Day Postponed in a bunch, 143, 266, 282, 314, 416.		
Business postponed until after Notice on Business Paper, 395.		
Government Business postponed in bunch, 400.		
General Orders postponed until after subsequent Order, 423, 471, 550, 553.		
POWER OF MORTGAGEES OF CHATTELS RESTRICTION BILL:—		
Motion made ( <i>Mr. Leven</i> ) for leave to bring in, presented, and read 1 <sup>o</sup> , 299.		
PRACTITIONERS (See "LEGAL PRACTITIONERS BILL").		
PRAYER:—		
Motion made ( <i>Mr. Turner</i> ) to open business with, upon each sitting day, and negatived, 147-8.		
PRECEDENCE OF BUSINESS (See "BUSINESS OF THE HOUSE").		
PREVIOUS QUESTION:—		
Motion made for and negatived, 89.		
PRICE, MR. E. B. (See "RAILWAYS").		
PRINCE ALFRED HOSPITAL (See "HOSPITALS").		
PRISONERS:—		
Return showing cost of maintenance of during 1889, laid on Table, 380 .....	7	649
PRISONERS AND CRIMINAL LUNATICS (See "DESPATCHES").		
PRISONS:—		
Report on, for 1889, laid on Table, 52 .....	7	649
PRIVATE BILL (See also "BILLS"):—		
Referred back to Select Committee, 436.		
PRIVILEGE:—		
SEAT OF HONORABLE SYDNEY SMITH, SECRETARY FOR MINES:—		
Motion made ( <i>Mr. Crick</i> ) to refer to Elections and Qualifications Committee, 27.		
NEWSPAPER ARTICLE:—		
Motion made ( <i>Mr. Copeland</i> ) that article in the <i>Daily Telegraph</i> headed "The Vernon Boys" is a breach of privilege, 177.		
Mr. Hurley called attention to article in the <i>Maitland Mercury</i> , and stated his intention to move a motion of Privilege thereon; article read by the Clerk, and Mr. Hurley not being present to make the motion of Privilege Mr. Dibbs moved a motion censuring the Honorable Member, 352.		
NEWSPAPER ARTICLE:—		
Motion made ( <i>Mr. Traill</i> ) that House do to-morrow proceed to inquire into statement that bribes had been offered to and asked for by Members of Parliament, and that the editor of <i>Truth</i> be summoned to give evidence at Bar, 291-2; Order of the Day read and Question put, that House proceed to the consideration of the statements referred to, and agreed to—Speaker informed House of issue of summons to editor of <i>Truth</i> , and motion made ( <i>Mr. Traill</i> ) that the editor of <i>Truth</i> be now examined at the Bar and agreed to—Mr. Adolphus George Taylor conducted to Bar, sworn by the Clerk, and examined—Witness withdrew, and on motion of Mr. Bruce Smith was discharged from further attendance—Order of the Day discharged, 299.		
THE HON. J. H. YOUNG:—		
Mr. Dibbs referring to certain correspondence in reference to alleged Bankruptcy of Mr. Speaker, drew the attention of the House to section 26 of the Constitution Act and section 4 of the Bankruptcy Act under which he considered Mr. Speaker's seat was vacated. Sir Henry Parkes having stated that, in the opinion of the Attorney-General, Mr. Young had not become a bankrupt within the meaning of the 26th section of the Constitution Act, Mr. Dibbs laid the correspondence on the Table, 375 .....		799
Motion made ( <i>Mr. Crick</i> ) that seat be referred to the Committee of Elections and Qualifications and negatived, 380.		
CHARGES AGAINST MEMBERS OF PARLIAMENT:—		
Motion made ( <i>Sir Henry Parkes</i> ), instructing Mr. Speaker to require Mr. Crick to state whether he had, at Lambton, denounced the Parliament as being "rotten and corrupt." Point of Order: That the matter not suddenly arising was not one of privilege, overruled; amendment proposed ( <i>Mr. Crick</i> ) for appointment of Royal Commission to inquire into charges of corruption and bribery in reference to the Broken Hill Water Supply Bill; amendment negatived; original motion passed. Mr. Crick denied having used the specific language as quoted in the resolution, 524, 525.		
PROBATE BILL:—		
Motion made ( <i>Mr. Gould</i> ) for Committee of the Whole, 58; Message from Governor, 68; House in Committee, Resolution agreed to, Bill presented and read 1 <sup>o</sup> , 142; read 2 <sup>o</sup> , committed, 170; House in Committee, 208; reported with amendments, report adopted, 314; read 3 <sup>o</sup> , passed, and sent to Council, 316; returned with amendments, 490; amendments agreed to, 498; assent reported, 527 .....	3	863
PROBATE OF WILLS (See "GRANTING OF PROBATE OF WILLS AND LETTERS OF ADMINISTRATION FACILITATION BILL").		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>P</b>		
PROCESSIONS (See "PARTY PROCESSIONS ACT REPEAL BILL").		
PROCLAMATIONS :—		
Defining boundaries of the Campbelltown Water District, laid on Table, 45.....	5	429
Defining boundaries of the Liverpool Water District, laid on Table, 45.....	5	427
Defining the boundaries of the Metropolitan Water District, laid on Table, 45 .....	5	431
On Opening Parliament, 1.		
Proroguing Council and Assembly .....	1	561
Vesting in the Board of Water Supply and Sewerage certain Sewerage Works, laid on Table, 45...	6	483
PUBLIC BUSINESS :—		
Adjournment moved to call attention to state of, and negatived, 108.		
Adjournment moved to call attention to the unsatisfactory state of, 336.		
PUBLIC HEALTH :—		
Motion made ( <i>Mr. Vivian</i> ) for report upon Mortality in the Metropolitan and Urban Districts from preventable diseases, and the remedy for same, and withdrawn, 147.		
Report of Board of Health on the deposits of Garbage in the borough of Redfern on a site for building purposes, laid on Table, 379 .....	2	503
APPOINTMENT OF DR. C. LEPREYANCHE AS GOVERNMENT MEDICAL OFFICER AT NARRABRI :—		
Motion made ( <i>Mr. J. P. Abbott</i> ) for papers in reference to, 320; Return to Order, laid on Table, 366 .....	2	493
INFLUENZA EPIDEMIC :—		
Report of the Chief Medical Inspector for 1890, laid on Table, 534 .....	2	551
PUBLIC INSTRUCTION (See "EDUCATION").		
PUBLIC INSTRUCTION ACT OF 1880 :—		
Regulations under, laid on Table, 17 .....	7	1001
PUBLIC OFFICES :—		
Notification of resumption, under the Land for Public Purposes Acquisition Act, of land in City of Sydney, laid on Table, 273 .....	8	695
LAND, PHILLIP-STREET, SYDNEY :—		
Notification of resumption under the Land for Public Purposes Acquisition Act, laid on Table, 18 .....	8	693
PUBLIC SCHOOLS (See "EDUCATION.")		
PUBLIC SERVICE INQUIRY COMMISSION (See "CIVIL SERVICE").		
PUBLIC TOLLS (See "TOLLS").		
PUBLIC VEHICLES REGULATION ACT AMENDMENT BILL :—		
Motion made ( <i>Mr. Slattery</i> ) for leave to bring in, presented, and read 1 <sup>o</sup> , 208.		
PUBLIC VEHICLES REGULATION ACTS AMENDMENT BILL (No. 2) :—		
Motion made ( <i>Mr. Burdakin</i> ) for leave to bring in, presented, and read 1 <sup>o</sup> , 216; read 2 <sup>o</sup> , committed, reported with amendments, Report adopted, 317; read 3 <sup>o</sup> , passed, and sent to Council, 320; returned without amendment, 332; assent reported, 352.		
PUBLIC WATERING-PLACES ACT, 1884 :—		
Amended Regulations under, laid on Table, 25 .....	5	465
PUBLIC WORKS (See "PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.")		
PUBLIC WORKS ACT OF 1888 :—		
NOTIFICATION OF RESUMPTION UNDER, LAID ON TABLE :—		
Public Recreation, Petersham, 18.....	4	787
Addition, Railway Works and Conveniences at Newtown, 358 .....	5	1137
Additional Siding Accommodation at Como, 188 .....	5	1133
Construction of an Approach Road to Meadow Bank Railway Platform, 390 .....	5	561
Construction of a Line of Tramway from Ashfield Railway Station to Portland Place, 390 .....	5	1143
Improvement of the Parramatta Road at University Cutting, 324.....	5	559
Reclamation of certain low-lying mud-flats in the vicinity of Long Cove, 358 .....	4	787
Tramway from Castlereagh-street to the Randwick Road, 324.....	5	1141
Tramway from Leichhardt to Five Dock, 257.....	5	1139
Widening Line of Railway from Sydney to Eveleigh, 358 .....	5	1135
PUBLIC WORKS DEPARTMENT :—		
Annual Statement of works carried out by Department during 1889, laid on Table, 257.....	8	1
PUBLIC WORKS PROPOSALS :—		
BRIDGES AT MORPETH AND HINTON :—		
Report by Examiners on, laid on Table, 465; Evidence laid on Table, 469 .....	5	773
IMPROVEMENTS OF THE BRUNSWICK RIVER :—		
Report of E. B. Price, Temporary Examiner on, laid on Table, 465 .....	7	169
BRANCH RAILWAY TO BALLINA :—		
Report by Mr. E. B. Price, Temporary Examiner on, in connection with the Lismore to the Tweed Line, 485 .....	5	991
GALONG TO BURROWA RAILWAY :—		
Report by Mr. P. Scarr, Temporary Examiner of Public Works proposals, laid on Table, 555.....	5	997
PUBLICANS LICENSES FURTHER RESTRICTION BILL :—		
Motion made ( <i>Sir Henry Parkes</i> ) for Committee of the Whole, 411; Message from the Governor, 425; Order of the Day postponed, 429; House in Committee, resolution agreed to, presented and read 1 <sup>o</sup> , 471-2.	3	993
PULLMAN CARS (See "RAILWAYS.")		
PUNT :—		
Petition from certain persons for abolition of tolls on Hinton, 216 .....	5	819
PYRMONT (See "BRIDGES").		
<b>Q</b>		
QUEENSLAND BORDER (See "ROADS").		
"QUESTION BE NOW PUT" :—		
Motion made for, and passed, 275, 336.		
Motion made, and less than forty members shown in Tellers list, in favour of, 275-6.		
QUESTIONS AND ANSWERS :—		
Sessional Order passed, 10.		
QUORUM (See "NO QUORUM.")		

## QUESTIONS :—

- ABATTOIRS :—**  
Removal from Glebe Island, 179.  
Trucking Cattle to Glebe Island, 332.
- ABBOTT, MR. J. P., M.P. :—**Letter in reference to Bores for Water, 97.
- ABORIGINALS :—**  
Enrolment on Electoral Lists, 243.  
Protection Board, 244.
- ADMINISTRATION OF JUSTICE :—**  
Acting Gaoler at Cobar, 107.  
Appeals under Crown Rents Bill, 370.  
Appointment of Mr. F. B. Hales, P.M., for Bombala and Eden, 552.  
Case of Alison v. Burns, 38, 56, 225.  
Case of Whittton v. White, tried at Bathurst, 198.  
Case of Constable Semmington, 264.  
Case of Gordon v. Garrett, heard at Dubbo, 446.  
Catherine Hill Bay, 255.  
Clerk of Petty Sessions for Tamworth, 285.  
Clerks of Petty Sessions in Sydney acting as Chamber Magistrates, 267, 286.  
Confines in Darlinghurst Gaol for Wife Maintenance, 369.  
Cost of maintenance of Prisoners, 149.  
Court-house, Milton, 128.  
Court-house, Bourke, 225.  
Court of Petty Sessions, Jindabyne, 140.  
Court of Petty Sessions and Lock-up for Katoomba, 187.  
Court of Petty Sessions at Swansea, 389.  
Daniel Grove and William Topper, Crown Witnesses, 162.  
Decisions in Land Court Appeal Cases, 551.  
District Court Judges, 30.  
District Court of Quarter Sessions, Condobolin, 127.  
Eastern Suburbs Court-house, 365.  
Ecclesiastical Court, 56.  
Ella, arrested for Sussex-street Riot, 150.  
Fines paid by Benjamin Tripp, 283.  
Imprisonment of Defendants in Civil Actions, 187.  
James Ray, incarcerated in Debtor's Prison, 23.  
Junee Court-house, 418.  
Law Reform, 513.  
Lord Howe Island, 244, 256.  
Man named Neish, convicted of Bigamy, 378.  
Members of Parliament, serving as Jurymen, 157.  
Metropolitan District Court, 66.  
Millane v. M. Tully, Land Case, 489.  
Mr. Thomas Connolly, J.P., 102.  
Mr. Lec, Stipendiary Magistrate, 206, 221.  
Mr. Giles, P.M., Parramatta, 334.  
New Court-house, Maclean, 263.  
Newcastle Court-house, 99.  
Police Magistrate, Broken Hill, 51.  
Police Magistrate, Bombala, 111, 285.  
Police Magistrate, Windsor and Richmond, 403.  
Prisoner Davidson, 60.  
Prosecution of Francis Leslie Shaw, 255.  
Police Magistrates transferred to Mines Department, 243.  
Remission of Fines by Magistrates, 135.  
Remuneration to Jurors, 352, 421.  
Sheriff's Officer, Cobar, 221.  
Stephen v. Erwin, 97.  
Site for Court-house, Redfern, 17.  
Small Debts Courts, Country Districts, 78.  
Small Debts Court at Yantabulla, 365.  
Vacation for Sydney Police Court, 177.  
Wesbury Atha, v. Olsand, 113.  
Witness in case Regina v. Myers, 422.  
Women Imprisoned for Debt, 243.
- ADVERTISEMENTS :—**  
Government, in Country Papers, 210.  
Sunday Amusements, 343.
- AGENT-GENERAL :—**Office of, 533.
- AGRICULTURAL :—**  
Branch, Mines Department, 16, 36.  
College at Bathurst, 10.  
College and Model Farm, Orange, 72.  
College, Ham Common, 172.  
College at Rookwood, 186.  
Establishment of Colleges, 97.  
Experimental Farm, Bourke, 132.  
Experimental Farms, 187, 215.  
Farm at Rookwood, 161.  
Freights on Produce, 378.  
Grants to Societies, 23, 99, 106, 224.  
Metropolitan Society's Ground, 120, 538.  
Metropolitan Society, 71, 85, 101.  
Model Farm, Hunter District, 161.

## Q

## QUESTIONS (continued) :—

- AGRICULTURAL (continued) :—**  
Premises rented by Scientific Department of, 504.  
Utilization of Reformatory Buildings and Grounds, Rookwood, 464.
- ALBERT GOLD-FIELDS :—**Application for Mineral Lease, 186.
- ALBURY :—**Express Trains, 417.
- ALISON v. BURNS :—**Case of, 38, 56, 225.
- AMAROO :—**Public School at, 219.
- AMMUNITION (See "MILITARY").**
- ANGLEDPOOL (See "WATER CONSERVATION").**
- ANNANDALE :—**Post and Telegraph Office, 78.
- ARCHITECT'S DEPARTMENT (See "GOVERNMENT ;" also "CIVIL SERVICE.")**
- ARDILL, MR. JOHN ROCHE :—**Claim to compensation, 8.
- ARGYLE ELECTORATE :—**Roads in, 209 (?).
- ARGYLE REEFS :—**Removal of, Clarence River, 414.
- ARTESIAN BORES :—**  
Angledool-Collarendabri Road, 15, 132.  
Barrington Contract, 123.  
Deniliquin to Moama Road, 496.  
Hay, 24.  
Letter of Mr. J. P. Abbott in reference to, 97.  
Prices of Well-boring Rods and Tubes, 223.  
Yellow Waterholes, near Moama, 129, 200.
- ARTILLERY (See "MILITARY").**
- ASHBURNHAM AND GORDON :—**Leasehold Areas in Counties of, 97.
- ASHBURY CARELAGES (See "RAILWAYS").**
- ASHFIELD :—**  
Railway Permanent Way to Burwood, 229.  
Tramway to Druitt Town, 478.
- ASLATS :—**Influx of, 75.
- ASSAYS (See "MINING").**
- ASYLUMS :—**  
Government, 376.  
Macquarie and George Streets, Parramatta, 171.  
Mrs. Canynghame, late Superintendent of the Macquarie-street Asylum, Parramatta, 377, 413.  
Purchase of Rossiville and Kenmore Estates for Lunatics, 85.  
Inebriate, 449.
- AUSTRALIAN COLONIES :—**Deportation of Pauper and Liberated Criminals to, 539.
- AUTOMATIC BRAKES (See "RAILWAYS").**
- BAAN BAA :—**Village at, 65.
- BAIRNSDALE :—**Extension of Railway to N. S. Wales border, 426.
- BALLINA :—**Railway to Lismore, 519.
- BALMAIN :—**  
Extension of Tramway to, 179.  
Railway to Longnose Point, 39, 332.  
Reclamation of White Bay, 57, 404, 446.  
Tram Extension from Forest Lodge, 392, 404.
- BALMORAL :—**Government Land at, 106.
- BANKS :—**Government Moneys in, 403.
- BARCLAY, ISAAC :—**Claim of, 128, 333.
- BARRATTA RUN :—**  
Annual leases, 272, 284.  
Forfeited Improvements on, 120.  
Petition in reference to, 37, 67.
- BARRINGTON :—**  
Bore, 123.  
Post Office, 121.  
Road to Bourke, 233.  
Swamp leading into Town, 121.
- BARTON, MR. G. B. :—**  
Agreement to write History of New South Wales, 279.  
Publication of History of New South Wales, 413.
- BATHS :—**Erection of, Sydney Harbour, 221.
- BATHURST :—**  
Agricultural College at, 10.  
Licensing Inspectors, 229.  
Locomotives at, 172.  
Railway Accident, 8, 37, 78, 114, 334.
- BATHURST BURN :—**Eradication of, 224, 280.
- BATTERSEA :—**Peppercorn's Property, 418, 455.
- BEAR ISLAND :—**Royal Commission on Fortifications, 158.
- BEEF, MUTTON, &c. :—**Export of, 205.
- BEGA :—**Railway to Eden, 43, 301.
- BELLINGER RIVER :—**  
Growth of Cedars in District, 315.  
Harbour and Entrance, 194.  
Improvements of Harbour, 459.
- BENEFIT SOCIETIES :—**Information respecting, 338.
- BENSUSAN (See "MINING").**
- BERRIDALE :—**Telegraph Line from Cooma, 315.
- BERRIGAN :—**  
Sale of Town Allotments, 129.  
Railway from Jerilderie, 418, 481.

## Q

## QUESTIONS (continued) :—

- BEVAN, MATTHEW :—Fine imposed under Stock Act, 240.  
 BEVAN, MR. :—New Guinea Explorer, 224, 244.  
 BEYTS, DR. SAMWIL CELLIM, F.M.C.P., D.C.L.M.M. :—  
 Status of, 305.  
 BINALONG :—Reserves at, 59.  
 BLACKHEATH :—Railway Accident at, 37.  
 BLACKTOWN :—Trial Survey of Line to Blayney, 9, 224.  
 BLAYNEY :—Trial Survey of Line from Blacktown, 9, 224.  
 BLUE-JACKET LEASE (See "MINING").  
 BLUESTONE :—Sale of, under Poisons Act, 50.  
 BOATMEN :—Of the Marine Board, 524.  
 BOGAN RIVER :—Bridge between Bourke and Brewarrina,  
 225.  
 BOMBALA :—  
 Mail Service from Perico, *via* Bondi, 280.  
 Police Magistrate, 111, 285.  
 Recreation Reserve, 552.  
 Road to Bondi, 280.  
 BOMBO QUARRY :—Fatal accident to man named Saunders,  
 164.  
 BONDI :—  
 Extension of Tramway, 61.  
 Road from Bombala, 280.  
 Tram Fares to, 206.  
 Tramline, 477.  
 BORENORE :—Conveyance of Mails to Forbes, 112, 119, 120.  
 BORES (See "ARTESIAN BORES").  
 BOTANIC GARDENS :—Supply of flowers to hospitals, 404.  
 BOTANICAL SURVEY :—Of the Colony, 315.  
 BOURKE :—  
 Bridge over the Bogan between Brewarrina and, 225.  
 Crown Land in Town of, 225.  
 Court-house, 225, 344, 365, 448.  
 Experimental Farm at, 132.  
 Flood, Railway Line, 15, 452.  
 Free Railway Passes, 128.  
 Government Buildings and Revenue, 230.  
 Hospital, 452.  
 Losses of Stock in District, 50.  
 Rabbit-proof fence between Dubbo and, 370.  
 Railway Line, 16, 173.  
 Railway from Byrock, 30.  
 Railway trucks for Wool at, 446.  
 Relief Fund, 537.  
 Repair of Road to North Bourke, 364.  
 Returns on Railways between Wellington and, 471.  
 Roads in District, 233.  
 Road from Barrington, 233.  
 Streets of, 233.  
 Time of arrival of Western Mail Train at, 446 (?).  
 Wool at Railway Stations between Nyngan and, 448.  
 BOWLING GREEN :—Formation of, Victoria Park, 497.  
 BOWRAL :—  
 Quarry at, for Railway purposes, 177.  
 Resumption of Pember's land for Cemetery, 460.  
 Road to Wombeyan Caves, 207.  
 BOYLE, CONSTABLE :—Assault on, at Fire in Pitt-street,  
 448.  
 BRACKENRIG, MRS. M. (See "CIVIL SERVICE").  
 BRADFORD, D. AND R. :—Tender for Special Castings,  
 478.  
 BRADLEY'S HEAD :—Lights and Fog-bell at, 60  
 BRAIDWOOD :—  
 Mr. Watts, Clerk of Petty Sessions, 7.  
 Postal Assistant at, 23.  
 Railway from Terago, 9.  
 BREAKWATER :—  
 Construction of, at Trial Bay, 194, 245.  
 Southern, at Richmond Heads, 551.  
 BREWARRINA :—  
 Bridge over the Bogan, between Bourke and, 225.  
 Bridge over the Narran Creek, between Goolooga and  
 225, 364.  
 Extension of Railway to, 44, 107.  
 Government Buildings and Revenue, 230.  
 Railway to Byrock, 16, 131, 392.  
 Repairs of streets, 233.  
 Special areas near, 233.  
 BREWONGLE :—  
 Loading Stage at, 319.  
 Telephone to O'Connell, 22.  
 BRIDGES :—  
 Coldstream River, 44.  
 Concrete used in Cylinder, 323.  
 Denison, at Kelso, 305.  
 Erection of, over Vale Creek at Perth, 9.  
 Erection of, to North Shore, 24.  
 Erection of, over the Murray, 293.  
 Glebe Island, 421.  
 Greg Greg, Upper Murray River, 50.

## QUESTIONS (continued) :—

- BRIDGES (continued) :—  
 Gundagai, 271.  
 Hawkesbury River, 57.  
 Iron Cove, 87, 352.  
 Ironwork for construction of, 199.  
 Morpeth and Hinton, 389.  
 Mulwala, over Murray River, 128, 256.  
 Narrandera, 60, 186.  
 Orphan School Creek, 180.  
 Over Murray River at Jingellic and Tintaldra, 8, 323.  
 Over River at Goolooga, 16, 140, 391.  
 Over Mulwarrie Creek at Goulburn, 51.  
 Over Murrumbidgee River at Freshford, 82, 234, 340.  
 Over Bogan, between Bourke and Brewarrina, 225.  
 Over Narran Creek, between Goolooga and Brewarrina,  
 225, 364.  
 Over George's River at Liverpool, 305.  
 Over Tarrabong Creek near Goolooga, 364.  
 Over Lachlan River at Cowra, 339.  
 Over Lachlan River at Forbes, 409.  
 Over Macleay River at Kempsey, 478.  
 Overhead, at Honeysuckle Point Railway Station, 533.  
 Over Parramatta River at Rydalmere, 528.  
 Overhead, and Railway Station, Katoomba, 331.  
 Pymont, 45, 251.  
 Pymont to Glebe Island, 251, 422.  
 Redbourneberry, 29.  
 Wilbertree, 92.  
 Yerong Creek, near Costigan's, 93.  
 BRIDGEWATER :—Public School, 488.  
 BRITISH PROTECTORATE :—Of, at New Guinea, 85.  
 BRODERICK (See "CROWN LANDS").  
 BROKEN BAY :—Crown lands in parish, 165.  
 BROKEN HILL :—  
 Police Magistrate at, 51.  
 Railway Extension *via* Wilcannia, 139.  
 BRUNSWICK RIVER :—  
 Improvements to, 180.  
 Works at Heads, 30.  
 BUCHARGINGAH RUN :—Application for Land, 206.  
 BUCKLEY, THOMAS :—Dismissal from Roads Department,  
 132.  
 BUCOBLE :—School at, 173.  
 BUDDAI :—Protection of and Ironwood, 364.  
 BUILDINGS :—Rented by Government, 132.  
 BULL MINE :—Use of naked lights in, 250.  
 BULLOCK ISLAND :—Application to mine under Fore-  
 shores, 150.  
 BUNGENDORE :—  
 Drainage Scheme, 214.  
 Road to Currawang and Collector, 220.  
 BUNYAN :—School at, 23.  
 BURROWA :—Proposed Railway from Galong, 24, 260.  
 BURSARIES :—Obtained by Public School Children, 36.  
 BURWOOD :—Railway Permanent way from Ashfield, 229.  
 BUSHGROVE :—Road from Maclean, 263.  
 BUTLER, THOMAS :—Dismissal of, 107.  
 BYROCK :—  
 Railway from Brewarrina, 16, 131, 392.  
 Railway to Bourke, 30.  
 Water supply for, and Coolabah, 364.  
 CABLE SERVICE :—Alternate route, 180.  
 CADET CORPS (See "MILITARY").  
 CALOOLA CREEK :—Application of P. J. Glasheen for  
 Church and School Land, 129.  
 CAMDEN :—Application for Corps of Mounted Infantry,  
 165.  
 CAMDEN HAVEN, UPPER :—Road, 172.  
 CAMP EQUIPMENTS :—Cartage of, 111.  
 CAMPING RESERVE (See "RESERVES").  
 CANAL :—From Murrumbidgee River to Lake Urana, 478.  
 CANANGLES :—Road from Cargo, 172.  
 CARRATHOOL :—  
 Road from Hillston *via* Camp Plain, 185, 478.  
 Road from Railway Station to Hillston, 487.  
 CARCOAR :—Trucking Yards, 75.  
 CAREENING COVE :—Reclamation at, 447.  
 CARGO :—  
 Mining Districts, 205, 391.  
 Road to Canangles, 172.  
 Post and Telegraph Office, 538.  
 CARMICHAEL :—Gratuity from Railway Commissioners  
 to, 7.  
 CARROLL (See "CROWN LANDS").  
 CARVINGS :—Removal of Post Office, 344.  
 CASINO :—Pastoral Lessors, 140, 528.  
 CASSIUS :—Railway from Muswellbrook, 37, 207.  
 CASTINGS, SPECIAL :—Tender of D. and R. Bradford for,  
 478.

## QUESTIONS (continued) :—

- CASWELL, MR. WARDEN :—  
Decisions in mining cases at Peak Hill, 146.  
Police Magistrate, Dubbo, 113.
- CATHERINE HILL BAY :—Administration of Justice at, 255.
- CATTLE-DRIVING (See "STOCK").
- CAVALRY (See "MILITARY").
- CEDARS :—Growth of, in Macleay and Bollinger Districts, 315.
- CEMETERIES :—  
Introduction of Bill, 446.  
Newbridge, 10.  
Nyrang Creek, 92.  
Petersham, 452.  
Resumption of Pember's land at Bowral for, 460.  
Thirlmere, 106.  
Trustees of, 249.
- CENSUS :—Of the Colony, 297.
- CENTENNIAL PARK :—  
Amount expended on, and sale of villa sites, 105.  
By-laws, 101.  
Sale or lease of frontages, 441.  
Marble Statues in, 552.
- CENTRAL DIVISION (See "CROWN LANDS").
- CHAMBER MAGISTRATES :—Clerks of Petty Sessions in Sydney acting as, 267, 286.
- CHATSWORTH :—Road from Harwood, 210.
- CHICAGO INTERNATIONAL EXHIBITION :—Representation at, 263.
- CHILLED MEAT :—  
Carriage of, 220.  
Rooms, Darling Harbour, 178.
- CHINESE :—Immigration to South Australia, 539.
- CHOWDER BAY :—  
Riot at, 468.  
Submarine Buildings, 22.
- CHURCHES, &C. :—Assessment by Water and Sewerage Board, 488.
- CHURCH AND SCHOOL LANDS :—Application for lease by P. J. Glasheen, 129.
- CIRCULAR QUAY :—Removal of Commissariat Stores, 189, 186.
- CITY RAILWAY :—Inquiry Commission, 17.
- CITY AND SUBURBAN :—Control of Tramways, 179.
- CIVIL ACTIONS :—Imprisonment of Defendants, 187.
- CIVIL SERVICE :—  
Appointment of Mr. Davidson as Draftsman, 251.  
Appointments to Railway Department, 140.  
Appointments from Gunnedah Electorate, 209.  
Appointment of Engineer-in-Chief for Railways, 464.  
Assistant Superintendent Stores Department, 244, 256, 260, 264, 267.  
Appointment of Mr. F. B. Hales, P.M., for Bombala and Eden, 552.  
Clerks in Lands Office, Sydney, 425.  
Clerk required to resign from Money Order Office, 440.  
Clerks in Telegraph Office, Sydney, 513.  
Commission, 60, 433, 504.  
Comptroller-General of Prisons, 135.  
Dismissal of Thomas Butler from Works Department, 107.  
Dismissal of Mr. Egeson from Observatory, 433.  
Dismissal and re-appointment of employee in Post Office, 514.  
Employment of Females, 210.  
Government Officials enrolled as Special Constables, 351, 403.  
"Hansard" Staff, 514.  
Immigration Department, 85.  
Lands Office Inquiry Commission, 31.  
Letters in *Protestant Standard* in reference to Postal Department, 129, 131, 140 (?).  
Messrs. Cracknell, Wilson, and Hipsley, 60.  
Mines Department, 534.  
Mr. Cracknell, 98 (?), 440.  
Mr. Watts, Clerk of Petty Sessions, Braidwood, 7.  
Mr. John Roche Ardill, 8.  
Mr. M'Creddie, Public Instruction Department, 22.  
Mr. W. A. Fraser, Clerk of Petty Sessions at Tingha, 56.  
Mr. Caswell, P.M., Dubbo, 113.  
Mr. F. Erbert, Fisheries Department, 413.  
Mr. Midclton, inquiry into case of, 50.  
    removal of, from Public Service, 477.  
Mrs. M. Brackenrig, Assistant Superintendent of Industrial School, Parramatta, 508.  
Mrs. Cunyngame, Superintendent of Macquarie-street Asylum, Parramatta, 377.  
Officers imported by Railway Commissioners, 101.  
Officers of Lands Department, 123.  
Officers of Colonial Architect's Department, 532.  
Pensioners and Pensions under Superannuation Fund, 37.

## Q

## QUESTIONS (continued) :—

- CIVIL SERVICE (continued) :—  
Postal Inspectors, 98.  
Promotion of Officers in Lands Department, 102.  
Reorganisation of Postal and Telegraph Departments, 427.  
Report of Commission on Post and Telegraph Department, 256, 422, 425.  
Report of Commission on Mines Department, 271, 283, 513, 523, 528, 533.  
Report of Commission on Treasury Department, 533.  
Salaries of Officers of Legislative Council, 496.  
Salary of Prothonotary, 272.  
Stock Board Examiners, Inspectors of Stock, 186.  
Superannuation Fund, 37, 422.  
Superintendent of Hospital for Insane, Newcastle, 145.  
The Agent-General, 533.  
The Colonial Architect, 120.  
Thomas Buckley's dismissal, 132.  
Vacancies in Postal Department, 139.
- CIVIL SERVICE ACT :—Report of Actuary on, 119.
- CLARENCE RIVER :—  
Dredge for, 44, 66, 210.  
Harbour Improvements at Heads, 384.  
Population of Electorate, 81.  
Removal of Argyle Reefs, 414.
- CLOCKS (See "POST OFFICE"; also "RAILWAYS").
- COAL :—  
Contract for Supply to Railway Department, 344, 369, 377, 378, 389.  
Rate of traction on Railways, 165.  
Slack in Illawarra District, 284.
- COALCRAFT :—Miners at, 447.
- COBAR :—  
Acting Gaoler at, 107.  
Additions to Post Office, 272.  
Government Buildings and Revenue, 230.  
Railway from Nyngan, 343.  
Reserve Rifle Company, 139.  
Ringbarking Crown Lands in District, 364, 370.  
Sheriff's Officer for, 221.  
Special area around, for small holdings, 16, 136.  
Town Common, 78.  
Water Supply, 78.
- COFF'S HARBOUR :—Jetty at, 463.
- COINAGE :—Of Silver at Sydney Mint, 206.
- COLDSTREAM RIVER :—Bridge over, 44.
- COLLARENBARRI (See "WATER CONSERVATION").
- COLLECTOR :—  
Road from Bungendore, 220.  
Marked-tree Road from Gundaroo, 475, 495.
- COLONIAL ARCHITECT :—  
Retirement of, 120.  
Officers of Department, 532.
- COMMISSARIAT STORES :—Removal of, from Circular Quay, 180, 186.
- COMMISSIONERS (See "RAILWAYS").
- COMMISSIONS :—  
City Railways, 17.  
Civil Service, 60, 433, 504.  
Fees paid in Milburn Creek, Fehon Inquiry, and Tramway Leasing, 497.  
Fortifications, Bear Island, 153.  
Lands Office Inquiry, 31.  
Mines Department, 271, 283, 513, 523, 528, 533.  
Post and Telegraph Office Inquiry, 256, 422, 425.  
Royal, on Works of Defence, 532.  
Treasury Department, 533.
- COMMONS :—  
Cobar Town, 78.  
Sydney and Moore Park, 146.  
Tank, Molong Town, 404.  
Trustees for Molong, 9.  
Town Goodooga, 233, 364.  
Town Coolabah, 364.  
Wilberforce, 115.
- COMPANIES :—  
Introduction of Bill for Registration, 35.  
Registered under Limited Liability Act, 127.
- COMPOSITORS (See "GOVERNMENT").
- COMPTROLLER-GENERAL OF PRISONS :—Appointment of, 134.
- CONCERT PUBLIC SCHOOLS :—Children taking part in, 392.
- CONCRETE (See "BRIDGES").
- CONDITIONAL PURCHASES (See "CROWN LANDS").
- CONDITIONAL LEASES (See "CROWN LANDS").
- CONDOBOLIN :—  
District Court of Quarter Sessions, 127.  
Land Office, 333.  
Stock route from Dandaloo, 180.  
Unsurveyed Land in District, 409.

## Q

## QUESTIONS (continued) :—

- CONFERENCE :—  
Of Road Engineers, 347.<sup>1</sup>  
Federation, 513.
- CONFINES :—In Debtors' Prison, 295.
- CONNOLLY, MR. THOMAS :—Appointment to Commission of Peace, 102.
- CONSOLIDATED REVENUE :—Amounts paid out of, 113.
- CONSTITUTION OF NEW SOUTH WALES :—Change in, 306.
- CONSUMPTION :—Dr. Koch's Cure for, 445, 455.
- CONTRACTORS (See "ROADS"; also "RAILWAYS.")
- CONTRACTS :—  
Clothing Military Forces, 151.  
Prices of new Railway Carriages and Motors, 157.  
Sub-letting of Government, 284.  
Winding Clocks and Watches on Great Northern Railway, 194.
- COOGEE :—Tram fares to, 206.
- COOK'S RIVER ROAD :—Expenditure on, 328.
- COOL STORAGE :—At Railway Stations, 9.
- COOLABAH :—  
Erection of Trucking Yards, 364.  
Police Station, 233, 364.  
Railway Accident, 225.  
Town Common, 364.  
Water Supply for Byrock and, 364.
- COOMA :—  
Land Board, 93.  
Railway returns, 102.  
Railway to Victorian Border, 120, 250.  
Sleeping Cars for railway from Goulburn, 369.  
Telegraph line to Berridale, 315.
- COONABARABRAN :—Abandoned Runs in Land District, 507.
- COONAMBLE :—Distances by various Railway routes from Sydney, 193.
- COORANBONG :—Post and Telegraph Office, 334.
- COPELAND :—School of Arts, 513, 552.
- CORAKI :—Road from Maclean, 45, 82.
- CORONALLO (See "CROWN LANDS").
- COROWA :—Special Areas in Land District, 166.
- COUNTRY NEWSPAPERS :—Government advertisements in, 210.
- COURT HOUSES :—  
And Police Station, Redfern, 311.  
Bourke, 225, 344, 365, 448.  
Hay, 356.  
Junee, 418.  
Liverpool, 311.  
Eastern Suburbs, 365.
- COURTS OF ARBITRATION AND CONCILIATION :—Introduction of Bill to provide for, 343.
- COWRA :—  
Bridge over Lachlan River at, 389.  
Local Works in, 72.  
Post and Telegraph Offices, 468.  
Road to Glenlogan, 244.  
Show Ground, 57.
- CRACE, MR. (See CROWN LANDS).
- CRACKNELL, MR. :—  
Absence in Melbourne, 440.  
Attendance at Postal Conference, 98.  
Salary and Allowances, 60, 98.
- CRIMINALS :—Deportation of Pauper and Liberated, to Australia, 539.
- CROOKWELL :—  
Post and Telegraph Office, 185.  
Railway from Goulburn, 51, 268.
- CROWN LANDS (See also "RESERVES").  
Abandoned Runs in Land Districts of Narrabri, Walgett, Gunnedah, and Coonabarabran, 507.  
Additional Conditional Purchase of George Curry at Cootamundra, 55.  
A. and J. Cunningham's Forfeited Conditional Purchase at Queanbeyan, 86.  
Advertising, for sale, 216.  
Agents applying for, 234.  
Albert Stafford's Irrigation Lease, 107.  
Applications for land, Bucharingah Run, 206.  
Appointment of Mr. C. A. Ring to Land Board, Silverton, 230.  
Area of Gosford population reserve, 279.  
Areas of land alienated at Stockton, 340.  
Board of Inquiry into working of Land Boards at Hay and Deniliquin, 363, 377.  
Barratta Run, 37, 67, 120, 272, 284.  
Binalong Reserve, 69.  
Cancellation of Land from dedication, parish of Willoughby, 388.  
Cancellation of Yugalbar and Solferino Gold-field Reserves, 405.

## QUESTIONS (continued) :—

- CROWN LANDS (continued) :—  
Case of Alison v. Burns, 38, 56.  
Cases of Broderick and Carroll, selectors, Queanbeyan District, 551.  
Casino District, Pastoral Lessees, 140, 528.  
Claim of Isaac Barclay, 128, 333.  
Compensation to Mrs. Tucker, of Forbes, 36.  
Conditional Purchase of Charles Tucker, jun., at Forbes, 30.  
Conditional Purchase of Michael Madden, 38.  
Conditional Purchase of James Maher, 146.  
Conditional Purchases transferred to Financial Institutions, 331.  
Cooma Land Board, 93.  
Coronallo Resumed Area, 66, 107, 121.  
Decisions in Land Court Appeal Cases, 551.  
E. Wolstencraft's Grant at Gindindy, 92.  
E. Wolstencraft's Grant at Nowra, 105.  
Forfeited Leases under Land Act of 1884, 177.  
Goff's Harbour, within 4 miles of Jetty, 45.  
Gold-fields Reserves between Forbes and Parkes, 145.  
Gosford Land District, 94.  
Government Land at Balmoral, 106.  
Grant held by Mr. Alexander Dyce, 503.  
Grants held by Messrs. Crace, Johnston, and Dyce, 468.  
Hay and Deniliquin Land Courts, 259.  
Homestead Lease of Mr. John Higgins at Wentworth, 49.  
Homestead Leases, 404.  
Increase of Rents above Board's recommendation, 71.  
Inquiry into Local Boards, 114, 363, 377.  
Introduction of Bill to prevent dummyism, 445.  
Land in Molong District, 123, 128.  
Land Agents, 427.  
Land Board, Gosford, 426, 479.  
Land Court, Mount M'Donald, 240.  
Land Office at Condobolin, 333.  
Lands selected and leased in Central Division, 347.  
Leaschold Areas, Counties of Ashburnham and Gordon, 97.  
Leaschold Areas reserved from settlement, Molong District, 173.  
Leases under 48th section of Act of 1889, 67.  
Leases in Eastern Division, 92.  
Lessees in Western Division, 469.  
Manly Cove, Narrabeen, and Broken Bay, 165.  
Maps of Snow Leases, 551.  
Maximum areas of Conditional Purchases, 302.  
Miss O'Brien's Forfeited Selection, Corowa, 86.  
Parishes of Narara, Popran, Mangrove, Eglington, and Koree, 286.  
Pastoral Holdings, 65.  
Pastoral Leases, 198.  
Quit rents, 445.  
Regulation No. 50 under Act, 552.  
Removal of Land Board Offices from Tamworth to Narrabri, 378.  
Rents of Homestead Leases in Bourke and other Western Districts, 81.  
Rents of Conditional Leases, 120.  
Rents of, 215, 225.  
Rents of Rabbit-infested, 244.  
Rents of Mr. Ricketson's Annual Leases at Deniliquin, 263.  
Reservation in Parishes of Arakoon, Kinchela, and Kempsey, 45.  
Reserves for selection, Richmond District, 16.  
Reserves, Molong District, 8, 173, 388.  
Reserves in Resumed Areas and Pastoral Holdings, 93.  
Reserves and Leasehold Areas in Eastern Division, 171.  
Reserves near Mungindi, 301.  
Ringbarking Crown Lands in Cobar District, 364, 370.  
Salaries of Members of the Land Court, 496.  
Sale of Town Allotments, Woodstock, 251.  
Sale of Town Allotments, Berrigan, 129.  
Sale of town lots, Delegate, 435.  
"Scrub" under Acts, 370.  
Selection made by John Patterson at Corowa, 38.  
Special Areas, Lands Act of 1889, 8, 128, 323.  
Special areas land, District of Corowa, 166.  
Special areas round Cobar for small holdings, 16, 136.  
Special areas near Brewarrina, 233.  
Special Areas—Return of made since March, 1889, 347  
Survey of Portion No. 31, parish of Clunes, county of Rous, 508, 537.  
Taken up on 17th July, 215.  
Township of Bourke, 225.  
Tumut Electorate, 279, 285.  
Unsurveyed land in Condobolin District, 409.

## Q

## QUESTIONS (continued):—

**CROWN LANDS (continued):**—  
 Volunteer Land Orders, 185.  
 Woodstock Township Allotments, 57.  
 Yowendah and Euroka Runs, Walgett District, 340.  
 Yugilbah Pastoral Holding, 533.  
**CROWN RENTS BILL:**—Error in, 240.  
 Appeals under, 370.  
**CROW'S NEST:**—Grant to E. Wolstencraft, 92.  
**CUDGELLICO LAKE:**—  
 Conservation of Water in, 186.  
 Works to conserve Water, 478.  
**CULLEN, JOHN:**—Dismissal from the Dredge Service, 404.  
**CUMNOCK:**—  
 Post and Telegraph Office, 172.  
 Road to Peak Hill, 56, 93.  
 Telegraph from Molong, 43.  
 Telegraph to Peak Hill, 43.  
**CUNNINGHAM, A. AND J.** (See "CROWN LANDS").  
**CUNYNGHAME, MRS.:**—  
 Cost of Inquiry before Select Committee, 377, 413.  
 Printing of "Protest" in case of, 514.  
**CURRAWANG:**—Road from Bungendore, 220.  
**CURRY, GEORGE** (See "CROWN LANDS").  
**CURVES** (See "RAILWAYS").  
**CYLINDERS OF BRIDGES:**—Concrete used in, 323.  
**DAIRIES SUPERVISION ACT:**—  
 Action of Board of Health, 333.  
 Cows Suffering from Tuberculosis, 98.  
 Expenses under, 82.  
**DAM:**—Yerong Creek, 186, 199.  
**DAMS** (See "WATER CONSERVATION").  
**DANDALOO:**—Stock route to Condobolin, 180.  
**DARLINGHURST:**—Debtors Prison, 44, 59, 285, 519, 528.  
**DARLING HARBOUR:**—  
 Chilled-meat Rooms, 178.  
 Control of Iron Wharf, 188.  
 Labourers at, 538.  
**DARLING ISLAND:**—Purchase of, 45.  
**DARLING RIVER:**—Telegraphic Communication during Floods, 113.  
**DAVIDSON:**—Imprisonment of Woman, 60.  
**DAVIDSON MR.:**—Appointment of as Draftsman, 251.  
**DAWES POINT:**—Reserve, 45.  
**DEBT:**—Women Imprisoned for, 243.  
**DEBTORS** (See "PRISONS").  
**DEEP CREEK:**—Opening of road on bank of, 414.  
**DEFENCE OF THE COLONY:**—  
 Department of and appointment of Military Secretary, 260, 425.  
 Replies to Communication of President of Committee, 514, 532.  
 Royal Commission on Works, 532.  
**DELEGATE:**—Sale of town lots, 435.  
**DENILQUIN** (See also "WATER CONSERVATION.")  
 And Hay Land Court, 259.  
 Board of Inquiry into working of Boards at Hay and, 363, 377.  
 Coronallo Resumed Area, 66.  
 Railway from Jerilderie, 418, 481.  
**DENISON BRIDGE** (See "BRIDGES").  
**DIFFERENTIAL RATES** (See "RAILWAYS").  
**DIMBECKI, ALEXANDER T.:**—Charges made by, 351.  
**DISEASED MEAT BILL:**—Introduction of, 91, 161.  
**DISEASES IN SHEEP ACT:**—Receipts and disbursements under, 98, 244, 267, 383.  
**DISEASES IN STOCK ACTS:**—Amendment of, 496.  
**DISTRICT COURT:**—  
 Metropolitan, 66.  
 Salaries of Judges, 30.  
**DOODLE COOMA:**—Road from Mynyabla, 45.  
**DRAINAGE:**—Scheme, Town of Bungendore, 214.  
 Union for Land at Seven Oaks, Macleay River, 376.  
**DRAW-BAR:**—Broken, on Goods Train—Granville to Strathfield, 302.  
**DREDGES:**—  
 Dismissal of John Cullen, 404.  
 For Clarence River, 44, 66, 210.  
 For Nambucca River, 50.  
 List of Employees, 57.  
 Sportsmans Creek, Clarence River, 381.  
**DREW, MESSENGER:**—Compensation to mother of, 426.  
**DRINK TRAFFIC:**—City of Sydney, 205.  
**DRUITT TOWN:**—Tramway from Ashfield, 478.  
**DUBBO:**—  
 Road to Peak Hill, 93.  
 Railway from Werris Creek, 113.  
 Rabbit proof fence between Bourke and, 370.  
**DUMMYISM:**—Introduction of Bill to prevent, 445.  
**DYCE, MR.** (See "CROWN LANDS").  
**EASTER MANŒUVRES:**—Visitors to Fortifications during, 61.

## QUESTIONS (continued):—

**EASTERN DIVISION** (See "CROWN LANDS"; also "HARES").  
**EASTERN SUBURBS:**—Court-house, 365.  
**EAST ST. LEONARDS:**—Amalgamation of Boroughs, 149, 183.  
**ECCLESIASTICAL COURT:**—Alteration and reform of practice of, 56.  
**EDEEN:**—Railway from Bega, 43, 301.  
**EDUCATION:**—  
 Agricultural College, Ham Common, 172.  
 Boarders in Public Schools, 224.  
 Bucoble School, near Molong, 173.  
 Bursaries obtained by Public School Children, 36.  
 Elementary Political Economy, Primary Schools, 60.  
 Examinations of Country Pupil-teachers, 98.  
 Female Teachers, 213.  
 Fuel in Country Schools in Winter, 61.  
 Instruction in Public Schools, 259.  
 Kirkeconnell Public School, Yetholme, 51, 193, 199.  
 Leave of absence to Professors, &c., Sydney University, 219.  
 Leichhardt Superior Public School, 344.  
 Model Farm and Agricultural College, Orange, 72.  
 Public School, Molong, 44.  
 Public School, Lawson, 67.  
 Public Schools, 199.  
 Public School at Amaroo, 219.  
 Public School Concert, 392.  
 Public School, Bridgewater, 458.  
 Public School, Norah Creek, 439.  
 Recreation Grounds for Public Schools, 389.  
 School at Bunyan, near Cooma, 23.  
 Scripture Lessons in Public Schools, 229.  
 Sydney University, 16, 111, 194, 240.  
 School-house, Louth, 365.  
 School of Telegraphy in connection with the Technical College, 447.  
 Technical School, Ultimo, 75.  
 Telegraphic School of instruction, 447.  
 Utilization of Reformatory Buildings and Grounds, Rookwood, 464.  
**EGGSON, MR.:**—Dismissal of from Observatory, 433.  
**EGLETON:**—Crown Land, parish of, 286.  
**EIGHT-HOUR DAY HOLIDAY:**—  
 Pay for Railway Men, 312.  
 Pay of Government Employees, 377, 378.  
**EIGHT-HOUR SYSTEM:**—Extension of principal to Government Employees, 355.  
**ELLA:**—Arrested for complicity in Sussex-street Riot, 150.  
**ELECTORAL:**—  
 Electorate of New England, 234.  
 Enrolment of Aborigines on Lists, 243.  
 Parliamentary Rolls, 94, 107.  
 Registration of Voters, 146.  
**ELECTORAL ACT:**—Expansive Clauses, 82.  
**ELEMENTARY POLITICAL ECONOMY** (See "EDUCATION").  
**EMPLOYEES** (See "RAILWAYS"; also "TRAMWAYS"; also "GOVERNMENT"; also "WATER SUPPLY"; also "SEWERAGE").  
**ENGINES** (See "RAILWAYS").  
**ERBERT, MR. E.:**—Alleged appointment to Fisheries Department, 413.  
**EROSION:**—Of River Banks, 31.  
**ERSKINE-STREET:**—Resumption of Land for Ferry Traffic, 404.  
**EGGOWRA:**—Reserve for Railway Purposes, 127.  
**EVELEIGH:**—Railway to La Perouse, 120.  
**EWING'S SURVEY** (See "ROADS").  
**EXCURSION TRAINS** (See "RAILWAYS").  
**EXPANSIVE CLAUSES** (See "ELECTORAL ACT").  
**EXPERIMENTAL FARMS** (See "AGRICULTURAL").  
**EXPRESS TRAINS** (See "RAILWAYS").  
**"EXTRA-HANDS"** (See "RAILWAYS").  
**FARLEY:**—Railway Accident at, 139.  
**FARMERS:**—Seed Wheat supplied to, 10.  
**FEDERATION CONFERENCE:**—Communication in reference to, 513.  
**FELON INQUIRY:**—Fees paid in, 497.  
**FEMALES:**—  
 Appointment to Civil Service, 210.  
 Teachers, Education Department, 213.  
**FERRISSON:**—Confinee in Debtors' Prison, 297.  
**FERRIES:**—  
 Largs, 389.  
 Resumption of Land at Erskine-street for Traffic, 404.  
 Tolls on, 452.  
 Traffic between Sydney and Suburbs, 403.  
**FINANCE** (See also "LOAN"):—  
 Amount due to the Consolidated Revenue for Charges under Rabbit Nuisance Act, 355.

## Q

## QUESTIONS (continued):—

## FINANCE (continued):—

- Amount paid for principal and interest under Act 31 Vic. No. 11, 388.
- Duty on Wire Netting, 178.
- Government Funds, 198.
- Net profit or loss on Tramways for Year 1889-90, 323.
- Revenue and Expenditure upon certain Railways and Tramways, 378.
- Treasury Bills, 150.

## FINANCIAL INSTITUTIONS:—Conditional Purchases transferred to, 331.

## FINES (See "ADMINISTRATION OF JUSTICE").

## FIRE (See "PITT-STREET FIRE.")

## FIRE BRIGADES:—Special Grants to, 234.

## FIRE BRIGADES BILL:—Amendment of, 30, 91.

## FIRE DAMP (See "MINING").

## FISHERIES ACT:—Administration of, 340, 389.

## FISHERIES COMMISSIONERS:—Trout-fry in Snowy and Umaralla Rivers, 111.

## FISHERMAN'S CHANNEL, MACLEAY RIVER:—Dredging of, 456.

## FIVE DOCK:—Extension of Train to Mortlake, 434.

## FLEMING, CORPORAL:—Inverell Mounted Infantry, 334.

## FLOODS:—

- Bourke Railway Line, 15, 452.
- Damage, Hunter River, 214.
- Embankment, West Maitland, 29.
- Telegraph communication on Darling River, during, 113.
- Tender for Flood-gate at Lawrence Drain, 381.

## FLOWERS:—Supply of, from Botanic Gardens, to Hospital, 404.

## FLYING FOXES:—Nuisance caused by, 384.

## FOOD AND LIQUOR ADULTERATION BILL:—Introduction of, 35.

## FOOT BRIDGE:—(See "RAILWAYS").

## FOOT-PATHS OBSTRUCTION:—Offenders against City By-law, 312.

## FORBES:—

- And Gunnedah Gaols, 145.
- Bridge over the Lachlan, 409.
- Conveyance of Mails from Orange and Boremore, 112, 119, 120.
- Gold-field Reserves, 145.
- Post and Telegraph Office, 478.
- Railway from Molong to Parkes and, 538.

## FOREST DEPARTMENT:—Steamer built on Murray River for, 68, 488.

## FOREST LODGE:—Tram extension to Balmain, 392, 404.

## FORTIFICATIONS (See "MILITARY"):—

- Visitors to, during Easter Manœuvres, 61.

## FRAZER, MR. W. A.:—Clerk of Petty Sessions, Tingha, 56.

## FREIGHTS ("See "RAILWAYS").

## FRESHFORD:—Bridge over Murrumbidgee at, 82, 234, 340.

## FREE LABOUR BUREAU:—

- Opening of, 31.

- Office for, 31.

## FREE PASSES (See "RAILWAYS").

## FRIENDLY SOCIETIES ACT:—Amendment of, 131, 537.

## FRUIT:—

- Inspection of, from other Colonies, 369.
- Introduction of Bill dealing with diseases in, 8, 439.

## FRUITGROWERS' UNION:—Endowments, 72.

## FUEL:—For Country Schools during Winter, 61.

## GALONG:—Proposed Railway to Burrowa, 24, 260.

## GANGERS (See "RAILWAYS").

## GAOLS:—

- Acting Gaoler at Cobar, 107.
- Confinees in Darlinghurst for Wife Maintenance, 369.
- Forbes and Gunnedah, 145.
- Tender for removal of refuse, Parramatta, 413.

## GARDEN ISLAND:—Naval Prison at, 223.

## "GENERAL GORDON" STEAMER:—Packet License granted to, 481.

## GENERAL POST OFFICE (APPROACHES IMPROVEMENT) ACT:—Resumptions under, 533.

## GENERAL STAFF (See "MILITARY").

## GEORGE, MR. HENRY:—Free Railway Pass granted to, 10.

## GEORGE'S RIVER:—Bridge at Liverpool, 305.

## GEORGE-STREET NORTH:—Post Office in, 471.

## GERMANTON:—

- Lockup, 61.
- Public Park, 61.

## GILES, MR., P.M.:—Attendance at Campbelltown Court, 334.

## GINDYANDY (See "CROWN LANDS").

## GLASHEEN, P. J.:—Application for Lease of Church and School Lands, 129.

## GLEBE-BALMAIN (See also "ROADS"):—

- Reclamation of White Bay, 57.

## QUESTIONS (continued):—

## GLEBE ISLAND:—

- Bridge from Pyrmont, 251, 422.
- Removal of Abattoirs, 179.
- Trucking Cattle to Abattoirs, 332.
- Bridge, 421.
- Branch Railway Line, 460.

## GLEN INNES:—

- Railway to Inverell, 36, 538.
- Railway Goods Traffic at, 36.

## GLENLOGAN:—Road from Cowra, 244.

## GOFF'S HARBOUR:—Crown Lands within four miles of Jetty, 45.

## GOLD DISCOVERY (See "MINING").

## GOLD LEASES (See "MINING").

## GOODE, DR.:—

- Charges against, Orange Hospital, 44.
- Imprisonment of, 297.

## GOODS TRAFFIC (See "RAILWAYS").

## GOODS RATES (See "RAILWAYS").

## GOODOOGA:—

- Bridge over the Narran Creek, between Brewarrina and, 225, 364.

- Bridge over Tarabong Creek, 364.

- Town Common, 233, 364.

## GOOLOGONG:—

- Bridge over River at, 16, 140.
- Bridge over the Lachlan River at, 391.

## GORDON v. GARRETT:—Case of, heard at Dubbo, 446.

## GOSFORD:—

- Area of Population Reserve, 279.
- Land District, 94.
- Land Board, 426, 479.

## GOULBURN:—

- Bridge over Mulwarrie Creek, 51.
- Locomotives at, 172.
- Railway to Crookwell, 51, 268.
- Sleeping Cars for Railway to Cooma, 369.

## GOVERNMENT:—

- Advertisements in Country Papers, 210.
- Asylums, 376.
- Buildings rented by, 132.
- Buildings and Revenue of Bourke, Cobar, and Brewarrina, 230.
- Compositors, 221.
- Contracts in Architect's Department, 324.
- Employees engaged as Waiters, 102, 199.
- Employee nominated for Parliament, 614.
- Funds in Sydney Banks, 198.
- Moneys in Banks, 403.
- Officials enrolled as Special Constables, 351, 403.
- Payment on Holidays to Employees, Printing Office, 75, 356.
- Pay of Employees on Eight-hour Day, 312, 377, 378.
- Printing Office, 434.
- Rates paid on Buildings, 375.
- Stores Department Assistant Superintendent, 244, 256, 260, 264, 267.
- Sub-letting of Contracts, 234.

## GOVERNORS:—

- Appointment of the Earl of Jersey, 292.
- Election of future, 140, 243.
- Residence at Hill View, Sutton Forest, 392.

## GRAFTON:—

- And Macleay Roads Office, 166.
- Population of Electorate, 81.
- Road to Yamba, 459.

## GREG GREG:—Bridge over Murray River, 50.

## GREGRA:—Camping Reserve, parish of, 92.

## GRETA COLLIERY:—Code of signalling, 551.

## GRONG GRONG:—Site for Tank, 38.

## GROVE, DANIEL:—Expenses of, as Crown Witness, 162.

## GUARDS (See "RAILWAYS").

## GULGONG:—Star Leases at, 35.

## GUM FLAT:—Cancellation of Reserves, 67.

## GUNDAGAI:—Railway Extension to Tumut, 112, 284.

## GUNDAROO:—Marked-Tree Road to Collector, 475, 495.

## GUNNEDAH:—

- And Forbes Gaols, 145.
- Appointments to Civil Service from Electorate, 209.
- Bridge, 271.

- Abandoned runs in Land District, 507.

## GUNNING:—Roads in District, 65.

## GUYRA:—Railway Goods Traffic at, 36.

## HALES MR. F. B.:—Appointment of, for Bombala and Eden, 552.

## HAM COMMON:—Agricultural College, 172.

## "HANSARD" STAFF:—Applications for increases of Salary, 514.

## HARBOURS (See also "WOLLONGONG HARBOUR TRUST"):—

- And Entrance, Bellinger River, 194, 459.

## Q

## QUESTIONS (continued):—

HARBOURS (See also "WOLLONGONG HARBOUR TRUST"):—  
*continued.*

Improvements, Clarence River Heads, 384.

Improvements, Richmond River, 434.

List of Dredge Employees in Department, 57.

Nambuccra, 199, 459.

HARES:—In Eastern Division, 92.

HARRIS PARK:—Resumption of Land, 440.

HARVEY, ARTHUR, AND WIFE:—Discharge of, from  
Public Instruction Department, 441.

HARWOOD:—Road to Chatsworth, 210.

HAWKESBURY RIVER:—Bridge over, 57.

HAY:—

Artesian Bore, 24.

And Deniliquin Land Court, 259.

Board of Inquiry into working of Boards at Deniliquin  
and, 363, 377.

Court-house, 356.

HEALTH BILL:—Introduction of, 23, 537.

HERON, MRS.:—Compensation to, by Railway Commis-  
sioners, 23.

HIGGINS, MR. JOHN:—Homestead Lease at Went-  
worth, 49.

HILLGROVE:—

Application to mine under a Road at, 106 (?).

Gold Leases at, 106 (?), 226.

Water Supply, 351.

Reward for Gold Discovery, 464.

HILLSTON:—

Dam over the Lachlan River, 38.

Road to Carathool, *via* Camp Plain, 185, 478.

Road from Carathool Railway Station, 487.

Weir on Lachlan River, 185, 487.

HILL VIEW:—Governor's Residence, Sutton Forest, 392.

HINTON:—Bridges at Morpeth and, 389.

HIPSLEY, MR.:—Salary and allowances, 60.

HISTORY OF NEW SOUTH WALES:—

Agreement with Mr. G. B. Barton, 279.

Contract with Subscribers, 331.

Publication of, 413.

HOBBS, WILLIAM:—Mineral Leases of, 146.

HOMESTEAD LEASES (See "CROWN LANDS").

HONEYSUCKLE POINT:—Overhead Bridge at Railway  
Station, 533.

HORSES (See "MILITARY").

HORTHON, A., Mineral Lease Applications at Silverton,  
198.

HOSPITALS:—

For the Insane Parramatta, 102.

Hours of duty of Nurses in Insane, 264.

Orange—Charges brought by Dr. Goode, 44, 341.

Orange—Charges brought by patients, 44.

Superintendent for Insane, Newcastle, 145.

Sydney, 230, 376.

Supply of Flowers from Botanical Gardens to, 404.

Bourke, 452.

HOSPITAL ACT:—Amendment of, 388.

HOTELS AND PUBLIC-HOUSES:—Licensed in City of  
Sydney, 197.

HOWELL, E.:—Road through land at North Lismore, 488.

HUDSON BROS.:—Supply of Coal to, by Railway Depart-  
ment, 302.

"HUME" STREAM-LAUNCH:—Detention at Albury, 129.

HUNTER DISTRICT:—Model Farm, 161.

HUNTER RIVER:—Damage by Floods, 214.

HYDRO-PNEUMATIC GUNS:—Contracts for, 250.

ILLAWARRA DISTRICT:—Coal Slack in, 284.

IMMIGRATION:—Department, 85.

IMPERIAL NAVY:—Prisoners of, 85, 224, 292.

INDECENT LITERATURE:—Publication of, 39.

INEBRIATE ASYLUMS:—Establishment of, 449.

INSANE (See "HOSPITALS").

INSURANCE MARINE OFFICES:—Government Insurance, 87.

INTERNATIONAL EXHIBITION, CHICAGO:—Representation  
at, 263.

INVENTIONS:—Patents for, 158.

INVERELL:—

Proposed routes of Railway to, 234.

Railway from Glen Innes, 36, 538.

Tank on Road from Swanbrook Creek, 146.

IRRIGATION:—Introduction of Bill to deal with, and  
Water Conservation, 250.

IRON COVE:—Bridge, 87, 352.

IRON POLES (See "TELEGRAPHS").

IRONWORKS (See "BRIDGES").

IRONWOOD:—Protection of and Buddah, 364.

JRANNERET, MR. C. E.:—Licensing Bench, Ryde, 22.

JERILDERIE:—Railway to Deniliquin, Berrigan and  
Tocumwal, 418, 481.

JERRY'S PLAINS:—Main North Road *via* Minimbah, 149.

JERSEY, EARL OF:—Appointment of, as Governor, 292.

## QUESTIONS (continued):—

JETTIES:—

Cost of Trial Bay, 260.

Life-buoys and Lines on Wharfs and, 435.

Coff's Harbour, 463.

JINDABYNE:—Court of Petty Sessions, 140.

JINGELLIC:—Bridge over the Murray River, 8, 323.

JOHNSTON MR. (See "CROWN LANDS").

JUNEE:—

Water Supply for, 417.

Court House, 418.

JURORS:—Remuneration to, 352, 421.

JURYMEN:—Members of Parliament serving as, 157.

KATOOMBA:—

Court of Petty Session and Lock-up, 187.

Railway Station and Overhead Bridge, 187, 331.

Reserve at, 173.

KELSO:—

Denison Bridge at, 305.

Railway Station, 36.

Station-master's House, 146.

KEMPSEY:—Bridge over Macleay River at, 478.

KENMORE ESTATE:—Purchase of, 85.

KIAMA:—Free pass to men employed on Railway exten-  
sion to Nowra, 533.

KIRKCONNELL:—

Public School, Yetholme, 193, 199.

Teachers for Public School, 50.

KOCH, DR.:—Cure for Consumption, 445, 455

KORBE:—Crown Lands, Parish of, 286.

KURNELL:—Site for Noxious Trades at, 186.

LABOUR (See "FREE LABOUR BUREAU").

Eight-hour System, 355.

Utilisation of Prison, 43.

LABOURERS (See "RAILWAYS" also "DARLING HAR-  
BOUR").

LABOUR STRIKE:—

Breaches of Shearing Agreements, 343.

Courts of Arbitration and Conciliation, 343

Cost of Protection of Property during, 376.

Alleviation of Distress, 409.

Distribution of Rations to Sufferers, 447.

LACHLAN RIVER:—

Dam at Hillston, 38.

Bridge over at Forbes, 409.

Bridge over at Goolagong, 16, 140, 391.

Bridge over at Cowra, 389.

Weir at Hillston, 185, 487.

LAKE CUDGELLICO:—

Additions to Police Barracks, 280.

Conservation of Water in, 186, 478.

LAND:—

Belonging to Messrs. O'Neill & Lenane, Michelago, 55.

Resumption of, under 53 Victoria No. 13, 72.

Agents, 427.

LAND BOARDS (See "CROWN LANDS").

LAND BILL:—Introduction of Amending, 448.

LAND COURT:—

Engagement of Mr. Wise for Crown, 441, 447.

Salaries of Members of, 496.

Decisions in Appeal Cases, 551.

LANDS DEPARTMENT:—

Annual Report, 214.

Officers in, 102, 123.

LANDS OFFICE:—

Inquiry Commission, 31.

Clerks, Sydney, 425.

LANGHORN'S CROSSING, SNOWY RIVER:—Boat for, 468.

LA PEROUSE:—Railway from Evccleigh, 120.

LARGS:—Ferry at, 389.

LAW REFORM:—Resolutions in favour of, 513.

LAWRENCE DRAIN:—Fenders for Flood-gate, 381.

LAWSON:—Public School, 67.

LEASES (See "CROWN LANDS").

LEE-MITFORD:—Supply of New Magazine Rifle, 23.

LEE, MR.:—

Appointment and Retirement, of 206.

Removal of, from Bathurst, 206, 221.

LEGISLATIVE COUNCIL:—Salaries of Officers, 496.

LEITCHHARDT:—Clock for Post and Telegraph Offices, 331.

Superior Public School, 344.

LEMON, SAMUEL:—Application for Compensation, 93.

LENDING BRANCH, PUBLIC LIBRARY:—Wooden Building  
adjoining, 140.

LEPER BILL:—Introduction of, 272.

LEPROSY:—Reports on Cases of, 404.

LICENSING:—

Bill for amending Acts, 93.

Drink Traffic, City of Sydney, 205.

Hotels and Public-houses in the City of Sydney, 197.

Inspectors, Bathurst, 229.

Mr. C. E. Jeanneret, Ryde, 22,

## Q

## QUESTIONS (continued):—

## LICENSING (continued):—

- Public-houses with Private Bars, 207.
- Proprietors of Private Up-stairs Bars, 205.
- Sale of Tobacco without a License, 206.

## LIFE-BUOYS AND LINES:—On Wharfs and Jetties, 435.

## LIFE INSURANCE:—Railway Service, 230.

## LIGHT LINES (See "RAILWAYS").

## LIGHTS AND FOG BELL:—At Bradley's Head, 60.

## LIMITED LIABILITIES ACT:—Companies registered under, 127.

## LIQUOR AND FOOD ADULTERATION BILL:—Introduction of, 35.

## LISMORE NORTH:—Road through Howell's land, 488.

## LISMORE:—Railway Line to Ballina, 519.

## LITERATURE (See "INDECENT LITERATURE").

## LIVERPOOL:—

## Bridge over George's River, 305.

## Court-house, 311.

## LOADING-STAGE (See "RAILWAYS").

## LOAN:—For Public Works, 146.

## LOCK-UP (See "PRISONS").

## LOCOMOTIVES (See "RAILWAYS").

## LOGAN, MRS.:—Compensation to, by Railway Commissioners, 23.

## LONG COVE CANAL:—Extension to Battle Bridge, 254.

## LONGNOSE POINT, BALMAIN:—Railway to, 39, 332.

## LORD HOWE ISLAND:—Administration of Justice, 244, 256.

## LOUTH:—

## Main Streets, 365.

## Racecourse at, 364.

## School-house, 365.

## Water Supply between Wanaaring and, 365.

LUCKNOW:—Road from Millthorpe *via* Spring Hill, 188.

## MACLEAN:—

## New Court-house, 263.

## Road to Coraki, 45, 82.

## MACLEAY:—

## Entrance to River, 214, 459.

## Growth of Cedars in District, 315.

## Road to Bushgrove, 263.

## Roads Office at, 166.

## Fisherman's Channel, 456.

## Bridge over River at Kempsey, 478.

## MADDERN, MICHAEL:—Conditional Purchase of, 38.

## MAGAZINE RIFLE (See "MILITARY").

## MAGISTRATES (See "ADMINISTRATION OF JUSTICE.")

## MAHER, JAMES:—Conditional Purchase of, 146.

## MAIL SERVICES:—

## San Francisco, 311, 315.

## Subsidized Lines, 145.

## MAIL-VANS:—Tenders for, 257.

## MAINTENANCE MEN (See "RAILWAYS").

## MAITLAND:—Railway from Wollombi, 150.

## MANGROVE:—Crown Lands, Parish of, 286.

## MANLY:—

## Crown Lands at Parish, 165.

## Water Supply, 72.

## And Pitwater Railway, 447.

## "MANN" CAR:—Cost of, 477.

## MANNING RIVER:—Erection of Wharf at Oxley Island, 22, 209.

## MARBLE STATUES:—In Centennial Park, 552.

## MARINE BOARD:—Boatmen of, 524.

## MARINE INSURANCE OFFICES:—Government insurances, 80.

## M'CREDDIE, MR.:—Charge against, 22.

## M'ARTHUR AND Co.:—Amount of Money paid to, 439, 445.

## MCSWEENEY, MR.:—Contract at San Souci, 378.

## MEAT (See also "DISEASED MEAT BILL"):—

## Beef, Mutton, &amp;c., Exported, 205.

## Chilled, Carriage of on Railways, 220.

## Chilled-meat Rooms, Darling Harbour, 178.

## Inspection of, intended for Food, 421.

## MEDICINE:—School of Veterinary, at University, 16.

## "MERIR" (See "'HUME' STEAM-LAUNCH").

## MERRIWA:—Stock Board, 249.

## METZ, PARISH OF:—Application for Mining Reserves, 198.

## MEYER, MR. OSCAR:—

## Payments to, 9, 22, 93.

## Purchase of Statuary, &amp;c., from, 136.

## MIDDLE HARBOUR:—Traffic across Spit Ferry, 165.

## MIDDELTON, MR.:—

## Inquiry into case of, 50.

## Removal of from Public Service, 477.

## MILBURN CREEK INQUIRY:—Fees paid in, 497.

## MILITARY:—

## Application for Corps of Mounted Infantry, Camden, 165.

## QUESTIONS (continued):—

## MILITARY (continued):—

## Appointment of 1st Lieutenant, Field Battery of Artillery, 194.

## Appointments to New Field Battery of Artillery, 224.

## Cartage of Camp Equipments, 111.

## Colonel Roberts, 539.

## Contracts for Clothing Forces, 161.

## Corporal Fleming, Inverell Mounted Infantry, 334.

## Defence of Colony, Appointment of Military Secretary, 260, 425.

## Defence Committee—Replies to Communications, 514, 532.

## Forces of the Colony, 478.

## General Staff, 463.

## Helmets for Cadet Corps, 103.

## Hydro-pneumatic guns, 259.

## Intended Retirement of Colonel Commanding Second Regiment, 433.

## Metropolitan Rifle Range, 94, 128, 220, 482, 496, 497, 532.

## Mounted Infantry and Cavalry, 29, 481, 532.

## New Magazine Rifle—the Lee-Mitford, 23.

## Partially-paid Mounted Infantry, 86 (?).

## Reorganization of Force, 149.

## Report of Officer Commanding Naval Forces, 539.

## Reserve Rifle Companies, 131, 351, 404, 417.

## Reserve Rifle Company at Cobarr, 139.

## Rifles issued to Reserve Corps, 22.

## Rifle Range, Moss Vale, 161.

## Rifle Ammunition, 539.

## Royal Commission on Fortifications, Bear Island, 158.

## Royal Commission on Works of Defence, 532.

## Steel Point Battery, 504, 532.

## Submarine Buildings, Chowder Bay, 22.

## Tenders for Supply of Horses for Guns, 131.

## Visitors to Fortifications during Easter Manœuvres, 61.

## Volunteer Artillery, 427, 455, 532.

## Volunteer Force, 439.

MILLANE *v.* M. TULLY:—Land case, 489.

## MILLER, MR.:—Appointment of, as Comptroller-General of Prisons, 135.

MILLTHORPE:—Road to Lucknow, *via* Spring Hill, 188.

## MILTON:—Court-house, 128.

## MINES DEPARTMENT:—

## Agricultural Branch, 16.

## Police Magistrates transferred to, 243.

## Report of Civil Service Commission on, 271, 283, 513, 523, 528, 533.

## Changes in, 534.

## MINING:—

## Application to mine on Water Reserve, County of Gough, 534.

## Application to mine under a Road at Hillgrove, 106 (?).

## Application for Lease, Albert Gold-fields, 186.

## Application for Mining Reserves, Parish of Metz, 198.

## Applications at Silverton made by A. Horthun, 198.

## Applications to Mine under Foreshores of Bullock Island, 150.

## Assays made in Department, 328.

## Bluc Jacket Lease, Canowindra, 8.

## Character of Sydenham Exhibition, 30.

## District of Cargo, 205, 391.

## Explosion of Fire Damp in Young-Wallsend Colliery, 251.

## For Coal under Road between Plattsburg and Minmi, 272.

## Gold-mining Lease of Messrs. Semmes, Bensusan, and B. B. Nicoll, 37.

## Greta Colliery, 551.

## Gold leases at Hillgrove, 106 (?), 226.

## Mineral Leases of William Hobbs, 146.

## Miners at Coalcliff, 447.

## Mr. Warden Caswell's decisions on cases at Peak Hill, 146.

## Mr. Oscar Meyer, Sydenham Exhibition, 9.

## Museum, Mines Department 16.

## Naked Lights used in Old Bulli Mine, 250.

## On Private Property Bill, 478.

## Peak Hill Gold-fields, 114.

## Prospecting Board, 30, 265, 463, 468.

## Prospecting Vote, 468.

## Rent paid on Mineral Leases at Tingha, 224.

## Reward for Gold Discovery at Hillgrove, 464.

## South Bulli Mine Ventilation, 250.

## South Bulli Coal-mine, 259.

## Star Leases at Gulgong, 35.

## Treatment of Refractory Ores, 213.

## Warden for the Tamworth District, 285.

## Weights and Measures Act, in reference to, 284.

## Windang Island, 157.

## MINMI:—Police Office and Lock-up, 388.

## Q

## QUESTIONS (continued):—

- MITTAGONG :—  
Removal of Railway Refreshment-rooms, 179.  
Water for Railway Purposes, 207.  
Duplication of Railway Line from Picton, 477.
- MOAMA :—Wharf at, 129, 200, 264 (See also "WATER CONSERVATION").
- MODEL FARMS (See "AGRICULTURAL").
- MOLONG :—  
Bucoble School, 173.  
Carriages on Railways, 112.  
Land in District, 123, 128.  
Leasehold Areas Reserved in District, 173.  
Public School, 44.  
Railway to Parkes and Forbes, 538.  
Reserves in District, 8, 388.  
Road to Peak Hill, 187, 215.  
Supply of Trucks at Railway Station, 446.  
Tank, Town Common, 404.  
Telegraph to Cumnock, 43.  
Trustees of Town Common, 9.
- MONETARY INSTITUTIONS :—Inspection of, 10.
- MONEY ORDER OFFICE :—Clerk required to resign from, 440.
- MONTAGU CHAMBERS :—Resumption and leasing of land, 67.
- MOORE PARK :—Proclamation dedicating, 146.
- MORPETH :—Bridges at Hinton and, 389.
- MORRIS, EDWARD :—Killed at Orange Railway Station, 460.
- MORTLAKE :—Extension of Tram from Five Dock, 434.
- MOSS VALE :—  
Rifle Range, 161.  
Site for Public Park, 9, 210.  
Tenders for erection of Refreshment Rooms at, 302.
- MOTORS (See "TRAMWAYS").
- MOUNT M'DONALD :—Land Court for, 240.
- MOUNTED INFANTRY (See "MILITARY").
- MUDGE :—Railway extension, 496.
- MULLION, THE :—Road from Taemas Bridge, 65.
- MULWALA :—Bridge over Murray River, 128, 256.
- MULWARRIE CREEK :—Bridge over, 51.
- MUNGINDI :—Reserve near, 301.
- MUNICIPAL :—  
Boroughs of St. Leonards, East St. Leonards, and Victoria, 149, 188.  
Borough Council of Wagga Wagga, 195.  
Grant to Country and Suburban Municipalities, 263.  
Grants for Sites for Town Halls or Municipal Chambers, 463.  
Repayment by Municipalities of cost of Water and Sewerage Works, 497.
- MUNYABLA :—Road to Doodle Cooma, 45.
- MURRAY RIVER :—  
Bridges at Jingellic and Tintaldra, 8, 323.  
Bridge at Greg Greg, 50.  
Bridges over, 293.  
Bridge at Mulwala, 128.  
Steamer built on for Forest Department, 68, 488.
- MURRUMBIDGE RIVER :—  
Bridge at Freshford, 82, 234, 340.  
Canal from, to Lake Urana, 478.
- MUSEUM :—Mines Department, 16.
- MUSWELLBROOK :—  
Railway to Cassilis, 37, 207.  
Roads in District, 301, 302.
- NAMBUCORA RIVER :—  
Dredge for, 50.  
Improvement of Harbour, 199, 459.
- NAMOI RIVER :—Village at Baan Baa, 65.
- NARARA :—Crown Land in Parish of, 286.
- NARRABEEN :—Crown Lands in Parish, 165.
- NARRABUNDABY :—Reserve, Parish of, 55.
- NARRABRI :—  
Abandoned runs in Land District of, 507.  
Goods at Railway Station, 250.  
Removal of Land Board from Tamworth to, 378.
- NARRAN CREEK :—Bridge between Goodooga and Brewarrina, 225.
- NARRANDERA :—  
Bridge, 60.  
Land resumed for Approach to Bridge, 186.
- NARRABUNDABY :—Trespass of Stock on Reserve, 365.
- NATIONAL PARK :—Secretary to Trust, 112.
- NAVAL FORCES :—Report of Officer commanding, 530.
- NAVAL PRISON (See "PRISONS").
- NEISH, MAN NAMED :—Convicted of Bigamy, 378.
- NET FISHING :—Tidal waters closed against, 533.
- NEUTRAL BAY :—Reclamation at, 447.
- NEWBRIDGE :—Cemetery at, 10.

## QUESTIONS (continued):—

- NEWCASTLE :—  
Court-house, 99.  
Locomotives at, 172.  
Pasturage Reserve, 205, 206.  
Pilot Service, 225, 250, 508.  
Superintendent of Hospital for Insane at, 145.  
Trades Hall, 271.  
Tramway Extensions, 93.
- NEW ENGLAND :—Electorate of, 284.
- NEW GUINEA :—  
British Protectorate, 85.  
Mr. Explorer Bevan, 224, 244.
- NEW SOUTH WALES :—  
Constitution of, 306.  
Election of future Governors, 140, 243.  
History of, 279, 331, 413.
- NEW YEAR'S CARD :—Issued by Postal Department, 78, 86, 98.
- NEW ZEALAND EXHIBITION :—Payment to Mr. Oscar Meyer, 22.
- NICOLL, B. B. (See "MINING").
- NIMITYBELLE :—Roads at, 250, 280.
- NORAH CREEK :—Public School, 489.
- NORTH BOURKE :—Repair of road from Bourke, 364.
- NORTH SHORE :—  
Erection of Bridge to, 24.  
Extension of Cable Tramway, 71.  
Railway, 267.
- NORTHERN DISTRICTS :—Police Force, 213.
- NORTHERN EXPRESS :—(See "RAILWAYS").
- NOWRA :—Free passes to men employed on railway extension from Kiama, 533.
- NOXIOUS TRADES :—Site for, at Kurnell, 186.
- NOXIOUS WEEDS :—Introduction of Bill to deal with, 224, 343.
- NURSES :—Hours of Duty in Hospitals for the Insane, 264.
- NYNGAN :—  
Railway to Cobar, 343.  
Wool at Railway Stations between Bourke and, 448.
- NYRANG CREEK :—Cemetery, 92.
- O'BRIEN, MISS (See "CROWN LANDS").
- OBSTRUCTING FOOTPATHS (See "FOOTPATHS").
- O'CONNELL :—Telephone from Brewongle, 22.
- OLIVER MR. R. J. (See "UNEMPLOYED").
- OMNIBUS STAND :—Removal from Redfern Railway Station, 524.
- O'NEILL AND LENANE, MESSRS. :—Land belonging to at Michelago, 55.
- OPERA HOUSE, KING-STREET :—Unsafe state of, 501.
- ORANGE :—  
Conveyance of Mails to Forbes, 112, 119, 120.  
Hospital—Charges brought by Dr. Goode, 44, 341.  
Hospital—Charges brought by patients, 44.  
Model Farm and Agricultural College, 72.
- ORPHAN SCHOOL CREEK :—Bridge over, 180.
- OXLEY ISLAND (See "MANNING RIVER").
- PACKET LICENSE :—Granted to steamer "General Gordon," 481.
- PARKES :—  
Gold-field Reserves, 145.  
Water Reserve on road at Bore-Cabonne, 44.  
Railway from Molong to Forbes and, 538.
- PARKS :—  
Centennial, 101, 105, 441.  
Germanton, 61.  
National, Secretary to Trust, 112.  
Parramatta, 66.  
Sassafras, Springwood, 78.  
Site for Public at Moss Vale, 9, 210.  
Marble Statues in Centennial, 552.
- PARLIAMENT :—  
Members serving as Jurymen, 157.  
New Houses of, 77, 113.  
Government Employee nominated for, 514.
- PARLIAMENTARY DRAFTSMAN :—Error in Crown Rents Bill, 240.
- PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS :—Payments to, 9.
- PARRAMATTA :—  
Hospital for the Insane, 102.  
Macquarie and George Street Asylums, 171.  
Park, 66.  
Tender for removal of refuse from Gaol, 413.
- PARRAMATTA RIVER :—Bridge at Rydalmere, 528.
- PASTEUR'S VACCINE SPECIFIC :—Use of, 39.
- PASTORAL HOLDINGS (See "CROWN LANDS").
- PASTURES AND STOCK PROTECTION ACT :—  
Fine imposed on Matthew Bevan, 240.  
Merriwa Board, 249.

## Q

## QUESTIONS (continued):—

**PATENTS**:—For Inventions, 158.  
**PATTERSON, JOHN**:—Selection at Corowa, 38.  
**PEAK HILL**:—  
 Mining Warden for, 114.  
 Mr. Warden Caswell's decisions on Mining Cases, 146.  
 Road from Cummoek, 56, 93.  
 Road from Dubbo, 93.  
 Road from Molong, 187, 215.  
 Telegraph to Cummoek, 43.  
**PEMBER'S LAND**:—Resumption of, at Bowral, for Public Cemetery, 460.  
**PENNY POSTAGE** (See "POSTAL").  
**PENRITH**:—Locomotives at, 172.  
**PENSIONS** (See "SUPERANNUATION FUND").  
**PEPPERCORN'S PROPERTY**:—At Battersea, 418, 455.  
**PERICO**:—Mail Service via Bondi to Bombala, 280.  
**PERMANENT-WAY** (See "RAILWAYS").  
**PERMITS**:—Issue of Stock by Justices of the Peace, 150.  
**PETERSHAM**:—Cemetery, 452.  
**PHYLOXERA**:—Vineyards infected, 145.  
**PICTON**:—Duplication of Railway Line to Mittagong, 477.  
**PILLARS, POSTAL**:—  
 Erection of New, 475.  
 Contracts for Erection of, 481, 508, 523.  
**PILOT SERVICE**:—Sydney and Newcastle, 225, 250, 509.  
**PITT-STREET FIRE**:—  
 Telegraph and Telephone Wires in Streets, 460.  
 Papers in reference to, 537.  
**PITTWATER AND MANLY RAILWAY**, 447.  
**PLACES OF AMUSEMENT**:—Regulation of, 107.  
**PLATFORMS** (See "RAILWAYS").  
**POINT PIPER ROAD**:—Commissioners of Trusts, 264.  
**POISONS ACT**:—  
 Breach of, 243.  
 Sale of Bluestone under, 50.  
**POLICE**:—  
 Additions to Barracks, Lake Cudgellico, 280.  
 Assault on Constable Boyle at late Fire in Pitt-street, 448.  
 Constable Semmington, 264.  
 Constable H. A. Slater, 312, 389.  
 Country Force, 52.  
 Land taken from Messrs. O'Neill and Lenane at Michelago, 55.  
 Northern Districts, 213.  
 Office and Lock-up at Minmi, 388.  
 Station and Court-house, Redfern, 311.  
 Station, Coolabah, 233, 364.  
 Tambar Springs, 519.  
 Travelling Allowance in Department, 305.  
**POLICE COURT, SYDNEY**:—Vacation for, 177.  
**POLICE MAGISTRATES** (See "ADMINISTRATION OF JUSTICE").  
**POPRAW**:—Crown Land in parish of, 286.  
**POSTAL**:—  
 Additions to Office, Cobar, 272.  
 And Telegraph Office, Cowra, 468.  
 And Telegraph Office, Cooranbong, 334.  
 And Telegraph Office, Cummoek, 172.  
 And Telegraph Office, Crookwell, 185.  
 And Telegraph Office, Forbes, 478.  
 And Telegraph Office, Cargo, 538.  
 Assistant at Braidwood, 23.  
 Attendance of Officers at Conference, 98.  
 Conveyance of Mails from Wilcannia over Tallywalka Creek, 102.  
 Conveyance of Mails, Orange to Forbes—Borenore to Forbes, 112, 119, 120.  
 Conveyance of mails to and from Scone Railway Station, 153.  
 Complaints against Department by Mr. J. Windred, J.P., 298.  
 Inspectors, 98.  
 Mail Service, between Perico via Bondi to Bombala, 280.  
 New Pillars, 475, 481, 508, 523.  
 New Year's Card issued by Department, 78, 86, 98.  
 Office at Annandale, 78.  
 Office, George-street North, 471.  
 Office, Randwick, 441, 448, 463.  
 Penny Postal System, 94.  
 Post Office, Barringun, 121.  
 Reorganisation of Telegraph Department and, 427.  
 Report of Civil Service Commission on Department, 256, 422, 425.  
 Subsidised Mail Service, 145.  
 San Francisco Mail Service, 311, 315.  
 Tenders for Mail-vans, 257.  
 Vacancies in Department, 139.  
**POST OFFICE**:—  
 Clock for Leichhardt, 331.  
 Clock for Tower of, at Redfern, 21, 311.

## QUESTIONS (continued):—

**POST OFFICE (continued)**:—  
 Clocks in Country Districts, 82.  
 Dismissal and re-employment of employee in General, 514.  
 Land resumed by Government for Street, 286.  
 Removal of Carvings, 344.  
 Tenders for Clock, 82.  
**POTT'S HILL**:—Water Supply Service, 538.  
**POULTON, MR.**:—Confinement in Gladsville Asylum, 215.  
**PRESS TELEGRAMS**:—Amount received for, for 1889, 230.  
**PRIMARY SCHOOLS** (See "EDUCATION").  
**PRISONS**:—  
 Debtors, Darlinghurst, 44, 50, 285, 519, 528.  
 Lockup, Germantown, 61.  
 Lockup, Uralla, 128.  
 Lockup, Katoomba, 187.  
 Lockup and Police Office, Minmi, 388.  
 Naval, at Garden Island, 223.  
 Utilisation of Labour, 43.  
 Works, Trial Bay, 245.  
**PRISONERS**:—  
 Cost of maintenance, 149.  
 Imperial Navy, 85, 224, 292.  
 Imprisonment of Dr. Goode, 297.  
 Man named Fergusson, confinement in Debtors Prison, 297.  
**PRIVATE UPSTAIRS BARS**:—  
 Number in Public-houses, 207.  
 Proprietors of, 205.  
**PRIVATE PROPERTY**:—Bill to regulate Mining on, 478.  
**PROBATE REVENUE**:—Transfer of Shares, 112.  
**PROPERTIES**:—Compensation for Roads through, 463.  
**PROSPECTING BOARD** (See "MINING").  
**PROSPECTING VOTE** (See "MINING").  
**Protestant Standard**:—Letters in reference to Postal Department, 129, 131, 140 (?).  
**PROTECTION OF PROPERTY**:—Cost of during Labour Strike, 376.  
**PROTHONOTARY**:—Salary of, 272.  
**PUBLIC HEALTH BILL**:—Introduction of, 23, 537.  
**PUBLIC HOUSES** (See "LICENSING").  
**PUBLIC LIBRARY**:—Wooden Building adjoining Lending Branch, 140.  
**PUBLIC SCHOOLS** (See "EDUCATION").  
**PUBLIC WORKS**:—  
 Loan for, 146.  
 Payments to Parliamentary Standing Committee, 9.  
**PULLMAN CARS**:—Use of, on Lines, 93.  
**PUPIL-TEACHERS** (See "EDUCATION").  
**PYRMONT**:—  
 Bridge, 45, 251.  
 Bridge to Glebe Island, 251, 422.  
**QUARANTINE STATION**:—Removal of, 501.  
**QUARRY**:—At Bowral for Railway purposes, 177.  
**QUANBEYAN**:—  
 Bridge over Murrumbidgee River at Freshford, 82, 234.  
 Tramway from Railway Station to Town, 82.  
 Turalla Reserve, 355.  
**QUIGLEY** (See "RAILWAYS").  
**QUIRINDI**:—Trucking Yards, 119.  
**QUIT RENTS**:—Recovery of, 445.  
**RABBIT ACT**:—  
 Assessment under, 67, 180.  
 Amount due to Consolidated Revenue for Advances, 355.  
 Expenditure under, 377.  
 Receipts and Expenditure under Act, 221.  
 Repeal of, 30, 206.  
**RABBITS**:—  
 Destruction of, 244.  
 Fence between Bourke and Dubbo, 370.  
 Fence between this Colony and Queensland, 251, 319.  
 Provision in Bill to place Infested Districts under Stock and Pastures Board, 508.  
 Rent of infested Crown Lands, 244.  
**RACECOURSE**:—Land for at Louth, 364.  
**RAD, ARTHUR**:—Imprisonment of, 488.  
**RAILWAYS**:—  
 Accident at Coolabah, 225.  
 Accident at Blackheath, 37.  
 Accident near Bathurst, 8, 37, 78, 114, 384.  
 Accident at Farley, 139.  
 Accident to No. 32, Up-goods Train, 381.  
 Accommodation at Woodstock, 57.  
 Across Shoalhaven River, 459.  
 Albury Express Trains, 417.  
 Amount expended out of Loan Act, 53 Vic., for Construction of Rolling Stock and Permanent-way, 172.  
 Amount paid for Principal and Interest under Act, 31 Vic. No. 11, 388.  
 Annual Reports, 127, 166.  
 Appointment of Quigley, 140, 151, 166.

QUESTIONS (continued):—

RAILWAYS (continued):—

Appointment of Engineer-in-Chief, 464.  
 Approaches to Stations and Platforms, 206.  
 Ashbury Carriages, 101.  
 Automatic Brakes for Railway Goods Stock, 188.  
 Bega to Eden, 43, 301.  
 Bourke Flood, Railway Line, 15, 452.  
 Bourke, Line near, 16, 173.  
 Brewarrina, Extension to, 44, 107.  
 Brewarrina to Byrock, 16, 131, 392.  
 Broken Hill *via* Wilcaunta, 139.  
 Broken Draw-bar on Goods Train, Granville to Strathfield, 302.  
 Burwood and Ashfield Permanent-way, 229.  
 Byrock to Bourke, 30.  
 Carriage of Chilled Meat, 220.  
 Carriages on Molong, 112.  
 City, Inquiry Commission, 17.  
 Commission on Material, 77.  
 Compensation to Mrs. Logan and Mrs. Heron, 23.  
 Compensation to Samuel Lemon, 93.  
 Conferences of Officers, 245.  
 Consideration of Policy, 251.  
 Contractors for Foot-bridge at Redfern Station, 379.  
 Contracts for Supply of coal to Department, 344, 369, 377, 378, 389.  
 Contract for Winding Clocks and Watches, Great Northern Line, 194.  
 Contract Prices of New Railway Carriages and Motors, 157.  
 Cooma, 102.  
 Cooma to the Victorian Border, 120, 250.  
 Curves on Western Line over Blue Mountains, 57.  
 Deniliquin to Jerilderie, Jerilderie to Berrigan, and Jerilderie to Tocumwal, 418, 481.  
 Differential Rates, 220.  
 Distances by various Railway Routes to Coonamble, 193.  
 Duplication of Line between Picton and Mittagong, 477.  
 Duplication of Southern Line, 507.  
 Edward Morris killed at Orange Station, 460.  
 Employees, 43, 77.  
 Erection of Trucking Yards, Coolabah, 364.  
 Eveleigh to La Perouse, 120.  
 Excursion Trains on Saturdays, 356.  
 "Extra Hands," 340, 344. (?)  
 Extension of Victorian, from Bairnsdale to New South Wales Border, 426.  
 Free Pass granted to Mr. Henry George, 10.  
 Free Passes to Bourke, 128.  
 Free-passes—Regulations made by Commissioners, 376, 381, 384, 391, 414.  
 Free passes to men employed on Extension from Kiama to Nowra, 533.  
 Freights on Agricultural produce, 378.  
 Galong to Burrowa, 24, 260.  
 Gangers in Service, 507.  
 Glebe Island Branch Line, 460.  
 Glen Innes to Inverell, 36, 538.  
 Goods at Narrabri Station, 250.  
 Goods Rates, 66.  
 Goods Traffic at Glen Innes and Guyra Stations, 36.  
 Goulburn to Crookwell, 51, 268.  
 Government Railways Act, investigations under, 72.  
 Gratuity from Commissioners to Fetterl Carmichael, 7.  
 Gratuities to relatives of men killed in service, 114.  
 Guards, 35.  
 Guards on Suburban Trains, 56.  
 Gundagai to Tumut Extension, 112, 234.  
 Inspection of Lines, 199.  
 Katoomba Station and Overhead Bridge, 187, 331.  
 Kelso Station, 36.  
 Labourers, 57.  
 Life Insurance in Service, 230.  
 Light Lincs, 91.  
 Lismore to Ballina, 519.  
 Loading Stage at Brewongle, 319.  
 Locomotive Engines indented for October, 1888, 61.  
 Locomotives, 86.  
 Locomotives at Newcastle, Penrith, Bathurst, and Goulburn, 172.  
 Locomotives, Manufacture of, 409, 421, 439, 440, 455, 532.  
 Longnose Point, Balmain, 39, 332.  
 "Mann" Carr, 477.  
 Maintenance Men, 231, 240. (?)  
 Maintenance of Lines by Contractors, 256.  
 Manly and Pittwater, 447.  
 Midelton, Mr., Inquiry into case of, 50.  
 Midelton, Mr., Removal of, from Service, 477.

QUESTIONS (continued):—

RAILWAYS (continued):—

Molong to Parkes and Forbes, 538.  
 Mr. Thow, Locomotive Engineer, 245.  
 Mudgee Extension, 496.  
 Muswellbrook to Cassilis, 37, 207.  
 New Locomotive Contract, 8.  
 Northern Express, Goods Train, 251.  
 North Shore, 267.  
 Nyngan to Cobar, 343.  
 Officials imported by Commissioners, 51, 101.  
 Overhead Bridge at Honeysuckle Point Station, 533.  
 Pay to Men for Eight-hour Day, Holiday, 312.  
 Premiums offered for best Routes, 214.  
 Proposed route to Inverell, 234.  
 Pullman Cars, 93.  
 Purchase of Land at Darling Island, 45.  
 Quarry at Bowral, 177.  
 Rate for Traction of Coal, 165.  
 Refreshment Rooms, 51.  
 Refrigerating Trucks, Cool Storage at Stations, 9.  
 Refrigerating Trucks, 538.  
 Removal of Refreshment-room from Mittagong, 179.  
 Reserve between Eugowra and Woodstock, 127.  
 Returns on, between Wellington and Bourke, 471.  
 Revenue and Expenditure upon certain Tramways and, 378.  
 Sleeping-cars for Goulburn to Cooma, 369.  
 Soundings and Borings between Milson's Point and Sydney, 128.  
 Spark-catchers on Engines, 448.  
 State Carriages, 451, 488.  
 Station-master's House, Kelso, 146.  
 Steel Rails, 56.  
 Steel Hopper Waggons, 105.  
 Survey at Werris Creek Line, 10.  
 Supply of Coal to Hudson Bros. by Department, 302.  
 Supply of Trucks at Molong Station, 446.  
*Sydney Mail*, Supplied to gangers, 355.  
 Tarago to Braidwood, 9.  
 Tenders for, 413.  
 Tenders for Erection of Refreshment Rooms at Moss Vale, 302.  
 Time of arrival of Western Mail Train at Bourke, 446. (?)  
 Tourist Tickets, Great Northern Line, 215.  
 Trial Survey of the Blacktown-Blayney Line, 9, 224.  
 Trucking Yards, Carcoar, 75.  
 Trucking Yards, Quirindi, 119.  
 Trucks for Wool at Bourke, 446.  
 Urana, 16, 171.  
 Wagga Wagga to Tumberumba, 8.  
 Water for, Mittagong, 207.  
 Werris Creek to Dubbo, 113.  
 Wollombi and Maitland, 150.  
 Wool at Railway Stations between Nyngan and Bourke, 448.  
 RANDWICK :—  
 Electric Tramway to Waverley, 151, 440.  
 Toll-bar, 17, 482.  
 Post Office, 441, 448, 463.  
 Tramline, 477.  
 RATES :—Paid on Government Buildings, 375.  
 RAY, JAMES :—Incarceration of in Debtor's Prison, 2.  
 RECLAMATION GROUND :—Smedly's Point, Manly, 86.  
 RECREATION GROUNDS :—For Public Schools, 389.  
 REDBOURNEBERRY :—Bridge, 29.  
 REDFERN :—  
 Contractors for Foot-bridge at station, 379.  
 Court-house and Police Station, 311.  
 Site for Court-house, 17, 311.  
 Turret Clock for Post Office, 21, 311.  
 Removal of Omnibus Stand from Railway Station, 524.  
 REFORMATORY BUILDINGS, &c., ROOKWOOD :—Utilization of by Education or Agricultural Department, 464.  
 REFRACTORY ORES :—Treatment of, 213.  
 REFRESHMENT ROOMS (See "RAILWAYS").  
 REFRIGERATING TRUCKS (See "RAILWAYS").  
 REGINA v. MYERS :—Witness in case of, 422.  
 REGISTRAR-GENERAL'S OFFICE :—Vacation in, 197.  
 REGISTRATION :—Introduction of Companies Bill, 35.  
 REGISTRATION OF VOTES :—Embodiment of, in new Electoral Bill, 146.  
 REGULATIONS (See "CROWN LANDS").  
 RENTS (See "CROWN LANDS").  
 RESERVE CORPS (See "MILITARY").  
 RESERVES :—  
 And Lensfold Area in Eastern Division, 171.  
 Application for Mining Reserves, Parish of Metz, 198.  
 Application to Mine on Water, County of Gough, 535.  
 Area of Gosford, Population, 279.  
 Binalong, 59.

## Q

## QUESTIONS (continued):—

## RESERVES (continued):—

- Bombala Recreation, 552.  
 Camping, Parish of Gregra, 92.  
 Cancellation of Gum Flat, 67.  
 Cancellation of Yugalbar and Solferino Gold-fields, 405.  
 Dawes Point, 45.  
 For Selection, Richmond River, 16.  
 Goff's Harbour, 45.  
 Gold-fields between Forbes and Parkes, 145.  
 Katoomba, 173.  
 Molong District, 8, 173, 388.  
 Near Mungindi, 301.  
 Newcastle Pasturage, 205, 206.  
 Parishes Arakoon, Kinchela, and Kempsey, 45.  
 Parish of Narrabundah, 55.  
 Resumed Areas and Pastoral Holdings, 93.  
 Turalla, Queanbeyan Electorate, 355.  
 Trespass of Stock on Narrabundah, 365.  
 Ulladulla, 503.  
 Water, Parkes Road at Bore-Cabonne, 44.  
 RESUMED AREAS (See "CROWN LANDS").  
 RESUMPTION (See "CROWN LANDS"; also "ROADS"; also "FERRIES"; also "HARRIS PARK").  
 RICHMOND RIVER:—  
 Destruction of Wrecks at Entrance, 16.  
 Engineers and Surveyors for, 75.  
 Harbour Improvements, 434.  
 North Arm, Obstructions in, 81.  
 Population of Electorate, 81.  
 Reserves for Selection, 16.  
 South Arm at Casino, 66.  
 Southern Breakwater at Heads, 551.  
 Wrecks at Entrance of, 439.  
 RICHMOND AND WINDSOR:—Police Magistrate, 403.  
 RICKETSON, MR.:—Rents of Annual Leases, Deniliquin, 263.  
 RIFLES (See "MILITARY").  
 RIFLE RANGE:—  
 Metropolitan, 94, 128, 220, 482, 496, 497, 532.  
 Moss Vale, 161.  
 Road across, 209.  
 RINGBARKING:—Crown Lands, Cobar District, 364, 370.  
 RING, MR. C. A.:—Appointment of, to Land Board, Silverton, 230.  
 RIOT:—Chowder Bay, 468.  
 RIVER BANKS:—Erosion of, 31.  
 ROADS:—  
 Across Rifle Range, 209.  
 Argyle Electorate, 209 (?).  
 Barrington to Bourke, 233.  
 Bombala to Bondi, 280.  
 Bourke District, 233.  
 Bowral to Wombeyan Caves, 207.  
 Bungendore to Currawang and Collector, 220.  
 Bushgrove—Maclean, 263.  
 Cargo to Canangies, 172.  
 Compensation for through properties, 463.  
 Conference of Engineers, 347.  
 Cook's River, 328.  
 Cowra to Glenlogan, 244.  
 Cummoock to Peak Hill, 56, 93.  
 Delay in Payments to Contractors, 38.  
 Dubbo to Peak Hill, 93.  
 Glebe-Balmain, Wood-blocking of, 45.  
 Grafton—Yamba, 459.  
 Gunning District, 65.  
 Harwood and Chatsworth, 210.  
 Hillston to Carrathool via Camp Plain, 185, 478.  
 Hillston to Carrathool Railway Station, 487.  
 Inspection and repair of, 215.  
 Leading to Bridge across Serpentine Channel, Clarence River, 363.  
 Maclean to Coraki, 45, 82.  
 Macleay and Grafton Office, 166.  
 Main North via Minimbah to Jerry's Plains, 149.  
 Marked-tree, Gundaroo to Collector, 475, 495.  
 Millthorpe to Lucknow via Spring Hill, 188.  
 Mining for Coal under Plattsburg-Minni, 272.  
 Molong to Peak Hill, 187, 215.  
 Munday to Doodle Cooma Railway Station, 45.  
 Muswellbrook District, 301, 302.  
 Nimitybella, 250, 280.  
 Old Point Piper, 264.  
 Opening of, on bank of Deep Creek, 414.  
 Repair of road between Bourke and North Bourke, 364.  
 Resumption of, known as Ewing's Survey, 81.

## QUESTIONS (continued):—

## ROADS (continued):—

- Rouchell to Scone through Segenhoe Estate, 496.  
 Tacmas Bridge to The Mullion, 65.  
 Through E. Howell's land at North Lismore, 488.  
 Upper Camden Haven, 172.  
 ROBERTS, COLONEL:—Official position in England, 539.  
 "RODONDO," S.S.:—Manning of, 324, 328.  
 RODS AND TUBES:—Prices of Well-boring, 223.  
 ROLLING STOCK (See "RAILWAYS").  
 ROOKWOOD:—  
 Agricultural Farm, 161.  
 Agricultural Farm and College, 186.  
 Reformatory Building and Grounds, 464.  
 ROSSELLE BAY:—Reclamation of, 245.  
 ROSSVILLE ESTATE:—Purchase of, 85.  
 ROUCHELL:—Road to Scone through Segenhoe Estate, 496.  
 RUST IN WHEAT:—  
 Experiments by Farmers, 50.  
 Remedies for, 36, 50.  
 RYDALMERE:—Bridge over Parramatta River at, 528.  
 RYDE:—Mr. C. E. Jeanneret, Licensing Magistrate, 22.  
 SAN FRANCISCO:—Mail Service, 311, 315.  
 SAN SOUCI:—Contract of Mr. McSweeney, 378.  
 SASSAFRAS (See "PARKS"; also "TANKS").  
 SAUNDERS:—Fatal Accident to man named, 166.  
 SAVINGS BANK ACT:—Lending powers of Trustee, 422.  
 SCHOOLS OF ARTS:—  
 Grants to, 187.  
 Copeland, 513, 552.  
 SCONE:—  
 Conveyance of Mails from Railway Station, 158.  
 Road from Rouchell through Segenhoe Estate, 496.  
 SCRIPTURE LESSONS:—In Public Schools, 229.  
 "SCRUB":—Under Crown Lands Acts, 370.  
 SEED WHEAT:—Supplied to Farmers, 10.  
 SEGENHOE ESTATE:—Road through, from Rouchell to Scone, 496.  
 SEMMES, MR. (See "MINING").  
 SEMMINGTON, CONSTABLE:—Case of, 264.  
 SERPENTINE CREEK, CLARENCE RIVER:—Road leading to Bridge over, 363.  
 SEVEN OAKS, MACLEAY RIVER:—Drainage Union, 376.  
 SEWERAGE:—  
 Employees under Board of Water and, 365, 392.  
 Assessment of Churches, &c., by Board, 488.  
 Repayment by Municipalities of Cost of Works, 497.  
 SHAW, FRANCIS LESLIE:—Prosecution of, 255.  
 SHEA'S CREEK:—Extension of Canal, 132.  
 SHEARING AGREEMENTS:—Breaches of, 343.  
 SHEARERS' UNION:—Imprisonment of Arthur Rae, Secretary, 438.  
 SHEEP:—  
 Receipts and Disbursements of Fund, 98, 244, 267, 383.  
 Worms in, 37.  
 SHERIFF'S OFFICER (See "ADMINISTRATION OF JUSTICE").  
 SHOALHAVEN RIVER:—Railway across, 459.  
 SHOW-GROUND:—Cowra, 57.  
 SILVERTON:—  
 Appointment of Mr. C. A. Ring to Land Board, 230.  
 Mineral lease application made by A. Horthun, 198.  
 SLATER, CONSTABLE H. A.:—Allowance to, 312, 389.  
 SLEEPING CARS (See "RAILWAYS").  
 SMALL DEBTS COURTS:—In Country Districts, 78.  
 SMALL DEBTS COURT:—At Yantabulla, 365.  
 SMEDLEY'S POINT, MANLY:—Recreation Ground, 86.  
 SNOW LEASES:—Maps of, 551.  
 SNOWY RIVER:—Langhorn's crossing, 468.  
 SOLFERINO GOLDFIELD:—Cancellation of Reserves at Yugalbar and, 405.  
 SOUNDINGS AND BORINGS (See "RAILWAYS").  
 SOUTH AUSTRALIA:—Chinese Immigration to, 539.  
 SOUTH BULLI MINE:—  
 Check Inspector's Report, 259.  
 Ventilation of, 250.  
 SPARK CATCHERS:—(See "RAILWAYS").  
 SPECIAL AREAS (See "CROWN LANDS").  
 SPECIAL CASTINGS:—Tender of D. and R. Bradford for, 478.  
 SPECIAL CONSTABLES:—Government Officials enrolled as, 351, 403.  
 SPECIAL GRANTS:—To Fire Brigades, 234.  
 SPIT FERRY:—Traffic across, 165.  
 SPORTSMAN'S CREEK:—Dredge for, at Clarence River, 381.  
 SPRINGWOOD:—Sassafras Park, 78.  
 STAFFORD, ALBERT:—Irrigation Lease at Narrabri, 107.  
 STAR LEASES:—Cancellation of, 35.  
 STATE CARRIAGES:—(See "RAILWAYS").

## Q

QUESTIONS (*continued*):—

- STATE HOUSE:—Erection, 441.  
 STATUARY:—Purchase of, from Mr. Oscar Meyer, 136.  
 STEAMER (See "MURRAY RIVER").  
 STEEL HOPPER WAGGONS (See "RAILWAYS").  
 STEEL POINT BATTERY:—  
   Guns at, 504.  
   Papers relating to, 532.  
 STEEL RAILS (See "RAILWAYS").  
 STEPHEN v. ERWIN:—Matter of, in Equity, 97.  
 STOCK:—  
   Amendment of Diseases in Stock Acts, 496.  
   Board Examiners and Inspectors, 186.  
   Cattle-driving through the Suburbs, 225, 311.  
   Cows suffering from Tuberculosis, 98.  
   Fine imposed on Matthew Bevan, under Act, 240.  
   Issue of permits by Justices of the Peace, 150.  
   Losses in Bourke and Walgett Districts, 50.  
   Merriwa Board, 249.  
   Receipts and Disbursements of Sheep Fund, 98, 244, 267, 383.  
   Removal of Quarantine Station, 501.  
   Route between Dandaloo and Coudobolin, 180.  
   Trespass on Narrabunda Reserve, 365.  
   Trucking to Giebe Island Abattoirs, 332.  
   Trucking-yards, Carcoar, 75.  
   Trucking-yards, Quirindi, 119.  
   Worms in Sheep, 37.  
 STOCKTON:—Areas of land alienated, 340.  
 STRIKE (See "LABOUR STRIKE").  
 ST. LEONARDS:—Amalgamation of Boronghs, 149, 188.  
 SUBMARINE BUILDINGS (See "MILITARY").  
 SUBURBAN TRAINS (See "RAILWAYS").  
 SUBURBS:—Ferry Traffic between Sydney and, 403.  
 SUNDAY AMUSEMENTS:—Advertisements of, 343.  
 SUNNY CORNER:—Water Supply, 22.  
 SUPERANNUATION FUND:—  
   Amount of and Subsidy to, 37.  
   Pensions and Pensioners, 37.  
   Return Ordered by House, 422.  
 SURVEYING:—Lecturer for University, 111.  
 SUSSEX-STREET RIOT:—Man named Ella arrested for complicity in, 150.  
 SUTTON FOREST:—Governor's residence at Hill View, 302.  
 SWANBROOK CREEK:—Tank on road to Inverell, 146.  
 SWANSEE:—Court of Petty Sessions at, 389.  
 SYDENHAM MINING EXHIBITION:—  
   Character of, 30.  
   Payments to Mr. Oscar Meyer, 9, 22.  
 SYDNEY:—  
   Ferry Traffic to Suburbs, 403.  
   Pilotage Service, 223, 250, 508.  
 SYDNEY COMMON:—Proclamation dedicating, 146.  
 SYDNEY HARBOUR:—Erection of Baths, 221.  
 SYDNEY HOSPITAL:—Erection of, 230, 376.  
*Sydney Mail*:—Copies supplied to gangers on railways, 355.  
 SYDNEY MINT:—Coinage of Silver, 206.  
 SYDNEY UNIVERSITY:—  
   Endowments, Students and tutorial assistance, 240.  
   Leave of Absence to Professors, &c., 219.  
   Lecturer on Surveying, 111.  
   School of Veterinary Surgery and Medicine, 16.  
   Students, Professors, and Demonstrators, 194.  
 TAEMAS BRIDGE:—Road to the Mullion, 65.  
 TAMBAR SPRINGS:—Police Force at, 519.  
 TAMWORTH:—  
   Clerk of Petty Sessions for, 285.  
   Removal of Land Board Offices to Narrabri, 378.  
   Warden for the district, 255.  
 TANKS (See also "WATER CONSERVATION"):—  
   Between Swanbrook Creek and Inverell, 146.  
   Erection of at Sassafras Public School, 508.  
   Molong Town Common, 404.  
   Site for at Grong Grong, 38.  
   Site for at Yerong Creek, 39.  
 TARAGO:—Railway to Braidwood, 9.  
 TARRARONG CREEK:—Bridge over, near Goodooga, 364.  
 TATHAM:—Telegraph Communication, 508.  
 TEACHERS (See "EDUCATION").  
 TECHNICAL SCHOOLS (See "EDUCATION").  
 TELEGRAPHS:—  
   And Post Office, Cargo, 538.  
   And Post Office, Cooranbong, 334.  
   And Post Office, Cowra, 468.  
   And Post Office, Crookwell, 185.  
   And Post Office, Cummock, 172.  
   And Post Office, Forbes, 478.

QUESTIONS (*continued*):—

- TELEGRAPHS (*continued*):—  
   Cable Service, 180.  
   Charge for Telegrams, 214.  
   Clerks in Sydney Office, 513.  
   Clock for Leichhardt Office, 331.  
   Communication on Darling River during Floods, 113.  
   Communication with Tatham, 508.  
   Cooma to Berridale, 315.  
   Danger of Wires, Pitt-street Fire, 460.  
   Iron Poles, 91.  
   Master at Yetman, 305.  
   Messenger Drew, 426.  
   Messrs. Cracknell, Wilson, and Hipsley, 60.  
   Molong to Cumnock—Cumnock to Peak Hill, 43.  
   Mr. Cracknell, Salary and Allowances, 98.  
   Office at Annandale, 78.  
   Press Telegrams, 230.  
   Reorganisation of Postal Department and, 427.  
   Report of Civil Service Commission on Department, 256, 425.  
   School of Instruction, 447.  
   Wire, 91.  
 TELEGRAPHY:—School of, in connection with Technical College, 447.  
 TELEPHONES:—  
   Between Brewongle and O'Connell, 22.  
   Western Electric Instruments, 263.  
 THEATRES, &c.:—Introduction of Bill to make better provision for safety of, 456.  
 THIRLMERE:—Cemetery, 106.  
 THOMPSON & GILES, MESSRS.:—Land resumed from, 286.  
 THOW, MR., LOCOMOTIVE ENGINEER:—Visit to England, 245.  
 TIDAL WATERS:—Closed against net-fishing, 533.  
 TINGHA:—Rent paid on Mineral Leases, 224.  
 TINTALDRA:—Bridge over Murray River, 8, 323.  
 TOBACCO:—  
   Sale of, without a license, 206.  
   Cultivation of, 404.  
 TOCUMWALL:—Railway from Jerilderie, 418, 481.  
 TOILETS:—  
   On Ferries, 452.  
   Randwick, 17, 482.  
 TOPPER, WILLIAM:—Expenses as Crown witness, 162.  
 "TOTALISATOR" THE:—Use in City, and Legalising of, 417.  
 TOURIST TICKETS:—Great Northern Line, 215.  
 TOWN HALLS:—Grants for Sites for, 463.  
 TOWNSHIPS ALLOTMENTS (See "CROWN LANDS").  
 TRADE-MARKS ACT:—  
   Bill to Amend, 504.  
   Registration under, 446.  
 TRADES HALL:—For Newcastle, 271.  
 TRAMWAYS:—  
   Ashfield to Druit Town, 478.  
   City and Suburban, 179.  
   Contract prices of new Motors, 157, 171.  
   Electric, between Waverley and Randwick, 151, 440.  
   Employees, 43.  
   Extension Five Dock to Mortlake, 434.  
   Extension of Bondi, 61.  
   Extension of North Shore Cable, 71.  
   Extension to Balmain, 179.  
   Extensions, Newcastle District, 93.  
   Extension, Forest Lodge to Balmain, 302, 404.  
   Fares to Bondi and Coogee, 206.  
   Fees paid in Leasing Commission, 497.  
   Gratuities to relatives of men killed in Service, 114.  
   Net profit or loss on, for year ended 30th June, 1890, 323.  
   Randwick, Waverley, Woollahra, and Bondi, 477.  
   Railway Station to Town of Queanbeyan, 82.  
   Revenue and Expenditure upon certain railways and 378.  
   Watches and Overcoats for Officers, 94.  
   Waiting-rooms, 105.  
 TRANSFER OF SHARES:—Probate Revenue, 112.  
 TRAVELLING ALLOWANCE:—In Police Department, 305.  
 TREASURY BILLS:—Extinction of Deficit, 150.  
 TREASURY DEPARTMENT:—Report of Commission, 533.  
 TRIAL BAY:—  
   Construction of Breakwater, 194, 245.  
   Cost of Jetty, 260.  
   Prison Works, 245.  
 TRIAL SURVEYS (See "RAILWAYS").  
 TRIPP, BENJAMIN:—Fines paid by, 283.

## Q

- TROUT FRY** :—In Snowy and Umaralla Rivers, 111.  
**TRUCKING YARDS** (See "RAILWAYS").  
**TRUCKS** (See "RAILWAYS").  
**TUBERCULOSIS** :—Cows suffering from, 98.  
**TUBES AND RODS** :—Prices of Well-boring, 223.  
**TUCKER, CHARLES, JUN.** :—Conditional Purchase at Forbes, 30.  
**TUCKER, MRS.** :—Compensation to, by Lands Department, 36.  
**TUMBERUMBA** :—Railway from Wagga Wagga, 8.  
**TUMUT** :—  
     Crown Lands in Electorate, 279, 285.  
     Railway Extension from Gundagai, 112, 284.  
**TURALLA** :—Reserve, Queanbeyan Electorate, 355.  
**TURRET CLOCK** :—Post Office, Redfern, 21.  
**QUESTIONS (continued)** :—  
**TWYED, THE** :—Traffic on River, 112.  
**TYPHOID FEVER** :—  
     Prevalence of, in Eastern Suburbs, 23.  
     Registration of Cases, 21.  
**ULLADULLA** :—Recreation Reserve, 503.  
**UNEMPLOYED, THE** (See also "FREE LABOUR BUREAU").  
     Employment of, at Bourke, 31.  
     Mr. R. J. Oliver, 66.  
     Railway pass, granted to Mr. R. J. Oliver, 66.  
     Resolutions passed at meeting, and deputation to Colonial Secretary, 30.  
**UNIVERSITY** (See "SYDNEY UNIVERSITY").  
**URALLA** :—Lock-up, 128.  
**URANA** :—  
     Canal from Murrumbidgee River to Lake, 478.  
     Railway to, 16, 171.  
**VACCINE SPECIFIC** :—Use of M. Pasteur's, 39.  
**VALE CREEK** :—Bridge over, at Perth, 9.  
**VETERINARY SURGERY** :—School of, 16.  
**VICTORIA** :—Amalgamation of Boroughs, 149, 188.  
**VICTORIA PARK** :—Formation of Bowling Green, 497.  
**VICTORIA WHARF** :—Resumption of, 435.  
**VICTORIAN BORDER** :—Railway from Cooma, 120, 250.  
**VINE AND FRUIT DISEASES** :—Introduction of Bill, 8.  
**VINEYARDS** :—Infected by Phylloxera, 145.  
**VOLUNTEER FORCE** (See "MILITARY").  
**VOLUNTEER LAND ORDERS** :—Applications for Special Areas under, 185.  
**WAGGA WAGGA** :—  
     Borough Council, 195.  
     Railway to Tumberumba, 8.  
**WAITERS** :—Government Employees engaged as, 102.  
**WAITING-ROOMS** (See "TRAMWAYS").  
**WALGETT** :—  
     Abandoned Runs in Land District, 507.  
     Losses of Stock in District, 50.  
**WANAARING** :—Water Supply between, and Louth, 365.  
**WATCHES AND OVERCOATS** (See "TRAMWAYS").  
**WATER CONSERVATION** :—  
     Artesian Bore at Hay, 24.  
     Artesian Bore, Deniliquin to Moama Road, 496.  
     Artesian Bores on Angledool—Collarendabri Road, 15, 132.  
     Introduction of Bill to deal with, and Irrigation, 250.  
     Lake Cudgellico, 186.  
     Letter of Mr. J. P. Abbott in reference to Bores for Water, 97.  
     Premises occupied by Department, 504.  
     Tanks and Dams, 15.  
     Works, Lake Cudgellico, 478.  
**WATER SUPPLY** :—  
     Artesian Water, Yellow Water-holes, 200.  
     Assessment of Churches, &c., by Board, 488.  
     Between Wanaaring and Louth, 365.  
     Byrock and Coolabah, 364.  
     Cobar, 78.  
     Dam at Costigan's, Yerong Creek, 186, 199.  
     Employees under Water and Sewerage Board, 365, 392.  
     Hillgrove, 351.  
     Junee, 417.  
     Manly, 72.  
     Potts' Hill, 538.  
     Repayment by Municipalities of cost of Works, 497.  
     Reserve Parkes Road at Bore-Cabonne, 44.  
     Site for Tank at Grong Grong, 33.  
     Site for Tank at Yerong Creek, 39.  
     Sunny Corner and Wattle Flat, 22.  
     Tank between Swanbrook Creek and Inverell, 146.  
     Tank, Sassafras Public School, 508.  
**QUESTIONS (continued)** :—  
**WATTLE** :—Cultivation of, 93.  
**WATTLE FLAT** :—Water Supply, 22.  
**WATTS, MR.** :—Clerk of Petty Sessions, Braidwood, 77.  
**WAVERLEY** :—  
     Electric Tramway to Raudwick, 151, 440.  
     Tramline, 477.  
**WEBSTER, WILLIAM C.** :—Employment of, in the Supreme Court, 285, 297, 323, 331.  
**WEIGHTS AND MEASURES ACT** :—Inspection of Weights in Mines, 284.  
**WEIR** :—At Hillston, on Lachlan River, 185, 487.  
**WELLINGTON** :—Returns on Railways between Bourke and, 471.  
**WERRIS CREEK** :—  
     Railway to Dubbo, 113.  
     Survey of Railway Line, 10.  
**WESTBURY ATHA, v. OLSUND** :—Case of, 113.  
**WEST MATLAND** :—Flood Embankments, 29.  
**WESTERN DIVISION** (See "CROWN LANDS").  
**WESTERN ELECTRIC INSTRUMENTS** (See "TELEPHONES").  
**WHARVES** :—  
     Erection of, at Oxley Island, Manning River, 22, 209.  
     Iron, Darling Harbour, 188.  
     Lifebuoys and Lines on Jetties and, 435.  
     Moama, 129, 200, 264.  
     Resumption of Victoria, 435.  
**WHEAT** (See also "SEED-WHEAT") :—  
     Rust in, 36, 50.  
**WHITE BAY, BALMAIN** :—Reclamation of, 57, 404, 446.  
**WHITTON v. WHITE** :—Case of, 198.  
**WIPE MAINTENANCE** :—Confinces in Darlinghurst Gaol for, 369.  
**WILBERTREE** :—Bridge, 92.  
**WILBERFORCE** :—Common, 115.  
**WILCANNIA** :—Conveyance of Mails over Tallywalka Creek, 102.  
**WILLOUGHBY** :—Cancellation of land from dedication, parish of, 388.  
**WILSON, MR.** :—Salary and Allowances, 60.  
**WINDANG ISLAND** :—Right to mine on, 157.  
**WINDRED, MR. J., J.P.** :—Complaints against Postal Department, 298.  
**WINDSOR AND RICHMOND** :—Police Magistrate for, 403.  
**WIRE** (See "TELEGRAPHS").  
**WIRE NETTING** :—Duty on, 178.  
**WISE, MR.** :—Engagement of, for Crown before Land Court, 441, 447.  
**WOLLOMBI** :—Railway to Maitland, 150.  
**WOLLONGONG HARBOUR TRUST** :—Expenditure of State subsidy, 195.  
**WOLSTENCRAFT, E.** (See "CROWN LANDS," also "CROW'S NEST").  
**WOMBAYAN CAVES** :—Road from Bowral, 207.  
**WOMEN** :—Imprisoned for Debt, 243.  
**WOOD-BLOCKING** :—Glebe-Balmain Road, 45.  
**WOODS** :—Protection of Ironwood and Buddah, 364.  
**WOODSTOCK** :—  
     Railway Accommodation, 57.  
     Reserve for Railway Purposes, 127.  
     Sale of Town Allotments, 251.  
     Township Allotments, 57.  
**WOOL** :—At Railway Stations, between Nyngan and Bourke, 448.  
**WOOLLAHRA** :—Tramline, 477.  
**WORMS IN SHEEP** :—Symptoms of, and Remedy for, 37.  
**WRECKS** :—Destruction of, at entrance of Richmond River, 16.  
**YAMBA** :—Road from Grafton, 459.  
**YUOLBAR** :—Cancellation of Reserves, and on Solferino Goldfields, 405.  
**YANTABULLA** :—Small Debts Court, 365.  
**YELLOW WATERHOLES** :—Artesian Bore, 129, 200.  
**YERONG CREEK** :—  
     Bridge near Costigan's, 93.  
     Dam in, 186, 199.  
     Site for Tank, 39.  
**YETMAN** :—Telegraph-master at, 305.  
**YOUNG WALLSEND COLLIERY** :—Explosion of Fire Damp in, 250.  
**YOWENDAH AND EUROKA RUNS** :—Survey of land on, 340.  
**YUGILBAH PASTORAL HOLDINGS** :—Decision of Land Court, 533.

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>R</b>		
<b>RABBIT BILL:—</b>		
Motion made ( <i>Mr. Brunker</i> ) for Committee of the Whole, 298; Message from the Governor, 324; House in Committee, resolution agreed to, Bill presented, and read 1 <sup>o</sup> , 338; Order of the Day postponed, 519, 524; Standing Orders suspended, 524; Read 2 <sup>o</sup> , committed, reported with amendments, report adopted, 536; Read 3 <sup>o</sup> , passed, and sent to Council, 541; Returned with amendments, 557; Amendments agreed to, 558 .....	5	331
Mr. Lakeman proceeding to move, without notice, that the Government should now introduce the Bill before any other business, and before the rising of the House. <i>Point of Order</i> ,—"That as Sessional Order in reference to new business after 11 o'clock was not rescinded until after that hour in this sitting, such Order still operated to end of sitting,"—ruled against. Mr. Speaker also ruled that motion could not be put without notice, unless by consent, 337.		
<b>RABBITS:—</b>		
Adjournment moved to call attention to necessity of dealing with question, 79, 222.		
Progress Report of Royal Commission into extermination of, laid on Table, 32 .....	5	63
<b>EXPENDITURE:—</b>		
Return showing annual, at present time, laid on Table, 379 .....	5	323
<b>METHOD OF DESTROYING, ON THE TERRAWYNNIA HOLDING:—</b>		
Motion made ( <i>Mr. Dickens</i> ) for report respecting, 87; Return to Order, laid on Table, 94 .....	5	321
<b>NUISANCE ACT:—</b>		
Petition presented from certain Owners of Stock in the Cooma District for repeal of, 121 .....	5	329
<b>RECEIPTS AND EXPENDITURE UNDER THE ACT:—</b>		
Motion made ( <i>Mr. J. P. Abbott</i> ) for return of, 107; Return to Order laid on Table, 379 .....	5	327
<b>RAILWAY EMPLOYEES PROVIDENT AND PENSION FUND BILL:—</b>		
Motion made ( <i>Mr. McMillan</i> ) for Committee of the Whole, 281; Order of the Day postponed, 295; Message from the Governor, 306; Order of the Day postponed, 314 .....	5	1109
<b>RAILWAYS (See also "LEVEL CROSSINGS ON RAILWAYS BILL;" also, "MILSON'S POINT EXTENSION RAILWAY BILL"):</b>		
Return showing receipts on, during month of August, 1889, laid on Table, 107 .....	5	1081
Report of Commissioners for quarter ended 31st December, 1889, laid on Table, 17 .....	5	891
Do do 31st March, 1890, laid on Table, 17 .....	5	899
Do do 30th June, 1890, 215 .....	5	907
Do do 30th September, 1890, 414 .....	5	915
Annual Report of Commissioners for the year ending 30th June, 1890, laid on Table, 273 .....	5	823
<b>ACCIDENT AT BATHURST:—</b>		
Report of Board of Inquiry, laid on Table, 52; Report in substitution, laid on Table, 68 .....	5	925
Motion made ( <i>Mr. Crick</i> ) for papers in connection with, 83; Return to Order, laid on Table, 87	5	939
Adjournment moved in reference to accident at Bathurst and other accidents; also tramway accidents, 95.		
Papers, &c, respecting charges made by Railway Commissioners and others against Mr. Schey, laid on Table, 260 .....	5	949
Papers laid on Table ( <i>Mr. McMillan</i> ), and motion made, that they be printed. <i>Point of Order:—</i> That papers reflected upon the conduct of a Member of, and referred to a Debate in, the House; Mr. Speaker ruled that they should not be presented; Papers and motion withdrawn, 265.		
Further correspondence respecting, laid on Table; motion made ( <i>Mr. McMillan</i> ) that document be printed. <i>Point of Order:—</i> "That papers were, equally with papers presented on a previous occasion, such as should not be laid on the Table"; ruled against by Mr. Speaker; motion carried, 272-3 .....	5	965
<b>ACCIDENT AT COOLABAH:—</b>		
Report of Board of Inquiry, laid on Table, 226 .....	5	967
<b>ACCIDENT AT FARLEY STATION:—</b>		
Report of Board of Inquiry on, laid on Table, 141 .....	5	971
<b>ADDITIONAL WORKS AND CONVENIENCES AT NEWTOWN:—</b>		
Notification of resumption of land, laid on Table, 358 .....	5	1137
<b>ALTERNATIVE ROUTES, GREAT WESTERN LINE:—</b>		
Report by Mr. E. B. Price on, for relieving congestion of traffic, 410 .....	5	1045
<b>BALMAIN, LINE OF TRAMWAY OR RAILWAY:—</b>		
Motion made ( <i>Mr. Hawthorne</i> ) that the increasing importance of that suburb demanded the construction of, 261.		
<b>BALLINA BRANCH LINE:—</b>		
Report by Mr. E. B. Price, Temporary Examiner on, in connection with the line from Lismore to the Tweed, 485 .....	5	991
<b>BLACKTOWN AND BLAYNEY:—</b>		
Motion made ( <i>Mr. Frank Farnell</i> ) for trial Survey with a view to construction of, and Debate adjourned, 269; Order of the Day postponed, 341, 372, 405, 428, 441; Debate resumed, House counted out, 521.		
<b>BYROCK TO BREWARRINA:—</b>		
Return to Order ( <i>Session 1889</i> ), laid on Table, 25 .....	5	1037
Report of the Assistant-Examiner of Public Works Proposals upon the proposed branch line, laid on Table, 392 .....	5	993
Motion made ( <i>Mr. Waddell</i> ) in favour of construction of, amendment proposed ( <i>Mr. Wright</i> ) to refer subject to Public Works Committee; amendment and motion negatived, 405-6.		
<b>CITY OF SYDNEY:—</b>		
Copy of Royal Commission appointing certain gentlemen to inquire into the several proposals for extending accommodation into, laid on Table, 17 .....	5	1055
<b>CLARENCE RIVER:—</b>		
Petition presented for construction of and for harbour improvements, 25 .....	5	1113
<b>COAL CONTRACTS:—</b>		
Return respecting for 1890, laid on Table, 345 .....	5	1075
<b>COBAR TO COCKBURN:—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to refer to Public Works Committee, 555.		
<b>COLO VALLEY:—</b>		
Report by Mr. E. B. Price, Temporary Examiner of Public Works Proposals on, laid on Table, 449 .....	5	995
<b>COOMA LINE:—</b>		
Return showing gross returns from date of opening to 31st May, 1890, laid on Table, 272 .....	5	1073

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>R</b>		
<b>RAILWAYS (continued) :—</b>		
<b>CONNECTING TOWNS WITH EXISTING LINES :—</b>		
Motion made ( <i>Mr. Waddell</i> ) to refer to Parliamentary Standing Committee on Public Works, where trial surveys have been made, and negatived, 147.		
<b>CONSTRUCTION OF LOCOMOTIVES IN THE COLONY :—</b>		
Motion made ( <i>Mr. Lyne</i> ), for papers in connection with letting of contracts, 46.		
<b>CONVEYANCE OF COAL :—</b>		
Return respecting, laid on Table, 166 .....	5	1077
<b>COOTAMUNDEA TO TEMORA (See also "COOTAMUNDEA TO TEMORA RAILWAY BILL") :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans of the Parliamentary Standing Committee on Public Works, laid on Table, 32; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 116 .....	6	859
<b>CULCAIRN TO COBOWA (See also "CULCAIRN TO COBOWA RAILWAY BILL") :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 40.		
<b>DIFFERENTIAL RATES :—</b>		
Motion made ( <i>Mr. John Wilkinson</i> ) against present system of, and by leave withdrawn, 353		
<b>DUPLICATING THE SOUTHERN LINE OF RAILWAY :—</b>		
Conditions, specifications, &c., of the contracts for, laid on Table, 553 .....	5	1057
<b>EXTENSION IN THE NORTHERN DISTRICTS OF THE COLONY :—</b>		
Report of the Assistant Examiners of Public Works proposals, laid on Table, 319 .....	5	1003
<b>EMPLOYEES :—</b>		
Petition presented in reference to dismissal and giving of their work to public contract, and praying for an inquiry, 325 .....	5	1127
<b>GALONG TO BURROWA :—</b>		
Report by Mr. P. Scarr, Temporary Examiner of Public Works; proposals on, laid on Table, 555.	5	997
<b>GLEN INNES AND GUYRA :—</b>		
Further Return respecting quantity of goods carried during 1889, laid on Table, 39 .....	5	1079
<b>GLEN INNES TO INVERELL :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to refer to Public Works Committee, 555.		
<b>GOULBURN TO CROOKWELL (See also "GOULBURN TO CROOKWELL RAILWAY BILL") :—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 40.		
<b>GRAFTON TO THE TWEED (See also "GRAFTON TO THE TWEED RAILWAY BILL") :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans from the Parliamentary Standing Committee on Public Works, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 125 .....	6	299
<b>GUYRA TO INVERELL :—</b>		
Petition presented from residents of Ollera, Wandsworth, Tenterden, &c., in favour of route, and praying that it may be submitted to the Works Committee, 479 .....	5	1131
<b>GUYRA TO GLEN INNES AND INVERELL, &amp;c. :—</b>		
Motion made ( <i>Mr. Cruickshank</i> ) for return of all goods traffic for last five years, 510.		
<b>HORNSBY TO ST. LEONARDS :—</b>		
Petition presented from residents of Districts in favour of, 25 .....	5	1111
<b>KIAMA TO NOWRA (See also "KIAMA TO NOWRA RAILWAY BILL") :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans from the Parliamentary Standing Committee on Public Works, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 116 .....	6	205
Petition presented from Residents and Freeholders, Nowra, against as proposed, 152 .....	5	1123
Motion made ( <i>Mr. Bruce Smith</i> ) to refer matter of Extension of, into town of Nowra, to the Public Works Committee, 555.		
<b>LIGHT LINES :—</b>		
Return respecting, laid on Table, 269 .....	5	1071
<b>LISMORE TO THE TWEED :—</b>		
Petition presented from Railway League, Casino, in favour of construction of, 52 .....	5	1115
<b>LOCOMOTIVE WORKS IN THE COLONY :—</b>		
Correspondence respecting establishment of, laid on Table, 17 .....	5	1023
<b>MARRICKVILLE TO THE BURWOOD ROAD (See also "MARRICKVILLE TO BURWOOD ROAD RAILWAY BILL"; also "MARRICKVILLE TO BURWOOD ROAD RAILWAY BILL (No. 2)") :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans from the Parliamentary Standing Committee on Public Works, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 117 .....	6	505
<b>MEADOW BANK PLATFORM :—</b>		
Notification of resumption of land under Public Works Act, laid on Table, 390 .....	5	561
<b>MERCHANDISE AND LIVE STOCK RATES :—</b>		
Adjournment moved to discuss, 247.		
<b>MOLONG TO PARKES AND FORBES (See also "MOLONG TO PARKES AND FORBES RAILWAY BILL") :—</b>		
Report together with Minutes of Evidence, Appendices, and Plan from Parliamentary Standing Committee on Public Works, laid on Table, 87; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out; amendment moved ( <i>Mr. Wright</i> ) to resubmit to Parliamentary Committee on Public Works, and negatived; Original Motion passed, 137-8 .....	6	607
Petition presented from inhabitants of Cudal against recommendation of the Parliamentary Standing Committee on Public Works, 103 .....	5	1117
Petition presented from residents of Canowindra District in favour of route <i>via</i> Cowra, 103 .....	5	1121
Petition presented from residents of Forbes and surrounding districts against carrying out pending Report on Extension from Cowra or Woodstock to Forbes, 124 .....	5	1119
Petition presented from residents of Eugowra and surrounding districts against carrying out, pending Report on Extension from Cowra or Woodstock to Forbes, 124 .....	5	
<b>MOSS VALE TO ROBERTSON :—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans from the Parliamentary Standing Committee on Public Works, laid on Table, 25 .....	6	1183
<b>MR. WILLIS AND COMMISSIONERS :—</b>		
Adjournment moved to deal with matter of, 239.		
<b>MUDGEES TO GULGONG :—</b>		
Report together with Minutes of Evidence, Appendices, and Plans, from the Parliamentary Standing Committee on Public Works, laid on Table, 68 .....	6	1255
<b>NEW ENGLAND TO THE COAST :—</b>		
Petition, Residents of New England and district west of Inverell, in favour of a line to the coast, and praying that lines Inverell to Guyra and Guyra to Grafton be referred to the Public Works Committee at the same time as the Glen Innes and Inverell line is considered, 434 ...	5	1129

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>R</b>		
<b>RAILWAYS (continued):—</b>		
<b>NORTH COAST:—</b>		
Motion ( <i>Mr. Fivian</i> ) to carry out being proceeded with, and House counted out, 121.		
<b>NYNGAN TO COBAR (See also NYNGAN TO COBAR RAILWAY BILL):—</b>		
Report, together with Minutes of Evidence, Appendices, and Plans from the Parliamentary Standing Committee on Public Works, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 116	6	1
<b>OFFICERS ENGAGED IN ENGLAND BY COMMISSIONERS:—</b>		
Return showing Special Travelling Allowances, laid on Table, 107	5	1087
<b>PLATFORM AT OR NEAR OURIMBAR CREEK:—</b>		
Motion made ( <i>Mr. Edmunds</i> ) for papers relating to, 141; Return to Order, laid on Table, 257	5	1091
<b>PULLMAN CARS:—</b>		
Motion made ( <i>Mr. Crick</i> ) for Papers relating to use of, 103; Return to Order, laid on Table, 158.	5	1031
<b>RAILWAY TO CONNECT NORTH SHORE RAILWAY WITH PORT JACKSON, AT MILSON'S POINT:—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) to remit to Parliamentary Standing Committee on Public Works, 40-41; Second Report brought up, 273; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 314	6	955
<b>RECENT DISASTERS:—</b>		
Adjournment moved ( <i>Mr. O'Sullivan</i> ) in reference to necessity of more formal inquiry, 53.		
<b>SOUTHERN EXPRESS:—</b>		
Return showing the time of arrival at Sydney and Albury, from 1st January to 31st October, 1890, laid on Table, 436	5	1080
<b>TARAGO TO BRAIDWOOD:—</b>		
Motion made ( <i>Mr. Byrie</i> ) to submit to Public Works Committee, 241.		
<b>TERALBA AND ADAMSTOWN:—</b>		
Return respecting Duplication of Line, laid on Table, 17	5	1083
<b>TRIPLEMERE ACCIDENT:—</b>		
Report of Departmental Board on, laid on Table, 216	5	985
<b>WAGGA WAGGA TO TUMBERUMBA:—</b>		
Report of the Commissioners on proposed branch line, laid on Table, 17	5	1001
<b>WALGETT:—</b>		
Petition presented from Progress Committee in favour of, 268	5	1125
<b>WIDENING LINE FROM SYDNEY TO EVELEIGH:—</b>		
Notification of resumption of land, laid on Table, 358	5	1135
<b>RANDWICK TOLL-BAR ABOLITION BILL:—</b>		
Motion made ( <i>Mr. Alfred Allen</i> ) for leave to bring in, 46.		
<b>RATES (See "TELEGRAPHS;" also "PILOTAGE RATES").</b>		
<b>RAY, CASE OF (See "ADMINISTRATION OF JUSTICE").</b>		
<b>RAY, J. J. (See "CROWN LANDS")</b>		
<b>REAL PROPERTY ACT:—</b>		
Returns under, for 1889, laid on Table, 32	8	697
<b>RECEIPTS AND EXPENDITURE (See "FINANCE").</b>		
<b>RECLAMATION (See "RESUMPTION OF LAND").</b>		
<b>RECREATION, PUBLIC (See "RESUMPTION OF LANDS"; also "CROWN LANDS").</b>		
<b>REDHEAD COAL-MINE RAILWAY ACT AMENDING BILL:—</b>		
Assent reported, 2.		
<b>REDUCTION OF COST OF LITIGATION BILL:—</b>		
Motion made ( <i>Mr. Walker</i> ) for leave to bring in, presented, and read 1 <sup>o</sup> , 181; Order of the Day postponed, 422; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 554-5		
<b>REFRESHMENT COMMITTEE:—</b>		
Sessional Order passed, 12.		
<b>REGISTRAR-GENERAL'S DEPARTMENT:—</b>		
Report from the Registrar-General respecting working of, 245	2	353
Motion made ( <i>Mr. Crick</i> ) for Select Committee to inquire into the working of, and negatived, 303.		
<b>REGULATIONS:—</b>		
<b>LAI'D ON TABLE:—</b>		
Criminal Law Amendment Act (Licenses), 231, 348	3	801, 803
Crown Lands Act, 136, 280, 307, 553 (?)	4	631, 633, 635, 637, 639
Imported Stock Act, 25, 260	5	37, 39
Land Court, 32, 188	4	207, 217
Public Instruction Act of 1880, 17	7	1001
Public-watering Places Act, 1884, 25	5	465
Removal and return of Prisoners and Criminal Lunatics—Despatch, 17	3	845
Stamp Duties Acts, 17	8	731
Industrial Schools Act of 1866, 174	7	1003
Wollongong Harbour Trust Act, 1880, 200, 234, 307, 332	7	173, 175, 179, 185
State School and University Bursaries, 393	7	633
<b>REMISSION OF PENALTIES BILL:—</b>		
Received from Legislative Council, and on motion ( <i>Mr. Gould</i> ) read 1 <sup>o</sup> , 222; Motion made for second reading. <i>Point of Order</i> , that the provisions of the Bill, were not covered by the Title ruled against by Mr. Speaker, 265; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 265; read 3 <sup>o</sup> , passed, and returned to Council, 277; assent reported, 286.		
Petition presented from certain persons connected with the Grand Lodge of the Royal Orange Institution against, 260	3	861
<b>RENTS (See "CROWN RENTS BILL;" also "DISTRESS FOR RENT ABOLITION BILL;" also "CROWN LANDS").</b>		
<b>REPORTS:—</b>		
<b>LAI'D ON TABLE:—</b>		
Annual, Department of Mines, for 1889, 18	4	797
Annual, Stock and Brands Branch, Department of Mines, for 1889, 25	5	1
Board of Water Supply and Sewerage for 1889, 17	5	333
Coast Hospital, Little Bay, for 1889, 32	2	493
Floods in Town and District of Bourke, 52	8	241
Goulburn Fire Brigades, under Fire Brigades Act, 1884, Fifth Annual, 82	8	681
Immigration for 1890, 32	8	47
Inspector-General of the Insane for 1889, 32	7	217
Leprosy in the Australian Colonies, 32	2	527
Minister of Public Instruction for 1889, 39	7	651

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>R</b>			
<b>REPORTS (continued) :—</b>			
<b>LAYD ON TABLE (continued) :—</b>			
National Art Gallery, for 1889, 79 .....		7	990
Naval Forces of the Colony for 1889, 32.....		2	213
Police Department for 1889, 32 .....		7	617
Prisons for 1889, 52 .....		7	643
Progress, Royal Commission, into schemes for Extermination of Rabbits, 32 .....		5	65
Railway Accident at Coolabah, 226 .....		5	967
Engineer-in-Chief for Harbours and Rivers on Southern Breakwater at Newcastle, 234 .....		7	171
Registrar-General's on Working of Department, 245 .....		2	353
Hunter River Floods—by Mr. George Gordon, C.E., 252 .....		8	245
Outbreak of Typhoid Fever at Waverley and Randwick, by J. Ashburton Thompson, M.D., D.P.H., 260 .....		2	507
Nautical School-ship "Vernon," for year ending 30 April, 1890, 260 .....		7	259
Railway Accident at Bathurst, 52; Report in substitution, 68 .....		5	925
Railway Commissioners', for quarter ended 31st December, 1889, 17.....		5	891
Do do 31st March, 1890, 17 .....		5	889
Do do 30th June, 1890, 216 .....		5	907
Do do 30th September, 1890, 414 .....		5	915
Do on proposed branch line from Wagga Wagga to Tumberumba, 17.....		5	1001
Do for year ending 30th June, 1890, 273.....		5	823
Seventh under the Inscribed Stock Act on the Creation, Inscription, and Issue of Stock, 17.....		3	177
Trustees of the Sydney Free Public Library for 1889-90, 17 .....		7	945
University of Sydney, for 1889, 52 .....		7	917
Vaccination for 1889, 32 .....		2	501
Votes for maintenance of Sick Paupers for years 1887-8-9, 32 .....		2	567
Civil Service Board of New South Wales for 1889, 121 .....		2	231
State Children's Relief Department for year ending 5th April, 1890, 123.....		7	197
Commissioners of Fisheries to 31 December, 1889, 107 .....		7	1051
Metropolitan Fire Brigades Board for 1889, under the Fire Brigades Act of 1884, 107.....		3	653
Military Forces of the Colony for 1889, 129 .....		2	207
Board of Inquiry into Accident at Farley, 141 .....		5	971
Postmaster-General for 1889, 141 .....		7	335
Dairies Supervision Act for 1887-8-9, 151 .....		2	533
President of Commission on the Centennial International Exhibition, 1888, 166.....		8	131
Board for the Protection of the Aborigines for 1889, 166 .....		7	269
Postal and Telegraph Conference, Adelaide, May, 1890, 180 .....		7	453
Wollongong Fire Brigades Board, to 31st March, 1890, 207 .....		3	683
Forest Conservancy Branch for 1889, 207 .....		5	333
Departmental Inquiry on Thirlmere Railway Accident, 216.....		5	985
Honorable B. Burdett Smith, M.L.C., Executive Commissioner for the Centennial International Exhibition Melbourne, 216 .....		8	161
Sydney Grammar School for 1889, 216 .....		7	937
Auditor-General, on Receipts and Expenditure of the Consolidated Revenue, 193 .....		3	1
Board to inquire into Pyrmont Bridge, Glebe Island Bridge, and line of Tramway to Balmain, 312 .....		5	1019
Railway Extension in the Northern Districts—by Assistant Examiners of Public Works proposals, 319 .....		5	1003
Australian Museum for 1889, 334 .....		7	961
Proposal to construct Bridge over Murrumbidgee River at Freshford, 341 .....		5	811
Tenth and Final, of Committee of Management on Technological, Industrial, and Sanitary Museum, for 1889, 341 .....		7	879
Cokes manufactured in New South Wales, 345 .....		8	423
Board of Health on Bovine Tuberculosis in the South Coast District, 366 .....		5	45
Annual, City of Sydney Improvement Board, for 1890, 366.....		2	581
Board of Health, on deposit of garbage in the Borough of Redfern, on a site for building purposes, 370 .....		2	503
Breakwater at Trial Bay, from Engineer-in-Chief for Harbours and Rivers, 392 .....		7	167
Railway from Byrock to Brewarrina, from Assistant Examiner of Public Works, proposals upon the proposed branch line, 392 .....		5	993
Drainage on Swamps in the Macleay River District ( <i>not printed</i> ), 392.....			
Alternative Railway Routes for relieving congestion of traffic on Great Western Line, by Mr. E. B. Price, 410 .....		5	1045
Ninth Annual Report of the Department of Lands for 1889, 414 .....		4	1
Public Service Inquiry Commission upon the General Post Office, Money Order Office, and the Electric Telegraph Department, 430.....		2	281
Colo Valley Railway, by Mr. E. B. Price, Temporary Examiner of Public Works Proposals, 440.....		5	995
Italian Settlement at the Richmond River, known as "New Italy," by Director-General of Forests, 464.....		5	59
Bridges at Morpeth and Hinton, by Examiners of Public Works Proposals, 465.....		5	773
Improvement of the Brunswick River, by Mr. E. B. Price, Temporary Examiner of Public Works Proposals, 463 .....		7	169
Annual on British New Guinea for 1889-90, 485 .....		8	257
Proposed Branch Railway to Ballina, in connection with line from Lismore to the Tweed, by Mr. E. B. Price, 485 .....		5	991
Inspector-General of Police on occurrences coming specially under the notice of the Police during Labour Strike, 502 .....		7	627
Influenza Epidemic, by Chief Medical Inspector for 1890, 534 .....		2	551
Mihi and Dungar Creeks, Bridges, 390 .....		5	801
Galong to Burrowa Railway, by Mr. P. Scarr, 555 .....		5	997
<b>FROM STANDING ORDERS COMMITTEE :—</b>			
Standing Orders, 485 .....		1	737
<b>FROM SELECT COMMITTEE :—</b>			
St. Leonards School of Arts Enabling Bill, 24 .....		2	153
Toronto Tramway Act Amendment Bill, 27 .....		2	175
Willoughby and Gordon Tramway Act Amending Bill, 59 .....		2	199
Goulburn Water Supply Charges Bill, 99 .....		2	123
City of Newcastle Gas and Coke Company's Electric and other Light Bill, 109 .....		2	83
Tarrawingee Tramway Bill, 124 .....		2	167
Borough of Newcastle Electric Lighting Bill, 182.....		2	39
Borough of Willoughby Naming Bill, 195 .....		2	69

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
	VOL.	PAGE.	
<b>R</b>			
<b>REPORTS (continued):—</b>			
Wagga Wagga Cattle Sale-yards Bill, 251 .....	2	189	
Tumut School of Arts Site Sale Bill, 298 .....	2	183	
Mrs. Cunynghame, late Superintendent of Macquarie-street Asylum for Infirm and Destitute, Parramatta, 328 .....	2	367	
Conditional Purchases of O. H. Thatcher, Forbes Land District, 328 .....	4	517	
M'Ilveen and Clift's Conditional Purchases, 341 .....	4	549	
Australian Banking Company of Sydney Bill, 358, 486 (Second) .....	2	1, 7	
Mr. Manning, Chairman of Licensing Bench at Ryde, 369 .....	3	871	
Claim of Mr. E. K. Grace to Crown Lands adjoining Gungahleen Estate, 373 .....	4	585	
Blayney Municipal Council Enabling Bill, 389 .....	2	33	
Calaghan's Conditional Purchases, Braidwood and Queanbeyan, 399 .....	4	507	
Elizabeth Ann Cartwright's Additional Conditional Purchases, 415 .....	4	531	
Borough of Newcastle Electric Lighting Bill (No. 2), 428 .....	2	63	
Hay and Deniliquin Tramway Bill, 434 .....	2	120	
Forfeiture of Henry Crowe's Conditional Purchase, County of Harden, 519 .....	4	541	
Adelaide Jubilee International Exhibition, 520 .....	8	73	
Claims of William Tom, James Tom, and J. H. A. Lister as the first Discoverers of Gold in Australia, 540 .....	4	1053	
Ryan's Conditional Purchases at Wagga Wagga, 268, 540 (Second) .....	4	557, 571	
Conveyance of Mails to and from General Post Office, 553 .....	7	529	
Management of the Orange Hospital (Special), 553 .....	7	309	
Hay Athenæum Trustees Enabling Bill, 553 .....	2	137	
<b>PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS:—</b>			
General, 25 .....	1	741	
Proposed Breakwater at Byron Bay, 25 .....	7	1	
Proposed Bridge over the Hunter River at Jerry's Plains, 25 .....	5	615	
Proposed Bridge over Tarban Creek, Parramatta River, 25 .....	5	741	
Proposed Bridge to connect Bullock Island with the Mainland at Newcastle, 32 .....	5	563	
Proposed Dredge and Plant for Sydney Harbour, 25 .....	7	157	
Proposed Extension of Sydney Water Supply to Southern Suburbs—Hurstville and Rockdale, 25 .....	5	415	
Proposed Improvements to the Entrance of the Clarence River, 25 .....	7	61	
Proposed Offices for Board of Water Supply and Sewerage, 25 .....	5	393	
Proposed Railway from Cootamundra to Temora, 32 .....	6	859	
Proposed Railway from Grafton to The Tweed, 25 .....	6	299	
Proposed Railway from Kiama to Nowra, 25 .....	6	205	
Proposed Railway from Marrickville to the Burwood Road, 25 .....	6	505	
Proposed Railway from Moss Vale to Robertson, 25 .....	6	1183	
Proposed Railway from Mudgee to Gulgong, 68 .....	6	1255	
Proposed Railway from Nyngan to Cobar, 25 .....	6	1	
Proposed Retention of the Western Suburbs Drainage Scheme, 25 .....	5	473	
Railway from Molong to Parkes and Forbes, 87 .....	6	607	
Iron Bridge at Cowra, 87 .....	5	663	
Proposed Railway to connect the North Shore Railway with Port Jackson at Milson's Point (second), 273 .....	6	956	
<b>RESERVES (See "CROWN LANDS").</b>			
<b>RESOLUTIONS:—</b>			
<b>FROM COMMITTEE OF THE WHOLE:—</b>			
Reported, 32, 133, 142 <sup>(2)</sup> , 155 <sup>(2)</sup> , 159 <sup>(2)</sup> , 160, 163, 167 <sup>(2)</sup> , 168 <sup>(4)</sup> , 169 <sup>(2)</sup> , 203, 217 <sup>(2)</sup> , 222, 227, 257, 314, 317, 338, 361, 368 <sup>(2)</sup> , 423, 429, 429, 457 <sup>(2)</sup> , 472, 490 <sup>(2)</sup> , 498, 502, 520.			
Agreed to, 32, 142 <sup>(2)</sup> , 155 <sup>(2)</sup> , 159 <sup>(2)</sup> , 163, 167 <sup>(2)</sup> , 168 <sup>(4)</sup> , 169 <sup>(2)</sup> , 175, 203, 217 <sup>(2)</sup> , 218, 222, 227, 258, 314, 317, 338, 341, 361, 412 <sup>(2)</sup> , 423, 430, 434, 457 <sup>(2)</sup> , 472, 490 <sup>(2)</sup> , 498, 502, 520.			
<b>FROM COMMITTEE OF SUPPLY:—</b>			
Reported, 325, 382, 542 <sup>(154)</sup> .			
Agreed to, 325, 382, 549 <sup>(154)</sup> .			
<b>FROM COMMITTEE OF WAYS AND MEANS:—</b>			
Reported, 337, 453, 549 <sup>(2)</sup> .			
Agreed to, 337, 453, 549 <sup>(2)</sup> .			
<b>RESUMED AREAS (See "CROWN LANDS").</b>			
<b>RESUMPTION OF LAND (See also "MOLESWORTH-STREET, LISMORE"):—</b>			
<b>NOTIFICATIONS OF, LAID ON TABLE:—</b>			
Bridge of Bishop's Creek, Field of Mars, 18 .....	5	817	
Buildings for Public Offices, Phillip-street, 18 .....	8	693	
Court-house at The Globe, 18 .....	3	855	
Court-house, Redfern, 273 .....	3	857	
Extension of Tramway from Leichhardt to Fire Dock, 257 .....	5	1139	
General Cemetery at Bowral, 18 .....	8	687	
Manly Water Supply, 18 .....	5	453	
North Shore Water Supply, 18 <sup>(2)</sup> .....	5	455, 457	
Public Cemetery, South Head, 32 .....	8	689	
Public Park, Clarence Town, 18 .....	4	783	
Public Recreation, Petersham, 18 .....	4	787	
Public School Purposes, 17, 79, 129, 174 <sup>(2)</sup> , 324 .....	7	( 1025, 1023 1031, 1033 1037, 1039	
Public Offices, Sydney, 273 .....	8	695	
Sewerage, Western Suburbs, 18, 226, 358 .....	5	487, 489, 491	
Water Supply, Town of Richmond, 32 .....	5	459	
Wharf Accommodation for Traffic between Sydney and Balmain, 18 .....	7	189	
Wharf Accommodation, Woodville, Paterson River, 32 .....	7	191	
Wharf Accommodation, Woolloomooloo Bay, 18 .....	7	187	
Tarreganda Bridge Approach, 129 .....	5	557	
Water Supply, City of Sydney, 273 .....	5	461	
Additional Siding Accommodation at Como, 188 .....	5	1133	
Tramway from Castlereagh-street to the Randwick Road, 324 .....	5	1141	
Improving the Parramatta Road at University Cutting, 324 .....	5	559	
Additional Railway Works and Conveniences at Newtown, 358 .....	5	1137	
Widening the line of Railway from Sydney to Eveleigh, 358 .....	5	1135	
Reclamation of certain low-lying mud flats in the vicinity of Long Cove, 358 .....	4	787	
Construction of an Approach Road to Meadow Bank Railway platform, 300 .....	5	561	

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>R</b>		
RESUMPTION OF LAND ( <i>continued</i> ):—		
Construction of a Line of Tramway from Ashfield Railway Station to Portland-place, 390 .....	5	1143
Sewerage of City of Sydney and Suburbs, 390 .....	5	493
Enlargement of the Post Office at West Maitland, 390.....	7	607
Conservation of Water, Paterson, 390 .....	5	463
Wharf Accommodation, Oxley Island, Manning River, 390.....	7	193
Post and Telegraph Office at Picton, 410 .....	7	609
General Cemetery at Teralba, 534 .....	8	691
RICHMOND RIVER (See also "ENTRANCE TO RICHMOND RIVER IMPROVEMENTS BILL") :—		
IMPROVEMENTS TO ENTRANCE :—		
Motion made ( <i>Mr. Bruce Smith</i> ) for work to be carried out, 40.		
RICHMOND, TOWN OF (See "WATER SUPPLY").		
ROADS :—		
Cook's River :—		
Return showing Expenditure on, laid on Table, 348 .....	5	513
BRUSHGROVE AND MACLEAN :—		
Correspondence respecting, laid on Table (not printed), 534.		
MILLHORPE TO LUCKNOW, VIA SPRING HILL :—		
Correspondence respecting repair to, laid on Table, 188 .....	5	517
NARRABRI TO THE QUEENSLAND BORDER :—		
Petition presented from certain residents of that portion of the Colony about and beyond Angledool, asking for bridges, culverts, embankments, &c., to be constructed, and that road should be made a first-class road, and that the works should be carried out at once, 452.	5	521
PARRAMATTA :—		
Notification for resumption under the Public Works Act of land at University Cutting for improvement of, laid on Table, 324 .....	5	559
PEAK HILL :—		
Motion made ( <i>Dr. Ross</i> ) for papers relating to, 167.		
SUBORDINATE ROADS :—		
Schedules A to F, Public Works Department, Estimates for 1891, laid on Table, 465.....	3	605
TARANA TO OBERON :—		
Return of Expenditure on, laid on Table (not printed), 32.		
THOMAS BUCKLEY :—		
Return respecting dismissal of, from Department (not printed), 312.		
TEENA TO BINDA, VIA JUNCTION POINT, AND OTHERS :—		
Return showing amounts expended on for 1888 and 1889, laid on Table, 210 .....	5	519
WHEBO POST VIA BYALLA TO GUNNING, GUNNING VIA CLEAR HILL TO GRABBERN GULLEN, AND WHEBO TO CROOKWELL :—		
Return showing expenditure on, laid on Table, 68 .....	5	515
ROBERTS, CHARLES JAMES, ESQUIRE :—		
Resignation of, reported, 1.		
ROBERTSON (See "RAILWAYS").		
ROCKDALE (See "WATER SUPPLY").		
ROLLS (See "ELECTORAL").		
ROSSVILLE ESTATE :—		
Correspondence respecting Purchase of, laid on Table, 141; Plans to be appended, laid on Table, 146.	7	283
ROUMANIA (See "DESPATCHES").		
RULES :—		
Supreme Court, laid on Table, 17, 188, 307, 324, 485 .....	3	807, 811, 809, 815, 813.
RULINGS OF SPEAKER :—		
On Points of Order arising in the House, 104, 125, 154, 181, 208 (?), 227, 247, 265 (?), 272, 288, 337, 423, 431, 436, 461, 465, 511, 524, 529.		
On Point of Order reported from Committee of Supply, 517(?).		
On other than Points of Order, 505, 521(?).		
Speaker ruled that no dissent from, could be made without notice, 422.		
Motion made to dissent from, and negatived, 125, 465.		
RYANS (See "CROWN LANDS").		
RYDE (See "MUNICIPALITIES OF RYDE AND HUNTER'S HILL BILL").		
<b>S</b>		
SAN FRANCISCO MAIL CONTRACT (See "POSTAL").		
SAVINGS BANK (See "GOVERNMENT SAVINGS BANK").		
SCHEDULE :—		
To Estimates-in-Chief for 1891, showing remuneration, &c., received by Public Officers during 1890, laid on Table, 392.....	3	357
Of Subordinate Roads, laid on Table, 465 .....	3	605
SCHEY, MR. (See also "RAILWAYS").		
Mr. Speaker calls attention to continued irrelevance and tedious repetition in Debate on part of, and directs the Honorable Member to discontinue his speech, 335.		
SCIENCE LECTURES (See "UNIVERSITY OF SYDNEY").		
SEGENHOE ESTATE IRRIGATION BILL :—		
Petition presented ( <i>Mr. Abigail</i> ) for leave to bring in, 510; leave given, presented, and read 1 <sup>o</sup> , 515; referred to Select Committee, 528.		
SELECT COMMITTEES (See also "REPORTS") :—		
Balloting for, Sessional Order passed, 11.		
Papers referred to, 13 (?), 88, 103, 246.		
Prayer of Petition for leave to appear before, granted, 24, 39, 87 (?), 124, 367, 384, 414.		
Vote of Chairman of, on Private Bills, 11.		
Member added to, 188.		
Leave given to make visits of inspection, 348, 392, 443.		
Evidence from, of previous Session, laid on Table by Clerk, 348.....	8	57
Report from, of present Session, referred to, 418.		
Private Bill referred back to, 436.		
Subject referred back to, 441.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
S	VOL.	PAGE.
<b>SELECT COMMITTEES</b> ( <i>continued.</i> )		
Amendment to refer Bill to, negatived, 505.		
Leave given to, to make Special Report, 553.		
Appointed during Session .....	1	731
<b>SERGEANT-AT-ARMS</b> :—		
Removes Member from Chamber by direction of Mr. Speaker, 395, 430.		
<b>SERVIA</b> (See "DESPATCHES").		
<b>SESSIONAL ORDERS</b> :—		
Passed, 10 <sup>(a)</sup> , 11 <sup>(s)</sup> , 12 <sup>(s)</sup> .		
Limitation of Business Hours, 40; rescinded, 336.		
Precedence of Orders of the Day of General Business, 253.		
Hour of Meeting on Business Days, negatived, 359.		
Friday made an Additional Sitting Day, and Government Business take precedence up to 6 o'clock, and General Business take precedence after 6 o'clock, and that General Orders take precedence of Motions, 410.		
Monday made an Additional Sitting Day, and Government Business to take precedence, 469.		
<b>SESSIONS</b> (See "PARLIAMENTARY SESSIONS BILL").		
<b>SEVEN-MILE BEACH</b> (See "CROWN LANDS").		
<b>SEWERAGE</b> (See also "DRAINAGE"; also "METROPOLITAN WATER AND SEWERAGE ACTS, 1880-89"; also "BOARD OF WATER SUPPLY AND SEWERAGE OFFICES ERECTION BILL"; also "BOARD OF WATER SUPPLY AND SEWERAGE OFFICES ERECTION BILL (No. 2)"; also "COUNTRY TOWNS WATER AND SEWERAGE ACT OF 1880").		
<b>AND WATER SUPPLY</b> :—		
Report, together with Minutes of Evidence, Appendices, and Plan, from the Parliamentary Standing Committee on Public Works, on Offices for Board, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 124 .....	5	393
Report of Board for 1889, laid on Table, 17 .....	5	363
<b>BOROUGH OF PADDINGTON AND WOOLLAHRA</b> :—		
Notification of completion and transfer of works to the Board of Water Supply and Sewerage, 246.	5	485
<b>CITY OF SYDNEY AND SUBURBS</b> :—		
Notification of resumption of land under the Land for Public Purposes Acquisition Act, laid on Table, 390 .....	5	461
<b>WESTERN SUBURBS</b> :—		
Notifications of resumption of land under the Lands for Public Purposes Acquisition Act, laid on Table, 18, 226, 358 .....	5	487, 489, 491
<b>WORKS</b> :—		
Proclamation vesting in Board of Water Supply and Sewerage, laid on Table, 45 .....	5	483
<b>SHEEP TRUST FUND</b> :—		
Motion made ( <i>Mr. Lyne</i> ) for return of receipts and disbursements, 320; Return to Order, laid on Table, 358 .....	5	31
<b>SICK PAUPERS</b> :—		
Report on Votes for Maintenance of, for years 1887-8-9, laid on Table, 32 .....	2	567
<b>SILK CULTURE</b> :—		
Motion made ( <i>Mr. Ewing</i> ) for copies of communications in reference to abandonment of, at Antony, 515.		
<b>SILVERTON FREE PUBLIC LIBRARY</b> :—		
By-laws, laid on Table, 414 .....	2	703
<b>SITES FOR CITIES, TOWNS, AND VILLAGES</b> (See "CROWN LANDS").		
<b>SLATTERY, THOMAS MICHAEL, ESQ., M.P.</b> :—		
Speaker having observed grave disorder in Committee resumed Chair, and expressed astonishment that the Honorable Member for Boorowa did not obey the ruling of Chairman, and stated that if the Honorable Member did not do so he would have to take an extreme course; Mr. Slattery explained; Speaker gave ruling, and the Committee resumed, 419.		
<b>SMALL POX</b> :—		
DETENTION OF THE STEAMSHIP "YARRA" :—		
Return to Order ( <i>Second Session</i> , 1889) laid on Table (not printed), 39.		
<b>SMITH, THE HON. BRUCE, ESQUIRE, M.P.</b> :—		
Makes personal explanation, 327.		
<b>CHARGE OF BUSINESS OF THE HOUSE</b> :—		
Adjournment moved ( <i>Mr. Copeland</i> ) in reference to—Point of Order that subject was not of sufficient importance to come under Additional Standing Orders; Mr. Speaker decided that it was not within his province to decide the point—motion negatived, 465.		
<b>SMITH, J.</b> (See "CROWN LANDS").		
<b>SMITH, THE HON. SYDNEY, ESQUIRE, M.P.</b> :—		
Motion made ( <i>Mr. Crick</i> ) to refer Seat of, to the Elections and Qualifications Committee, 27.		
<b>SMOKING IN THE LIBRARY AND READING-ROOMS</b> :—		
Complaint of Mr. O. O. Dangar, laid on Table (not printed), 46.		
<b>SOLICITORS' RIGHT OF AUDIENCE BILL</b> :—		
Received from Legislative Council, and on motion ( <i>Mr. Cullen</i> ) read 1 <sup>o</sup> , 299; Order of the Day postponed, 313, 324, 341, 353, 372, 435; Motion made ( <i>Mr. Slattery</i> ) for 2 <sup>o</sup> , and withdrawn; Order of the Day discharged; Bill withdrawn, 553.		
<b>SOUTH COAST DISTRICT</b> :—		
Report of the Board of Health on Bovine Tuberculosis, laid on Table, 366 .....	5	45
<b>SOUTH HEAD</b> (See "CEMETERIES").		
<b>SOUTHERN BREAKWATER, NEWCASTLE</b> :—		
Report of Engineer-in-Chief for Harbours and Rivers on condition of, laid on Table, 234 .....	7	171
<b>SOUTHERN EXPRESS</b> (See "RAILWAYS").		
<b>SOUTHERN SUBURBS</b> (See "WATER SUPPLY").		
<b>SPEAKER</b> (See also "YOUNG, THE HON. J. H., M.P.") :—		
Calls attention to continued irrelevance and tedious repetition on part of Member, and directs Member to discontinue his speech, 334, 335, 399, 407.		
Reports Issue of summons under Parliamentary Evidence Act for witness to attend at Bar of the House, 299.		
Lays on Table Complaint of Mr. O. O. Dangar in reference to Smoking in Library and Reading-rooms (not printed), 46		
Lays on Table Warrant appointing Elections and Qualifications Committee, 7 ( <i>Mr. Young</i> ); 391 ( <i>Mr. J. P. Abbot</i> ); Maturity reported, 35, 411.		
Lays Papers on Table, 193 .....	3	1
Motion made to dissent from ruling of, and negatived, 125, 465.		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>S</b>		
<b>SPEAKER (continued) :—</b>		
Reports attendance of House in Council Chamber to hear Opening Speech, 2.		
Reports issue and return of writ, 1 (?), 171, 213, 239, 255, 395, 503.		
Reports presentation of Address in Reply to Governor, and Answer to Address in Reply, 15.		
Reports resignation of Member, 139, 157		
Gives casting vote, 164, 342.		
Reports receipt of Certificate notifying death of Member, 161, 223.		
Informed the House that Sir Henry Parkes would resume his duties on 27th August, and asked for the departure from certain rules for that purpose, 267.		
Clerk announces receipt of letter from James Henry Young, Esq., resigning Office of, 387.		
Joseph Palmer Abbott, Esq., elected, and presented to His Excellency the Governor, 387.		
Refers to an amendment made by the Legislative Council in the Board of Water Supply and Sewerage Offices Erection Bill, 294.		
Calls attention to nature of amendments made by the Legislative Council in the Marrickville to Burwood Road Railway Bill, 359.		
Clerk informs the House of the unavoidable absence of, 385.		
Commission to Administer the Oath, 388.		
Orders removal of Member from Chamber for disobeying Chair, 395, 430.		
Motion that House dissents from action of, and negatived, 396.		
Having observed grave disorder in Committee resumes Chair, 419.		
Authorised to present Appropriation and Loan Bills to Governor for Assent, 558.		
<b>RULINGS OF :—</b>		
That the Agricultural Society of New South Wales Lease Bill was not beyond the order of leave, 104.		
That he could not accept the Public Works Act as governing the proceedings or limiting the powers of the House, 125.		
That under section 13 of the Letters Patent, in the absence of His Excellency, Message signed by the Lieutenant-Governor by deputation from the Governor was in order, 154.		
That amendment was in order to substitute another name in a motion to appoint a member to the Parliamentary Standing Committee on Public Works, and against a demand for a ballot, 181.		
That special reference to provision in the Crown Lands Bill, in reference to the repeal of existing legislation, was not necessary in the Title, 208.		
That clause 9 of the Crown Rents Bill which interfered with actions pending or a judgment obtained should be mentioned in the Order of Leave, and that therefore the Bill was improperly before the House, 208.		
That since the adoption of the Additional Standing Orders, altering the character of the Motions for Adjournment, the practice of the House of Commons in respect to two motions of a similar character being moved consecutively, did not apply to these questions, 247.		
That Papers should not be laid upon the Table of the House which reflected upon the conduct of a Member of, or referred to a debate in, the House, 265.		
That Bills coming from the Council could not be ruled out of order in this House on the ground of informality in its initiation there, 265.		
That the Order of Leave to bring in the Imprisonment for Debt Abolition Bill was sufficiently comprehensive to cover the Bill, 227.		
That papers did not refer to the action of a Member in this House, and could be laid on Table, 272.		
That the Borough of Newcastle Electric Lighting Bill was beyond the Order of Leave, 288.		
That Sessional Order relative to New Business after 11 o'clock rescinded after that hour in the same sitting was not in force to end of sitting, 337.		
That motion for expulsion of Mr. Crick was in order, 431.		
That no dissent from, could be made without notice, 432.		
That Bank Holidays Act Amendment Bill was beyond the Order of Leave, 423.		
That Early Closing Bill did not involve expenditure, and did not require to be covered by a Message from the Governor, 436.		
That Boats Registration and Regulation Bill was beyond the Order of Leave, and was therefore out of order, 461.		
That question as to what was a matter of "public importance" under the Additional Standing Order in reference to Adjournments of the House was not a matter for him to decide, 465.		
That in future cases of swearing in new Members he would put in operation the Standing Orders of the House of Commons, passed on 30th April, 1886, which prevented the interruption of the business, 505.		
That provision in Marrickville to Burwood Road Railway Bill (No. 2) was covered by the order of leave, 511.		
That in Supply, during the discussion of a Minister's salary, reference could be made to subsequent items, as the Committee had a right to criticise the Minister's policy when voting his salary, 517.		
That Honorable Members should sit in the Chamber in a manner respectful to other Honorable Members and to the occupant of the Chair, and so that the passages would be left clear between the seats, but that it was a matter to be left to the good taste of Honorable Members, 517.		
That certain provisions in the Eight-hour Bill were beyond the order of leave, and also referred to rules in reference to preparation and drawing of Bills, 521.		
That the Net-fishing in Port Hacking Prohibition Act Amendment Bill was beyond the order of leave, 521.		
That motion was one of privilege dealing with language which denounced Parliament as "rotten and corrupt," 524.		
That motion in reference to charges of Bribery in connection with the passing of the Broken Hill Water Supply Bill was substantially the same as an amendment submitted the previous night, and, therefore, could not be put, 529.		
<b>SPECIAL ADJOURNMENT :—</b>		
Motion made for, and passed, 14, 373, 383, 393.		
<b>SPECIAL AREAS (See "CROWN LANDS").</b>		
<b>SPECIAL CONSTABLES (See "POLICE").</b>		
<b>SPECIAL GRANTS (See "MUNICIPAL").</b>		
<b>SPIRITS, WINES, AND BEER :—</b>		
<b>CONVICTIONS UNDER THE LICENSING ACT :—</b>		
Annual Return to Order, laid on Table, 32, 174 .....	3	935, 939
<b>SPIIT FERRY, MIDDLE HARBOUR :—</b>		
Return showing traffic for half years ending 31st December, 1889, and 30th June, 1890, laid on Table, 188 .....		
<b>STAFFORD ALBERT (See "CROWN LANDS").</b>		
<b>STAFFORD WILLIAM (See "POLICE").</b>		

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. 1—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>S</b>		
STAMP DUTIES ACTS :—		
Amended Regulations and Form under, laid on Table, 17 .....		
STAMP DUTY (See "TRANSFER OF MINING STOCK STAMP DUTY EXEMPTION BILL.")		
STANDING AND SELECT COMMITTEES :—		
Appointed during Session .....	1	731
STANDING ORDERS :—		
Committee, Sessional Order passed, 11.		
Name of Mr. Young added to the Committee, 418.		
Motion made ( <i>Mr. Alfred Allen</i> ) to refer to the Standing Orders Committee the Additional Standing Orders for consideration as to the expediency of increasing the number of members required to rise in support of motions for adjournment from five to twenty, and amendment proposed ( <i>Mr. J. P. Abbott</i> ) to refer the whole of the Standing Orders to the Committee, and amendment carried, 372-3; Report brought up, 485 .....	1	737
DISORDER ARISING WHILE THE HOUSE IS IN COMMITTEE :—		
Motion made ( <i>Mr. Dibbs</i> ) that when any Member refuses to obey the Chairman the case shall be reported without debate to the House to be dealt with, after explanation from the offending Member, and amendment moved ( <i>Mr. Garrard</i> ) to give the Chairman the right to make an explanation, amendment and original motion negatived, 436.		
SUSPENSION OF :—		
Motion made ( <i>Mr. McMillan</i> ) to enable the Consolidated Revenue Fund Bill to pass through all its stages in one day, and amendment moved ( <i>Mr. Crick</i> ) to insert words and negatived—motion agreed to, 321.		
To enable the Rabbit Bill to pass through all its remaining stages in one day, 524.		
To enable the Appropriation Bill to pass through all its stages in one day, 536.		
To enable the Loan Bill to pass through all its stages in one day, 540.		
STATE CHILDREN'S RELIEF DEPARTMENT :—		
Report for year ending 5th April, 1890, laid on Table, 123 .....	7	197
STATE SCHOOL BURSARIES (See "EDUCATION").		
STATE SCHOOLS (See "EDUCATION").		
STATISTICS (See "CENSUS AND INDUSTRIAL RETURNS BILL").		
STATUTARY :—		
Return showing, purchased from or through the agency of Mr. Oscar Meyer, laid on Table, 200 ..	8	237
ST. CLAIR, OSSIAN :—		
Motion made ( <i>Mr. Crick</i> ) for papers in reference to death of, 152; Return to an Order, laid on Table, 166 .....	3	695
ST. LEONARDS (See "RAILWAYS").		
ST. LEONARDS SCHOOL OF ARTS ENABLING BILL :—		
Petition presented ( <i>Mr. Cullen</i> ) for leave to bring in, 4; leave given, presented, and read 1 <sup>o</sup> , 13; referred to Select Committee, 19; Report brought up, 24; read 2 <sup>o</sup> , committed, reported with amendments, 104; order of the day postponed, 132, 167; report adopted, 227; read 3 <sup>o</sup> , passed, and sent to Council, 232; returned with amendments, 294; Order of the Day postponed, 302; amendments agreed to, 314; assent reported, 327 .....	2	153
STEPHEN, WILLIAM, ESQ., M.P. :—		
Adjournment moved to direct attention to attack made on character of by Postmaster-General, 217		
STOCK (See also "IMPORTED STOCK ACTS, 1871-84"; also "WAGGA WAGGA CATTLE SALE-YARDS BILL" also "METROPOLITAN CATTLE AND SHEEP DRIVING BILL") :—		
Annual Report of Stock and Brands Branch, Department of Mines, for 1889, laid on Table, 25 ..	5	1
CONTAGIOUS DISEASES IN :—		
Petition presented from the Borough of New Lambton praying that a Bill be brought in to deal with, 174 .....	5	53
BOARD OF EXAMINERS :—		
Return respecting laid on Table, 188 .....	5	29
EASTERN, CENTRAL, AND WESTERN DIVISIONS :—		
Return of, laid on Table, 260 .....	5	33
BOURKE, WALGETT, AND BROWARRINA DISTRICTS :—		
Return respecting loss by floods, laid on Table, 260 .....	6	35
SHEEP TRUST FUND :—		
Motion made ( <i>Mr. Lyne</i> ) for return of receipts and disbursements, 320; Return to Order, laid on Table, 358 .....	5	31
STOCKTON GAS AND ELECTRICITY BILL :—		
Petition presented ( <i>Mr. Fletcher</i> ) for leave to proceed with, under the 65th Standing Order, presented and read 1 <sup>o</sup> , 26; Order of the day postponed, 88, 317.		
Petition presented from Mayor and Aldermen of Stockton against, 5, 405 .....	2	161, 163
Petition presented from Ratepayers and Inhabitants of the Borough of Stockton against, 76 .....	2	165
STRANGERS, EXCLUSION OF :—		
Sessional Order passed, 12.		
STREETS IMPROVEMENTS (See "METROPOLITAN STREET IMPROVEMENTS BILL").		
STRIKE (See "LABOUR STRIKE").		
SULLIVAN, J. M. D. (See "CROWN LANDS.")		
SULLY, W. (See "CROWN LANDS").		
SUNDAY LAWS AMENDMENT BILL :—		
Motion made ( <i>Mr. Want</i> ), for leave to bring in, presented, and read, 1 <sup>o</sup> , 226.		
Petition presented against—		
From Ministers, Members, and Adherents of St. Stephen's Presbyterian Congregation, Phillip-street, Sydney, 334 .....	8	761
From Primitive Methodist Denomination, Sydney District, 341 ..	8	763
From residents of Leichhardt, 345 .....	8	763
From certain parishioners of St. Clement, Marrickville, 347 .....	8	763
From certain residents of Wickham, 347 .....	8	763
From certain residents of Barrington, 347 .....	8	763
From certain residents of Stanmore, 347 .....	8	763
From certain residents of Taree, 347 .....	8	763
From certain residents of Appin and Willon, 347 ..	8	763
From certain residents of Enmore, 352 .....	8	765
From certain members of the Newcastle Minister's Association, 352 .....	8	765
From certain residents of Newcastle and suburbs, 352 .....	8	765
From certain residents of Hamilton and neighbourhood, 352 ..	8	765

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>S</b>			
<b>SUNDAY LAWS AMENDMENT BILL (continued) :—</b>			
Petition presented against (continued)—			
From certain residents of Auburn and Rookwood, 352.....			
From certain residents of Peelwood, Tucna, &c., 352 .....			
From residents of Lambton and vicinity, 352 .....			
From certain residents of Campbelltown, 352 .....			
From certain residents of Picton, 352 .....			
From certain residents of Inverell, 352 .....			
From certain residents of Islington, 352 .....			
From certain residents of Dalwich Hill, 352 .....			
From certain residents of Marrickville, 352 .....			
From certain residents of Petersham and Leichhardt, 352 .....	8		765
From certain residents of Wagga Wagga, 352 .....			
From certain residents of Parramatta, 356 .....			
From certain residents of Lawrence, 356 .....			
From certain residents of Maclean, 356 .....			
From certain residents of Narrabri, 356 .....			
From certain residents of Stanmore, 356 .....			
From certain residents of Richmond, 356 .....			
From certain residents of Sydney, 356.....			
From certain residents of Tumbarumba and Welaregang, 356.....			
From certain residents of East Maitland, 356 .....			
From certain residents of Hamilton, 357 .....			
From certain residents of Tinonee, 357 .....			
From certain adherents of the Primitive Methodist Church, Annandale, 356 .....			
From certain residents of Scone, &c., 357 .....			
From certain residents of Singleton, 357 .....			
From certain residents of Berry and district, 358 .....			
From certain residents of Mittagong, 358 .....			
From certain residents of Bowral, 358 .....			
From certain residents of Braidwood, 358 .....			
From certain residents of Marulan, 358 .....			
From certain residents of Binda and Julong, &c., 358 .....			
From certain residents of Gundaroo, 358 .....			
From certain residents of Wallsend and Minni, 358.....			
From certain residents of Newcastle, 358 .....			
From certain citizens and inhabitants of New South Wales, 358.....			
From certain residents of the town and district of Inverell, 358.....			
From certain residents of Tumut, Adelong, and Gundagai, 358 .....			
From members of the Hamilton Presbyterian Church, 358 .....			
From certain residents of Newcastle, 358 .....			
From certain residents of Newcastle and district, 358 .....			
From certain members and adherents of the Hunter-street Presbyterian Church, Newcastle, 358 .....			
From certain residents of Leichhardt, 358 .....			
From certain residents of Murrumbidgee, 358 .....			
From certain residents of Araluen, 358 .....			
From certain residents of Crookwell, 358 .....			
From certain residents of Electoral District of Albury, 358 .....			
From certain residents of Bowral, 358 .....			
From certain residents of the City of Bathurst, 358 .....			
From certain residents of Bathurst and Pitt Streets, 366 .....			
From certain residents of Kelso, Peel, Raglan, Duramana, Eglinton, Oberon, and White Rock, 366 .....			
From certain residents of Emmaville, &c., 366 .....			
From certain residents of Petersham, Enmore, &c., 366 .....	8		766
From certain residents of St. Peters, 366 .....			
From certain residents of Bexley and Arncliffe, 366 .....			
From certain residents of Cobar and Nymagee, 366 .....			
From certain residents of Willoughby, Gordon, and adjoining neighbourhood, 366.....			
From certain residents of Woolahra, &c., 366 .....			
From certain citizens and inhabitants of New South Wales, 366.....			
From certain residents of Raymond Terrace, Miller's Forest, Fullarton Cove, and Clarence Town, 366 .....			
From certain residents of Walcha, 366 .....			
From certain residents of Hillgrove, 367.....			
From certain residents of Oberon, 367 .....			
From certain residents of Bourke, 367 .....			
From certain residents of Cobar, 367 .....			
From certain residents of Homebush, &c., 367 .....			
From certain residents of Woolwich and Hunter's Hill, 367 .....			
From certain residents of the Electoral District of Shoullhaven, 367 .....			
From certain residents of Homebush, Strathfield, &c., 367 .....			
From certain residents of Carcoar, &c., 367 .....			
From certain residents of Monkerni, &c., 367 .....			
From certain residents of Stroud and district, 367.....			
From certain residents of Pyrmont, &c., 367 .....			
From certain residents of the City of Goulburn, 367 .....			
From certain residents of Adamstown, &c., 367 .....			
From certain residents of Lismore, 367 .....			
From certain residents of the Tweed and Brunswick Rivers, 367 .....			
From certain residents of West Maitland, 367 .....			
From certain residents of West Maitland, 367 .....			
From certain residents of Petersham, 367 .....			
From certain residents of Kogarah, &c., 367 .....			
From certain residents of Ballina, Tintubar, &c., 367 .....			
From certain residents of Casino, 367 .....			
From certain residents of Penrith, 367 .....			
From certain residents of Leichhardt, 367 .....			
From certain residents of Camperdown, Annandale, &c., 367 .....			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
	VOL.	PAGE.	
<b>S</b>			
<b>SUNDAY LAWS AMENDMENT BILL (continued):—</b>			
Petition presented against (continued):—			
From certain residents of Waverley, &c., 367	8	766	
From certain residents of Bondi, 367			
From certain residents of Euabalong and district, 367			
From certain residents of Warialda, 367			
From James Ross, M.A., Archdeacon of Armidale, 367			
From certain residents of Hillgrove, 367			
From certain residents of Redfern, 367			
From certain residents of Forbes, 367			
From certain residents of Pitt Town, &c., 367			
From certain residents of Wilberforce and Windsor, 367			
From certain residents of Pitt Town, Ebenezer, and Sackville Reach, 367			
From certain residents of Bergalia, &c., 367			
From certain residents of Parramatta and district, 367			
From certain residents of Gladesville, 367			
From certain residents of Germantown and vicinity, 367			
From certain residents of Braespring, Culcairn, &c., 367	8	767	
From certain residents of Cooma, 367			
From certain residents of Lewisham, Summer Hill, &c., 367			
From certain residents of Petersham West, 367			
From certain residents of Marrickville East, 367			
From certain residents of Belmore and Moorefield, 367			
From certain residents of South Sydney, 367			
From certain residents of Picton and Thurmere, 367			
From certain residents of Bondi and Waverley, 367			
From certain residents of The Glebe, 367			
From certain residents of The Glebe, 367			
From certain residents of Forbes, 367			
From certain residents of Broken Hill, 367			
From certain residents of Broken Hill, 367			
From certain residents of Broken Hill, 367			
From certain residents of Balmain, 370	8	769	
From certain residents of Singleton, 370			
From certain residents of Orange, 370			
From certain residents of New South Wales, 370			
From certain residents of Queanbeyan and vicinity, 370			
From certain residents of Annandale, 370			
From certain residents of Cooma, 370			
From members of the Star of the South Lodge No. 76, Cooma, I.O.G.T., 370			
From certain residents of Randwick, 370			
From certain residents of Paddington, 370			
From certain residents of Paddington, 370			
From certain residents of Waverley, 370			
From certain residents of Coogee and neighbourhood, 370			
From certain residents of Double Bay and Rose Bay, 370			
From certain residents of Kempsey and district, 370			
From certain residents of Manly, 370			
From certain residents of Waterloo and Alexandria, 370			
From certain residents of Botany, 370			
From certain residents of Armidale and Uralla, 370			
From certain residents of Wagga Wagga, 370			
From certain residents of Hay and district, 370			
From certain residents of Grenfell, 370			
From certain residents of Gunning, Collector, &c., 370			
From certain residents of Gunning and Collector, 370			
From certain residents of Gladesville, Ryde, Five Dock, &c., 370			
From certain residents of Eden, 370			
From certain residents of Ashfield and vicinity, 370			
From certain residents of Marrickville, 370			
From certain residents of Kogarah, 370			
From certain residents of Marrickville, 370			
From certain residents of Strathfield, 370			
From certain residents of Narrandera, 370			
From certain residents of Hillston, 370			
From certain residents of Penrith, 370			
From certain residents of Bowral, Joadja Creek, &c., 370			
From certain residents of Woolloomooloo, 370			
From certain residents of Woolloomooloo, 370			
From certain residents of Woolloomooloo, 371	8	770	
From certain residents of Grafton, 371			
From James S. Scott, Moderator, and Andrew Barron, Clerk of the Presbytery of the Clarence, 371			
From certain residents of Grafton and neighbourhood, 371			
From certain citizens and inhabitants of New South Wales, 371			
From certain residents of Moruya, 371			
From certain residents of Bega, 371			
From certain residents of Kiama, 371			
From certain residents of Gerringong, 371			
From certain residents of Wickham, 371			
From certain residents of the Electoral District of South Sydney, 371			
From certain residents of Surry Hills, 371			
From certain residents of Surry Hills, 371			
From certain residents of Surry Hills, &c., 371			
From certain residents of Newtown, 371			
From certain residents of Hunter's Hill, 371			
From certain residents of Tenterfield, 371			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.		PAPERS.	
		VOL.	PAGE.
<b>S</b>			
<b>SUNDAY LAWS AMENDMENT BILL (continued):—</b>			
Petition presented against (continued):—			
From certain residents of Dabbo, 371.....			
From Wm. G. Taylor, Chairman of Public Meeting held in Centenary Hall, York-street, Sydney, 371.....			
From certain members and adherents of the Scots' Church, 371.....			
From certain members, adherents, and friends of the Congregational Church, Harris-street, 371.....			
From the Congregational Union of New South Wales, 371.....			
From certain residents of Sydney, 371.....			
From W. Stephen, Chairman of Public Meeting of citizens of Sydney, held in Protestant Hall, Castlereagh-street, 371.....			
From certain residents of Parramatta, Baulkham Hills, &c., 371.....			
From certain residents of Daringhurst and vicinity, 371.....			
From certain residents of Woolloomooloo, 371.....			
From certain residents of Woolloomooloo South, &c., 371.....			
From certain residents of Leichhardt, Pyrmont, &c., 371.....			
From certain residents of Dungog, &c., 371.....			
From certain residents of Eccleston and Lostock, 371.....			
From James H. Terras, Chairman of Public Meeting held in Greta, 371.....			
From certain residents of Sydney and Suburbs, 371.....			
From certain residents of Newtown, 371.....			
From certain members, adherents, and friends of the Presbyterian Church, Quarry-street, Ultimo, 371.....			
From certain residents of Woollahra, &c., 371.....			
From certain residents of Watson's Bay, 371.....			
From certain residents of Darling Point and vicinity, 371.....			
From certain residents at Jerilderie, 371.....			
From certain residents of Deniliquin, 371.....			
From certain residents of Waterloo and Alexandria, 371.....			
From certain residents of Darlington, Alexandria, and Redfern, 371.....			
From certain residents of Forest Lodge, 371.....			
From certain residents of Kurrungong, 379.....			
From certain residents of the Electoral District of Yass and Burrown, 379.....			
From certain residents of Manly, 379.....			
From certain residents of West Sydney, &c., 379.....			
From certain residents of Redfern and Waterloo, 379.....			
From certain residents of Redfern, 379.....			
From William N. Wilson, Moderator, and John S. Macpherson, Clerk of the Presbytery of Maitland, 379.....			
From certain residents of Coonabarabran, 379.....			
From representatives of the Evangelical Alliance of New South Wales, 379.....			
From certain residents of Orange, 379.....			
From certain residents of Spring Hill, 379.....			
From certain residents of Petersham, 379.....			
From certain residents of Summer Hill and vicinity, 379.....			
From certain residents of Kogarah, 379.....			
From certain residents of Canterbury, 379.....			
From certain residents of Muswellbrook, 379.....			
From certain residents of Muswellbrook, 379.....			
From certain residents of Rouchel, 379.....			
From certain residents of Glebe and Forest Lodge, 379.....			
From certain residents of Gunnedah, 379.....			
From certain residents of Gunnedah, 379.....			
From certain residents of Boggabri and Gunnedah, 379.....			
From certain residents of the Taraiga district, 379.....			
From certain residents of Tarniga, 379.....			
From certain residents of Goulburn, 379.....			
From certain adherents of the Congregational Church at Manly, 381.....			
From certain residents of Young, 381.....			
From certain residents of Murrumburrah, 381.....			
From certain residents of Temora district, 381.....			
From certain residents of Bulli and Woonona, 381.....			
From certain residents of Dapto, 381.....			
From certain residents and persons employed in the Electoral District of West Sydney, 381.....			
From certain residents of Wellington, &c., 381.....			
From certain residents of Molong, Garra, and Warac, &c., 381.....			
From certain residents of Hill End, 381.....			
From certain residents of Sunny Corner, &c., 381.....			
From certain residents of Lithgow, Eskbank, &c., 381.....			
From certain residents of Lithgow, 381.....			
From certain residents of Ryde, 384.....			
From certain residents of Warren, 384.....			
From certain residents in the Electoral District of Carcoar, 384.....			
From certain residents of Milton, 384.....			
From certain residents of Mount Macquarie, &c., 384.....			
From certain residents of Camden and surrounding district, 384.....			
From certain residents of Bowral, 384.....			
From the Minister and certain members and adherents of St. George's Presbyterian Church, Sydney, 384.....			
From certain residents of Bundarra, Tingha, Ollera, &c., 384.....			
From the Bishop of Sydney, 384.....			
From certain residents of Woodburn, 390.....			
From certain residents of Glen Innes and vicinity, 395.....			
From certain residents of Glen Innes, 395.....			
From certain residents of Parkes and The Bogan, 395.....			
From certain residents of Newtown, Enmore, &c., 399.....			
From certain residents of Petersham, &c., 399.....			
From certain residents of Gordon and Hornsby, 399.....			

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>S</b>		
<b>SUNDAY LAWS AMENDMENT BILL, (continued) :—</b>		
Petition presented against (continued) :—		
From certain residents of West Maitland, 399 .....	8	775
From certain residents of New South Wales in various Electoral Districts, 399 .....	8	775
From certain residents of Stockton, 405 .....	8	777
From certain residents of Forbes, 410 .....	8	777
From certain residents of St. Peters, 435 .....	8	779
From certain residents of New England, 461 .....	8	781
From residents of Paddington, 520 .....	8	783
From residents of George's Plains, Rockley, Esrom, Dunkeld, Perth, &c., 529 .....	8	785
From residents of George's Plains, in the Electoral District of West Macquarie, 529 .....	8	785
From residents of Rockley, in the Electoral District of West Macquarie, 529 .....	8	785
<b>SUPERANNUATION FUND (See "CIVIL SERVICE").</b>		
<b>SUPERIOR SCHOOLS (See "EDUCATION").</b>		
<b>SUPPLY :—</b>		
COMMITTEE OF :—		
Sessional Order passed, 11.		
Motion made ( <i>Mr. McMillan</i> ) to enable House to go into Committee, 313.		
House in Committee, 325, 382, 466, 470, 476, 486, 490, 502, 511, 517 (?), 526, 542.		
Resolutions reported, 325, 382, 542 (154).		
Resolutions agreed to, 325, 382, 549 (154).		
No quorum reported from, 486.		
Points of Order reported from Committee, 517 (?).		
<b>SUPREME COURT :—</b>		
RULES OF, LAID ON TABLE :—		
In Bankruptcy, 17, 307 .....	3	807, 809
In Equity, 188, 485 .....	3	811, 813
In Divorce and Matrimonial Causes, 324 .....	3	815
<b>SURETIES (See "BONDSMEN AND SURETIES LIABILITY BILL").</b>		
<b>SWAMPS IN THE MACLEAY RIVER DISTRICT :—</b>		
Reports, letters, &c., respecting the question of draining, laid on Table ( <i>not printed</i> ), 392.		
<b>SWEETMAN, CABMAN (See "ADMINISTRATION OF JUSTICE.")</b>		
<b>SWEARING-IN NEW MEMBERS :—</b>		
Speaker stated that in future he would put into operation the Standing Order of the House of Commons passed on 30th April, 1866, to prevent the Suspension of Business, 505.		
<b>SYDNEY BRANCH ROYAL MINT :—</b>		
Despatch respecting, laid on Table, 151, 540 .....	8	725, 727
<b>SYDNEY COMMON :—</b>		
Notices of Dedication and Appointment of Trustees, laid on Table, 146 .....	4	747
<b>SYDNEY FREE PUBLIC LIBRARY :—</b>		
Report from the Trustees for 1889-90, laid on Table, 17 .....	7	945
<b>SYDNEY GRAMMAR SCHOOL :—</b>		
Annual Report for 1889, laid on Table, 216 .....	7	937
<b>SYDNEY HOSPITAL (See "HOSPITALS").</b>		
<b>SYDNEY TRAMWAY AND OMNIBUS COMPANY'S BILL :—</b>		
Petition presented ( <i>Mr. Want</i> ) for leave to proceed with, under the 65th Standing Order, presented and read 1 <sup>o</sup> , 18.		
<b>T</b>		
<b>TARAGO. (See "RAILWAYS").</b>		
<b>TARANA (See "ROADS").</b>		
<b>TARBAN CREEK (See "BRIDGES").</b>		
<b>TARIFF CONFERENCE (See "CUSTOMS").</b>		
<b>TARRAWINGEE TRAMWAY BILL :—</b>		
Petition presented ( <i>Mr. Wyman Brown</i> ) for leave to bring in, 87; leave given, presented and read 1 <sup>o</sup> , 95; referred to Select Committee, 99; report brought up, 124; Order of the Day postponed, 167; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 195; read 3 <sup>o</sup> , passed and sent to Council, 203; returned with amendments, 246; Order of the Day postponed, 252; amendments agreed to, 266; assent reported, 287 .....	2	167
<b>TARREGANDA (See "BRIDGES").</b>		
<b>TAX (See "ABSENTEE TAX"; also "DOG TAX").</b>		
<b>TAYLOR, ADOLPHUS GEORGE Esq. (See also "PRIVILEGE").</b>		
Issue and return of Writ for West Sydney, reported, 395; sworn, 395.		
Removed from Chamber by Order of Mr. Speaker, for disobeying the Chair, 395; motion made that he be heard in his place and negatived, 396.		
Speaker calls attention to continued irrelevance or tedious repetition, and directed the Hon. Member to discontinue his speech, 399, 407.		
<b>TEA, DUTY ON :—</b>		
Motion made ( <i>Mr. Willis</i> ) for removal of, and intercepted by previous question, 89.		
Motion made ( <i>Mr. Willis</i> ) for removal of and negatived, 406.		
<b>TECHNOLOGICAL, INDUSTRIAL, AND SANITARY MUSEUM :—</b>		
Tenth and Final Report of Committee of Management, for 1889, laid on Table, 341 .....	7	870
<b>TEECE, CECIL BEDFORD, Esquire :—</b>		
Issue and return of Writ for Goulburn reported, 255; sworn, 257.		
<b>TEECE, WILLIAM, JUNIOR, Esquire, M.P. :—</b>		
Death of the Honorable Member for Goulburn reported, Seat declared vacant, 223.		
<b>TELLERS (See also "NO TELLERS").</b>		
Not agreeing in division, 432.		
<b>TELEGRAPHS :—</b>		
Adjournment of the House moved to call attention to Administration of Department, 152.		
<b>AND POSTAL CONFERENCE :—</b>		
Report and Proceedings of, held in Adelaide, May, 1890, laid on Table, 180 .....	7	453

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>T</b>		
TELEGRAPHS (continued):—		
AND POST OFFICE AT PICTON:—		
Notification of resumption of land under the Lands for Public Purposes Acquisition Act, laid on Table, 410 .....	7	609
COMPLAINTS MADE BY MESSRS. BUCKNELL AND LOMAX:—		
Motion made ( <i>Mr. Hasall</i> ) for Papers in reference to, 181.		
GENERAL POST OFFICE, MONEY ORDER OFFICE, AND THE ELECTRIC TELEGRAPH DEPARTMENT:—		
Report of the Public Service Inquiry Commission, laid on Table, 430. ....	2	281
RATES, BORDER STATIONS AND STATIONS IN QUEENSLAND:—		
Notification of reduction in Rates, laid on Table, 62.....	7	615
TEMORA (See "RAILWAYS").		
TERALBA See "RAILWAYS"; also "CEMETERIES").		
TERRAWYNNIA HOLDING (See "RABBITS").		
THATCHER, C. H. (See "CROWN LANDS").		
THIRLMERE ACCIDENT (See "RAILWAYS").		
TIDAL WATERS:—		
Return respecting, closed against Net Fishing, laid on Table, 534 .....	7	1081
TIRES (See "WIDTH OF TIRES REGULATION BILL").		
TOCUMWAL (See "BRIDGES").		
TOLLS (See also "RANDWICK TOLL-BAR ABOLITION BILL"):—		
PUBLIC:—		
Motion made ( <i>Mr. Frank Farnell</i> ) for abolition of, 19.		
TOM, WILLIAM AND JAMES (See "GOLD DISCOVERY").		
TORONTO TRAMWAY ACT AMENDMENT BILL:—		
Petition presented ( <i>Mr. Stevenson</i> ) for leave to bring in, 4; leave given, presented, and read 1 <sup>o</sup> , 14; referred to Select Committee, 19; report brought up, 27; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 133; read 3 <sup>o</sup> , passed and sent to Council, 141; returned with amendments, 200; Order of the Day postponed, 210; Council's amendments agreed to; Message to Council, 227; assent reported, 239 .....	2	175
TRADES AND LABOUR UNIONS:—		
Motion made ( <i>Mr. Walker</i> ) for Committee of the Whole to bring in a Bill to authorize Government Loans, &c., to, and negative, 442-3.		
TRADES CONCILIATION BILL:—		
Motion made ( <i>Mr. Dibbs</i> ), that minutes and evidence of Select Committee—Sessions 1887-8, be laid upon Table, Ordered to be printed, 348. ....	8	57
TRADES UNIONS AND UNIONISTS:—		
Adjournment moved in reference to the attitude of the Government towards, 332.		
TRAINING COLLEGE (See "EDUCATION").		
TRAMWAYS (See also "TORONTO TRAMWAY ACT AMENDMENT BILL"; also "SYDNEY TRAMWAY AND OMNIBUS COMPANY'S BILL"; also "WILLOUGHBY AND GORDON TRAMWAY ACT AMENDING BILL"; also "BROKEN HILL AND PINNACLES TRAMWAY BILL"; also "TARRAWINGEE TRAMWAY BILL"; also "MOUNT KEIRA TRAMWAY ACQUISITION ACT AMENDMENT BILL"; "HAY AND DENILQUIN TRAMWAY BILL"; also "COOK'S RIVER ROAD TRAMWAYS BILL").		
AND RAILWAY ACCIDENTS:—		
Adjournment moved ( <i>Mr. Schey</i> ) to draw attention to, 95.		
BALMAIN LINE OF TRAMWAY OR RAILWAY:—		
Motion made ( <i>Mr. Haulborne</i> ) that the increasing importance of that Suburb demands the construction of, 261.		
Report of Board appointed to inquire into the questions of the construction of a new Bridge to replace the existing Pyrmont Bridge, Glebe Island Bridge, and a line of Tramway to, 312.....	5	1019
CASTLEREAGH-STREET TO THE RANDWICK ROAD:—		
Notification of resumption of land under Public Works Act, laid on Table, 324 .....	5	1141
LEICHHARDT TO FIVE DOCK EXTENSION:—		
Notification of the resumption of land under Public Works Act, laid on Table, 257 .....	5	1139
NEWCASTLE EXTENSIONS:—		
Minute of the Secretary of Public Works respecting, laid on Table ( <i>not printed</i> ), 94.		
ASHFIELD RAILWAY STATION TO PORTLAND-PLACE:—		
Notification of resumption of land under Public Works Act, laid on Table, 390.....	5	1143
TRANSFER OF MINING STOCK DUTY EXEMPTION BILL:—		
Motion made ( <i>Mr. McMillan</i> ) for Committee of the Whole, 207; House in Committee, Resolution agreed to; Bill presented and read 1 <sup>o</sup> , 217; read 2 <sup>o</sup> , committed, reported with amendments; report adopted, 277; read 3 <sup>o</sup> , passed and sent to Council, 281; returned without amendment, 320; assent reported, 339.		
TRANSPORT OF GOODS:—		
Petition from certain Residents of Bourke, drawing attention to unfair competition to carriers by use of Camels by Afghans, and praying the House to remove the evil, 464 .....	8	749
TRIAL BAY:—		
Report of the Engineer-in-Chief for Harbours and Rivers respecting construction of a breakwater at, laid on Table, 392 .....	7	167
TRUST MONEYS DEPOSIT ACCOUNT:—		
From 1 April, 1889, to 31 March, 1890, laid on Table, 17 .....	3	601
TRUTH NEWSPAPER (See "PRIVILEGE").		
TUENA (See "ROADS").		
TUMBERUMBA (See "RAILWAYS").		
TUMUT SCHOOL OF ARTS SITE SALE BILL:—		
Petition presented ( <i>Mr. Jones</i> ) for leave to bring in, 261; leave given, presented and read 1 <sup>o</sup> , 269; referred to Select Committee, 274; Report brought up, 298; read 2 <sup>o</sup> , committed, reported without amendment; Report adopted, 422; read 3 <sup>o</sup> , passed, and sent to Council, 427-8; returned with amendments, 434; Order of the Day postponed, 501; amendments agreed to, 512; assent reported, 527.....	2	183
TWEED, THE (See "RAILWAYS").		
TYPE-WRITING:—		
Petition presented from Sydney Association in favour of legalizing, for Petitions and other documents, 490 .....	8	751
TYPHOID FEVER:—		
Returns respecting, in Sydney and Suburbs for 1876-1880, laid on Table, 32 .....	2	521
Report of J. Ashburton Thompson, M.D., D.P.H., on outbreak at Waverley and Randwick, laid on Table, 260 .....	2	507

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAGES.	
	VOL.	PAGE.
<b>U</b>		
<b>UNEMPLOYED, THE:—</b>		
Petition presented from, for Employment, 76.....	8	741
Petition presented from, praying for free railway passes to where they can get Employment, 129.....	8	743
<b>UNITED STATES OF AMERICA</b> (See "DESPATCHES").		
<b>UNIVERSITY OF SYDNEY</b> (See also "EDUCATION"):—		
Report of, for 1889, laid on Table, 52.....	7	917
Information as to number of Students attending Science Lectures, names of Professors and Demonstrators in Science, and cost of certain Laboratories, &c., laid on Table, 200.....	7	920
By-laws, laid on Table, 414.....	7	931
<b>BURSARIES:—</b>		
Regulations respecting, and State School, laid on Table, 393.....	7	933
<b>USHER</b> (See "BLACK ROD").		
<b>V</b>		
<b>VACANCY OF SPEAKERSHIP:—</b>		
Clerk announced receipt of letter from James Henry Young, Esq., resigning position of Speaker, 387.		
<b>VACANT SEAT</b> (See also "ELECTORAL"). 139, 157, 161, 223, 375, 431-2.		
<b>VACATIONS</b> (See "LAW VACATIONS ABOLITION BILL").		
<b>VACCINATION:—</b>		
Report for 1889, laid on Table, 32.....	2	501
<b>VEHICLES</b> (See "PUBLIC VEHICLES REGULATION ACT AMENDMENT BILL" also "PUBLIC VEHICLES REGULATION ACTS AMENDMENT BILL (No. 2).")		
<b>"VERNON" REGULATIONS</b> (See "NAUTICAL SCHOOL SHIP "VERNON").		
<b>VINE DISEASES ACTS CONTINUATION BILL</b> (Second Session, 1890):—		
Assent reported, 2		
<b>VINE DISEASES ACTS FURTHER CONTINUATION BILL:—</b>		
Motion made ( <i>Mr. Sydney Smith</i> ) for Committee of the Whole, 476; Order of the Day postponed, 485-6; House in Committee, resolution agreed to, Bill presented and read 1 <sup>o</sup> , 490; Message from Governor, 498; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 498; read 3 <sup>o</sup> , passed, and sent to Council, 501; returned without amendment, 511; assent reported, 527.	5	63
<b>VIVIAN, WALTER HUSSEY, ESQUIRE:—</b>		
Issue and Return of Writ for The Hastings and Manning, reported, sworn, 1.		
Vote on Crown Rents Bill challenged, 236.		
<b>VOLUNTEER FORCE REGULATION ACT OF 1867:—</b>		
Amended Regulations under, laid on Table, 32.....	2	225
<b>VOTE</b> (See "MEMBERS"; also "CASTING VOTE").		
<b>VOTE OF CHAIRMAN OF SELECT COMMITTEE ON PRIVATE BILLS:—</b>		
Sessional Order passed, 11.		
<b>VOTE OF CREDIT:—</b>		
Message from the Governor recommending, 306.....	3	593
<b>VOTES AND PROCEEDINGS</b> (See "ASSEMBLY").		
<b>VOTES OF CENSURE:—</b>		
Motion made ( <i>Mr. Hawken</i> ) that no Vote except so defined, should be regarded as, and withdrawn, 178.		
<b>FISCAL POLICY OF THE GOVERNMENT:—</b>		
Motion made ( <i>Mr. Dibbs</i> ) condemning postponement of, and in favour of a protective policy— <i>Disorder</i> , Mr. A. G. Taylor removed from the Chamber for refusing to obey the Chair, Mr. Speaker explained reasons for directing the removal of Mr. Taylor and motion made ( <i>Mr. Garvan</i> ) to disapprove of Mr. Speaker's action; amendment proposed ( <i>Mr. Willis</i> ) that Mr. Taylor be heard in his place and negatived; Mr. Garvan's motion negatived.—Debate adjourned, 395-6-7; Debate resumed, amendment moved ( <i>Mr. Ewing</i> ) approving of the action of the Government, original motion negatived and amendment carried, 400-1.		
<b>W</b>		
<b>WAGGA WAGGA</b> (See "RAILWAYS").		
<b>WAGGA WAGGA CATTLE SALE-YARDS BILL:—</b>		
Petition presented ( <i>Mr. Gormly</i> ) for leave to bring in, 123; leave given, presented, and read 1 <sup>o</sup> , 129; referred to Select Committee, 132; report brought up, 251; read 2 <sup>o</sup> , committed, reported with amendments, Report adopted, 422; read 3 <sup>o</sup> , passed, and sent to Council, 427; returned with amendments, 483; amendments agreed to, 554.....	2	159
<b>WAKEFORD Mr. WILLIAM:—</b>		
Motion made ( <i>Mr. J. P. Abbott</i> ) for papers in reference to contract at Kiama Harbour, 264; Return to Order, laid on Table (not printed), 348.....		
<b>WALGETT</b> (See "CROWN LANDS"; also "RAILWAYS"; also "STOCK").		
<b>WARIALDA</b> (See "CROWN LANDS").		
<b>WATER CONSERVATION:—</b>		
<b>IN LAKE ALBERT, NEAR WAGGA WAGGA:—</b>		
Motion made ( <i>Mr. Gormly</i> ) for, and negatived, 53.		
<b>PATERSON:—</b>		
Notification of resumption of land under the Land for Public Purposes Acquisition Act, laid on Table, 380.....	5	468
<b>WATER CONSERVATION BILL:—</b>		
Motion made ( <i>Mr. Sydney Smith</i> ) for Committee of the Whole, 359; Order of the Day postponed, 412; Order of the Day discharged, 524.		
Motion made ( <i>Mr. Sydney Smith</i> ) for Committee of the Whole, 497; Message from Governor, 515; House in Committee, resolution agreed to, presented and read 1 <sup>o</sup> , 520.....	5	457

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>W</b>		
<b>WATER CONSERVATION AND UTILIZATION BILL:—</b>		
Motion made ( <i>Mr. Lyne</i> ) for leave to bring in, 450.		
<b>WATER SUPPLY</b> (See also "CROWN LANDS"; also "BROKEN HILL WATER SUPPLY BILL"; also "GOULBURN WATER SUPPLY CHARGES BILL"; also METROPOLITAN WATER AND SEWERAGE ACTS, 1830-89"; also "PUBLIC WATERING-PLACES ACT, 1884"; also "SEWERAGE"; also "BOARD OF WATER SUPPLY AND SEWERAGE OFFICES ERECTION BILL"; also "BOARD OF WATER SUPPLY AND SEWERAGE OFFICES ERECTION BILL (No. 2)"; also "BY-LAWS"; also "COUNTRY TOWNS WATER AND SEWERAGE ACT OF 1889"; also "BROKEN HILL WATER-WORKS BILL"):		
Report of Board for 1889, laid on Table, 17 .....	5	363
Report, together with Minutes of Evidence, Appendices, and Plans from the Parliamentary Standing Committee on Public Works, on Offices for Board, laid on Table, 25; motion made ( <i>Mr. Bruce Smith</i> ) that work be carried out, 124.....	5	393
<b>CITY OF SYDNEY:—</b>		
Notification of resumption of land under the Lands for Public Purposes Acquisition Act, laid on Table, 273 .....	5	461
<b>MANLY:—</b>		
Notification of resumption of land under the Lands for Public Purposes Acquisition Act, laid on Table, 18 .....	5	453
<b>NORTH SHORE:—</b>		
Notification of resumption of land under the Lands for Public Purposes Acquisition Act, laid on Table, 18 (?) .....	5	455, 457
<b>SOUTHERN SUBURBS, HURSTVILLE AND ROCKDALE:—</b>		
Report, together with Minutes of Evidence and Plan from the Parliamentary Standing Committee on Public Works, laid on Table, 25 .....	5	415
<b>TOWN OF RICHMOND:—</b>		
Notification of resumption of land under the Lands for Public Purposes Acquisition Act, laid on Table, 32 .....	5	459
<b>WATER DISTRICTS:—</b>		
Proclamation defining boundaries of Liverpool, laid on Table, 45 .....	5	427
Do do do Campbelltown, laid on Table, 45 .....	5	429
Do do do Metropolitan, laid on Table, 45.....	5	431
<b>WORKS, BOROUGH OF ORANGE:—</b>		
Notification of completion of and transfer to Municipal Council, laid on Table, 210.....	5	449
<b>WORKS, BOROUGH OF PADDINGTON AND WOOLLAHRA:—</b>		
Notification of completion of, and transfer to, Board of Water Supply and Sewerage, laid on Table, 246 .....	5	485
<b>WATERING-PLACES</b> (See "PUBLIC WATERING-PLACES ACT, 1884").		
<b>WAVERLEY AND RANDWICK</b> (See "TYPHOID FEVER").		
<b>WAYS AND MEANS:—</b>		
Committee of Sessional Order passed, 11.		
Motion made ( <i>Mr. McMillan</i> ) to enable the House to go into Committee, 313.		
House in Committee, 337, 382, ( <i>Financial Statement</i> ) 390, 430, 434, 419, 452, 549.		
Resolutions reported, 337, 453, 549 (?).		
Resolutions agreed to, 337, 453, 549 (?).		
Estimates of for 1890, laid on Table, 382 .....	3	517
<i>Disorder:—</i> Chairman reports disorder from Committee, and also that he had directed the removal of the Honorable Member for West Macquarie ( <i>Mr. Crick</i> ) from the Chamber, 430.		
<b>WEBB, S.</b> (See "CHURCH AND SCHOOL LANDS").		
<b>WEEKLY ABSTRACT OF PETITIONS:—</b>		
Nos. 1 to 34 .....	1	649
<b>WEEKLY REPORT OF DIVISIONS:—</b>		
Nos. 1 to 18 .....	1	571
<b>WENTWORTH IRRIGATION BILL:—</b>		
Motion made ( <i>Mr. J. P. Abbott</i> ) for leave to bring in, presented, and read 1 <sup>o</sup> , 26; read 2 <sup>o</sup> , committed, reported with amendments, report adopted, 132; read 3 <sup>o</sup> , passed and sent to Council, 137; returned with amendments, 201; Order of the Day postponed, 252; Amendments agreed to, 266; assent reported, 287.		
<b>WEST MACQUARIE</b> (See "ELECTORAL").		
<b>WEST MAITLAND</b> (See "POSTAL").		
<b>WEST SYDNEY</b> (See "ELECTORAL").		
<b>WEST WALLSEND COAL COMPANY (LIMITED) BILL:—</b>		
Petition ( <i>Mr. Burns</i> ) for leave to proceed with, under the 65th Standing Order, presented and read 1 <sup>o</sup> , 4; Order of the Day postponed, 52, 79; read 2 <sup>o</sup> , committed, reported without amendment; report adopted, 104; read 3 <sup>o</sup> , passed and sent to Council, 116; returned without amendment, 152; assent reported, 174.		
<b>WESTERN DIVISION</b> (See "CROWN LANDS"; also "STOCK").		
<b>WESTERN SUBURBS</b> (See "SEWERAGE"; also "DRAINAGE").		
<b>WESTERN SUBURBS (CITY OF SYDNEY) SEWERAGE SCHEME, RETICULATION AND COMPLETION BILL:—</b>		
Motion made ( <i>Mr. Bruce Smith</i> ) for Committee of the Whole, 187; Message from Lieutenant Governor, 154; Order of the Day postponed, 163; House in Committee, resolution agreed to, Bill presented, and read 1 <sup>o</sup> , 168-9; read 2 <sup>o</sup> , committed, reported without amendment, report adopted, 190; read 3 <sup>o</sup> , passed and sent to Council, 202; returned without amendment, 332; assent reported, 352 .....		
5	511	
<b>WHARFS:—</b>		
<b>ACCOMMODATION FOR TRAFFIC BETWEEN SYDNEY AND BALMAIN:—</b>		
Notification of resumption of land under Lands for Public Purposes Acquisition Act, laid on Table, 18 .....	7	189
<b>ACCOMMODATION, WOODVILLE, PATERSON RIVER:—</b>		
Notification of resumption under Lands for Public Purposes Acquisition Act, laid on Table, 32 ...	7	191
<b>ACCOMMODATION, WOOLLOOMOOLOO BAY:—</b>		
Notification of resumption of land under the Land for Public Purposes Acquisition Act, laid on Table, 18 .....	7	187
<b>ACCOMMODATION, OXLEY ISLAND, MANNING RIVER:—</b>		
Notification for resumption of land under Lands for Public Purposes Acquisition Act, laid on Table, 390.....	7	193

REFERENCES TO THE VOTES AND PROCEEDINGS, VOL. I—14TH PARLIAMENT—SESSION 1890.	PAPERS.	
	VOL.	PAGE.
<b>W</b>		
WHEEO POST OFFICE (See "ROADS").		
WIDTH OF TIRES REGULATION BILL :— Motion made ( <i>Mr. Lyne</i> ) for leave to bring in, 328.		
WILCANNIA :— COUNTRY TOWNS WATER AND SEWERAGE ACT :— Proclamation respecting application of, 189	5	417
WILLIAMS, HENRY (See "ADMINISTRATION OF JUSTICE").		
WILLIAMS, W. H. (See "CROWN LANDS").		
WILLIS, WILLIAM NICHOLAS, ESQUIRE, M.P. :— Adjournment moved to deal with remarks made by, in reference to Railway Commissioners, 239. Mr. Speaker calls attention to continued irrelevance and tedious repetition in Debate on part of, and directs the Hon. Member to discontinue his speech, 334.		
REMOVAL OF, FROM COMMISSION OF THE PEACE :— Petition from Citizens of New South Wales presented in favour of replacing him on the Roll, 516.	3	869
Correspondence respecting, laid on Table, 558	3	865
WILLOUGHBY (See "BOROUGH OF WILLOUGHBY NAMING BILL").		
WILLOUGHBY AND GORDON TRAMWAY ACT AMENDING BILL :— Petition presented ( <i>Mr. Cullen</i> ) for leave to bring in, 32; leave given, presented, and read 1 <sup>o</sup> , 39; referred to Select Committee, 46; Report brought up, 59; Order of the Day postponed, 167; read 2 <sup>o</sup> , Committed, reported without amendment, report adopted, 227; read 3 <sup>o</sup> , passed, and sent to Council, 232; returned, with amendments, 273; amendments agreed to, 282; assent reported, 319	2	199
WILSHIRE, JAMES THOMPSON, ESQUIRE, M.P. :— Leave of absence granted to, 332.		
WOLLONGONG FIRE BRIGADES BOARD :— Report for year ending 31st March, 1890, laid on Table, 207	3	683
WOLLONGONG HARBOUR TRUST ACT, 1889 :— Regulations under, laid on Table, 200, 234, 307, 332	7	173, 175, 179, 185.
WOMEN'S PROPERTY (See "MARRIED WOMEN'S PROPERTY BILL").		
WOODSTOCK (See "RAILWAYS").		
WOODVILLE (See "WHARVES").		
WOOL (See "LIENS ON WOOL BILL").		
WOOLLOOMOOLOO BAY (See "WHARVES").		
WOOROOWOOLGEN RUN (See "CROWN LANDS").		
WRITS (See "ELECTORAL").		
<b>Y</b>		
"YARRA," DETENTION OF STEAMSHIP :— Return to Order ( <i>Second Session 1889</i> ), laid on Table, (not printed) 39		
YOUNG, THE HON. J. H., M.P. :— Addresses House in reference to intended retirement from the Speakership, 383. Clerk informs the House of unavoidable absence of Speaker, 385. Resignation of Office of Speaker by, announced by Clerk, 387. Name of, added to Standing Orders Committee, 418.		
PRIVILEGE :— Mr. Dibbs referred to certain correspondence respecting the alleged bankruptcy of, and drew attention to section 26 of the Constitution Act and the section 4 of the Bankruptcy Act, under which he considered Mr. Speaker's seat vacated; and Sir Henry Parkes having stated that in the opinion of the Attorney-General Mr. Young was not a bankrupt in the meaning of the said 26th section of the Constitution Act, Mr. Dibbs laid on the Table the correspondence referred to, 375	1	799
Motion made ( <i>Mr. Crick</i> ) to refer seat to Elections and Qualifications Committee, and nega- tived, 360.		

1890.

NEW SOUTH WALES.

## DEPARTMENT OF MINES.

(ANNUAL REPORT OF THE STOCK AND BRANDS BRANCH.)

Presented to Parliament by Command.

TO THE HONORABLE SYDNEY SMITH, ESQ., M.P., MINISTER FOR MINES AND  
AGRICULTURE.

Sir,

I have the honor to submit herewith the Report of the Chief Inspector of Stock, which shows that the several Inspectors have performed a large amount of work during the year.

There has been a steady increase in the number of horses each year since 1882, and as regards the breed they appear to be improving in most of the districts.

Though there is a serious decrease in the number of cattle as compared with the number in 1879, it is satisfactory to note that there has been a steady increase since 1885, and in only three districts are the cattle said to be deteriorating. It is also satisfactory to find that inoculation where tried has proved successful.

The increase in the number of sheep is very satisfactory, the number having nearly doubled since 1878 notwithstanding the heavy losses from drought in the interior. In only two districts is the condition of the flocks said to be deteriorating. With regard to lambing the general averages are satisfactory, considering that the western portion of the Colony was suffering from drought during the early part of the year.

The clip of wool for the year shows a large increase, but a much larger proportion was shipped from Melbourne than in 1888, through the rivers being up.

Appendix G contains some valuable information concerning the chilled meat trade, and I venture to think great credit is due to the Chief Inspector for his persistent efforts in this direction. It is to be hoped they will eventually be crowned with success, as it will tend not only to increase our export of meat, but will greatly improve the meat supply of the metropolis, and will put an end to the cruelties inflicted upon the stock brought to market for killing.

The opening for increasing our exports of meat and dairy products with the aid of artificial cold are exceptionally good, and special efforts should, I think, be made to secure the full benefit of it.

I have, &amp;c.,

HARRIE WOOD,

Under Secretary for Mines.

Department of Mines and Agriculture,  
Sydney, 5th May, 1890.

## The Chief Inspector of Stock to The Under Secretary for Mines.

Sir, Department of Mines, Stock Branch, Sydney, 1st April, 1890.  
 On the 1st February last I submitted a Progress Report for the year ending 31st December, 1889, giving the approximate number of the horses, cattle, and sheep then in the Colony; and I have now the honor to submit for your consideration my complete Report for that year on the working of this Branch, which is as usual based very much upon Inspector's estimates—owners still showing very little inclination to furnish data. It will be seen that the actual number of horses, cattle, and sheep in this Report exceed those in the Progress Report.

I have, &c.,

ALEX. BRUCE,  
 Chief Inspector of Stock.

### I.—INSPECTORS AND THEIR WORK.

#### 1. *The Inspectors.*

There are now forty-eight inspectors, having charge of sixty-two Sheep Districts.

#### 2. *The Inspections made.*

The inspections made during the year were as follows:—

Of Stock	...	...	...	...	...	...	18,545
„ Reserves	...	...	...	...	...	...	4,329
„ Pounds	...	...	...	...	...	...	407
„ Noxious animals	...	...	...	...	...	...	5,521
„ Dogs	...	...	...	...	...	...	650
„ Pigs	...	...	...	...	...	...	100
Total	...	...	...	...	...	...	29,552

This would give an average of 616 inspections made by each of the forty-eight inspectors, and is exclusive of inspections made as overseer of Public Watering-Places.

#### 3. *Horses, Cattle, and Sheep inspected.*

*Horses.*—The number of horses inspected during the year was 90,836, by forty-seven inspectors.

*Cattle.*—The number of cattle inspected during the year was 1,024,343.

*Sheep.*—The number of sheep inspected during the year was 28,203,337. This is an increase of 2,808,770 on last year's inspections.

#### 4. *Inspections at Homebush Sale-yards.*

During the year bi-weekly visits to the Homebush yards have been made by the Sydney inspector, with the view to inspecting the stock yarded. The total number of stock submitted to auction was as follows:—Cattle, 89,845 head; sheep, 1,575,195, or a weekly average of 1,727 cattle and 30,292 sheep, being a decrease of 63 cattle and an increase of 5,080 sheep on the weekly average, as compared with previous year. These inspections are called for not only for the prevention of disease but also to check stock stealing, and with that view the inspector sees that the brands and marks of the stock correspond with those in the permits or travelling statements accompanying the stock, which are collected and filed in this office for future reference, should, as it at times happens, inquiry be made with respect to stock suspected of being stolen.

#### 5. *Distance travelled by Inspectors during the year on duty.*

The total number of miles travelled by forty-eight inspectors was 190,037, or an average of 3,959 each per annum, being a decrease of 70 miles for each inspector as compared with last year.

#### 6. *Prosecutions and Convictions.*

The prosecutions instituted during the past year were as follows:—

Under Sheep Act	...	...	...	...	...	...	144
„ Imported Stock Act	...	...	...	...	...	...	3
„ Brands Act	...	...	...	...	...	...	5
„ Pastures Act	...	...	...	...	...	...	173
„ Public Watering-places Act	...	...	...	...	...	...	27
„ Impounding Act	...	...	...	...	...	...	1
„ Slaughtering Act	...	...	...	...	...	...	1
Total	...	...	...	...	...	...	354

This shows a decrease in the number of prosecutions for the year. Under the Public Watering-places Act only have the prosecutions increased, they being for trespass on reserves.

The number of convictions were:—

Under Sheep Act	...	...	...	...	...	...	127
„ Imported Stock Act	...	...	...	...	...	...	3
„ Brands Act	...	...	...	...	...	...	3
„ Pastures Act	...	...	...	...	...	...	154
„ Public Watering-places Act	...	...	...	...	...	...	23
„ Impounding Act	...	...	...	...	...	...	1
„ Slaughtering Act	...	...	...	...	...	...	1
Total	...	...	...	...	...	...	312

## II.—HORSES.

1. *The Number.*

The number of horses in the Colony during the twenty-nine years previous to and including 1889 was as follows:—

Year.	No.	Year.	No.	Year.	No.
1861 ... ..	251,497	1871 ... ..	337,597	1881 ... ..	398,577
1862 ... ..	233,220	1872 ... ..	304,100	1882 ... ..	328,026
1863 ... ..	273,389	1873 ... ..	328,408	1883 ... ..	326,964
1864 ... ..	262,554	1874 ... ..	334,462	1884 ... ..	337,172
1865 ... ..	284,567	1875 ... ..	357,697	1885 ... ..	344,697
1866 ... ..	282,587	1876 ... ..	366,703	1886 ... ..	361,663
1867 ... ..	278,437	1877 ... ..	328,150	1887 ... ..	390,609
1868 ... ..	280,201	1878 ... ..	336,468	1888 ... ..	411,368
1869 ... ..	280,818	1879 ... ..	360,038	1889 ... ..	490,777
1870 ... ..	280,304	1880 ... ..	395,984		

This shows an increase of 19,409 during the year, and is due principally to an increase in the number of breeders and to the returns being more complete.

The number of horses in each Sheep District will be found in Appendix A.

2. *The different Breeds.*

*Draught.*—The numbers returned under this head are—Ordinary, 119,528; thoroughbred, 19,850; total, 139,378.

*Light Harness.*—The number returned as ordinary is 95,433; thoroughbred, 14,226; total, 109,659;

*Saddle.*—The numbers of ordinary are given as 156,683; thoroughbred, 25,057; total, 181,740.

3. *Horses introduced.*

*From other districts.*—The number of stud horses introduced were 369, and stud mares, 165; ordinary mares, 2,752; and horses, 3,215.

*From other Colonies.*—The number introduced by sea was—Stud horses and mares, 65; and ordinary horses and mares, 302.

The number introduced overland was 76 stud mares and 49 stud horses; and ordinary, 382 mares and 623 horses.

*From England and other Countries.*—The number introduced under this head was 24. For particulars see Appendix B1.

4. *Horses fit for sale.*

The numbers returned as being fit for market during the coming year are 22,517 draught; 22,096 light harness; and 32,478 saddle.

Of this number it is estimated that 18,220 are suited for the India and China markets.

There were sent from three districts 154 horses to be shipped from Sydney, and from three districts 514 horses to Melbourne for foreign countries.

5. *Improvement.*

In forty-two districts the horses are said to be improving. The principal reasons given are—Introduction of superior stud horses, breeding from good mares, more attention to the rules of breeding, and better prices obtainable; and in fifteen districts there is no improvement. In three districts they are deteriorating,—the reasons given being too much light blood introduced, breeding from weedy mares for racing purposes.

6. *Diseases in Horses.*

This year has been unusually free from epizootic diseases in horses.

*Anthrax* was reported in one district.

*Horse Fever.*—This disease appeared in a mild form in two teams of horses in the Balranald district; but it did not spread, as few horses were travelling at the time.

*Australian Stringhalt* occurred during January, February, and March in three districts. Some of the cases were investigated by Mr. Stanley, G.V.S., and he is confirmed in his opinion that the disease is due to intestinal parasites. A paper read by him at the Stock Conference on this subject is reprinted as Appendix C.

*Rheumatism and Pneumonia.*—Have not been reported.

*Strangles.*—Has during the year been of a mild character, and has been reported in only seven districts.

*Prurigo.*—Continues to give much trouble in the Clarence and Richmond River districts. Cleanliness of the horse's body and washing with caustic soda and water— $\frac{1}{2}$  oz. to a pint of water—are said to give good results. A full account of this disease appeared in last year's report. It is about to be further investigated by Mr. Government Veterinarian Stanley.

7. *Losses in Horses through Accidents, &c.*

The losses in horses from wire in chaff and other accidents, as reported, amount to 1,638.

8. *Wild Horses.*

The number of wild horses in the Colony is estimated at 4,230, which shows a decrease on the previous year of 1,251.

9. *Tax on Entire Horses.*

A large majority of owners are still in favour of a special tax being placed on entires.

## III.—CATTLE.

1. *Number.*

The returns of cattle in the Colony during the twenty-nine years ending 31st December, 1889, stand as follows:—

Year.	No.	Year.	No.
1861	2,271,923	1876	3,131,013
1862	2,620,383	1877	2,716,385
1863	2,032,522	1878	2,771,583
1864	1,924,119	1879	2,914,210
1865	1,961,905	1880	2,580,040
1866	1,771,809	1881	2,597,318
1867	1,728,427	1882	1,859,985
1868	1,761,411	1883	1,640,753
1869	1,795,904	1884	1,425,130
1870	2,195,096	1885	1,317,315
1871	2,014,888	1886	1,367,844
1872	2,287,660	1887	1,575,487
1873	3,794,327	1888	1,622,907
1874	2,856,699	1889	1,741,592
1875	3,134,086		

This shows an increase during the year of 118,685, and a decrease as compared with the decennial year 1879 of 1,172,618.

The number of cattle in the several Sheep Districts will be found in Appendix A.

The number of cattle introduced from Queensland was 175,117, and the number sent from this Colony into that, 1,867.

2. *Different Breeds.*

*Shorthorns.*—The number of pure-bred and stud Shorthorns is estimated at 46,099; and ordinary, 642,375; total, 688,474.

*Hereford.*—Pure and stud, 25,713; ordinary, 206,270; total, 231,983.

*Devon.*—Pure and stud, 10,274; ordinary, 54,043; total, 64,317.

*Black-polled.*—Pure and stud, 671; ordinary, 972; total, 1,643.

*Ayrshire.*—Pure and stud, 2,620; ordinary, 6,613; total, 9,233.

*Alderneys.*—Pure and stud, 441; ordinary, 464; total, 905.

*Jersey.*—Pure and stud, 10.

*Brittany.*—Pure and stud, 100.

*Crosses.*—First crosses, 5,273; ordinary, 739,654; total, 744,927. The crosses are estimated as follows:—Shorthorn and Hereford, 248,121; Shorthorn and Devon, 86,476; Hereford and Devon, 48,610; Shorthorn and Black-polled, 4,662; Ayrshire and Shorthorn, 4,132; the balance, 352,926, being unrecognizable.

There is a comparatively large increase in the milking breeds of cattle. This arises through many of our cattle-owners in the coast districts having turned their attention to dairying instead of fattening for market; and it is believed that this change will continue and increase.

3. *Cattle introduced.*

*From other Districts.*—Stud bulls, 322; stud cows, 605; total, 927; ordinary cattle, 100,841.

*From other Colonies by Sea.*—Stud bulls, 49; stud cows, 13; total, 62; ordinary cattle, 189.

*Overland.*—Stud bulls, 242; stud cows, 851; ordinary cattle, 175,117; total, 176,210.

*From Countries outside the Australian Colonies.*—Bulls, 12; cows, 3; total, 15. Of these, 2 were Shorthorn; 2 Devon; and 11 Hereford. For particulars, see Appendix B2.

4. *Increase and decrease of Cattle.*

In fifty-one districts the cattle are reported to be increasing, for which the following reasons are given:—(1.) The good season and no losses from starvation and disease. (2.) Increase in number of owners. (3.) Considerable numbers of store cattle have been introduced from Queensland. (4.) More owners have taken to breeding cattle, and are stocking-up their runs, cattle having become good property of late. In the remaining districts they are decreasing on account of large sales, owners not breeding or stocking-up, and bad season.

5. *The "Cast" of Fat and Store Cattle.*

The estimated "cast" of fat cattle to be sent to market during the coming year is 298,153, and store cattle, 174,571. From twelve districts the fat cattle are principally sent to Melbourne; from two districts they are principally sent to Adelaide; and the remaining districts supply the markets of Sydney, Maitland, Mudgee, Bathurst, Orange, Goulburn, Tamworth, and Albury.

6. *How kept.*

The number of cattle kept wholly in paddocks is returned as 1,318,488; on open runs, 250,214; and the balance, 172,890, are depastured both ways.

7. *Improvement and deterioration.*

In forty districts the cattle are said to be improving; in seventeen districts they are stationary; and in three districts deteriorating. The principal reasons given for the improvement are—introduction of good stud stock; more attention and care in selection; also, in culling and keeping in paddocks. The reason given for deterioration is inattention to breeding, many owners breeding from all sorts without respect to breed or quality.

8. *Their diseases and Ailments.*

*Pleuro-Pneumonia.*—In twenty-six districts, on 195 runs, the cattle were reported as affected with pleuro-pneumonia; and in thirty-four districts the cattle are reported as being free from that disease.

In

In the whole of the infected districts the disease is attributed to introduction of cattle and contact with infected travelling-stock from Queensland.

Inoculation was tried on 165 holdings in twenty-five districts, and in every case but one with satisfactory results—the disease leaving the herds without further loss. The failure in the one case was caused by bad virus and an inexperienced operator.

The number of owners in favour of inoculation is given as 7,798; against, 517; undecided, 2,076; and 7,696 opinions not known.

The number of owners in favour of compulsory inoculation in the case of infected herds is given as 6,398; against it, 1,533; undecided, 1,993; and 9,709 opinions not known.

This shows a very large majority of owners in favour of the compulsory inoculation of all herds in which the disease appears; and it is hoped that legislation in this direction will soon be obtained.

*Cultivation of Virus.*—Following up the experiments made by M. Pasteur's representatives—Dr. Germont and M. Loir—in Brisbane, an attempt has been made by Mr. Government Veterinarian Stanley to cultivate the virus of pleuro-pneumonia by injecting the virus taken from the lung of a diseased beast beneath the skin of a healthy calf on the fore ribs and in the neck; but the cultivation was made on too small a scale to give satisfactory results. Only fourteen calves having been inoculated, it is therefore as yet in the experimental stage, and it is intended immediately a supply of reliable natural virus can be obtained, to take the matter up on a more extensive scale, and there is no doubt the results will be as successful here as it is reported they have been in Queensland.

*Tuberculosis.*—Although power is given under the Imported Stock Acts to deal with and destroy imported stock affected with this deadly and dangerous disease there is no law in force which empowers an inspector of stock to interfere with any of our own cattle so affected. It is true that the meat of such cattle can be seized and destroyed by inspectors of slaughter-houses, but to do this effectually all the slaughter-houses in the Colony would have to be regularly inspected, and this cannot be done.

It is also the case that under the Dairies Supervision Act tuberculous milch cows can be seized and destroyed, but notwithstanding this it is currently reported by persons competent to judge that there are tuberculous cows now in the dairies in Sydney and the suburbs.

Several cases of this disease have been detected at the Homebush and Maitland sale-yards during the year, and agents have notified sellers that they will not receive cattle affected in this way at the sale-yards.

Notwithstanding this, cattle affected with the disease are still met with at the public abattoirs. They are of course condemned and destroyed. It is to be hoped that in the interests of the public health local authorities will prohibit the slaughter for food of tuberculous cattle in the country townships.

*Cumberland Disease.*—From eight districts the number of cattle reported to have died from this form of anthrax is 682, being 534 less than last year.

*Symptomatic Anthrax or Blackleg* is reported to have carried off 782 head in eight districts, being an increase of 454 on last year, the principal outbreak being in a mob of cattle belonging to Mr. R. Hassall, of Braidwood, which were travelling from Mudgee. For Mr. Government Veterinarian Stanley's report on this case see Appendix D.

*Cancer.*—Cattle to the number of 1,997 are reported from twenty districts to have died of tubercular swellings in the throat, being an increase of 92 on last year.

*Red Water.*—From one district 20 deaths are recorded, but the disease is very prevalent in certain localities in the coast country.

*Ophthalmia* occasionally assumes an epidemic form, and the losses are often considerable. From ten districts 367 deaths are recorded from this cause.

*Blaine* has not been reported this year.

#### IV.—SHEEP.

##### 1. *The number.*

The number of sheep in the Colony during the twenty-nine years ending 31st December, 1889, stands as follows:—

1861	...	...	6,119,169	1876	...	...	25,269,755
1862	...	...	6,558,896	1877	...	...	21,521,662
1863	...	...	7,169,126	1878	...	...	25,479,484
1864	...	...	9,082,463	1879	...	...	30,062,910
1865	...	...	9,650,106	1880	...	...	35,398,121
1866	...	...	11,644,593	1881	...	...	36,591,946
1867	...	...	15,066,377	1882	...	...	36,114,814
1868	...	...	16,000,090	1883	...	...	37,915,510
1869	...	...	16,848,217	1884	...	...	31,660,321
1870	...	...	16,218,825	1885	...	...	37,820,906
1871	...	...	16,766,012	1886	...	...	39,169,304
1872	...	...	17,873,696	1887	...	...	46,965,152
1873	...	...	18,990,595	1888	...	...	46,503,469
1874	...	...	22,797,416	1889	...	...	50,106,768
1875	...	...	25,353,924				

The number of sheep in the several Sheep Districts will be found in Appendix A.

##### *Increase and Decrease.*

This shows an increase for the whole Colony of 3,603,299. The increase in this instance was greatest in the north-eastern and eastern portions of the Colony and less in the central, with an actual decrease in the north-western and western districts, where the drought of 1888 was most severely felt, and it continued there to the month of March in 1889. The result was that not only were considerable numbers of sheep lost, and those that remained so reduced as to be in very low condition for breeding, but the owners in that dry country, with the sad experience of 1883-4, dreaded a continuance of the drought, and refrained in many cases from putting the rams to the ewes. During the year 223,369 sheep left this Colony for Queensland and 311,583 were brought from that Colony into this.

2. *The different Breeds.*(1.) *Merino.*

	Combing.				Total.
	Rams.	Ewes.	Wethers.	Lambs.	
Pure and stud—Superfine ...	54,572	654,007	169,484	299,429	1,177,492
Ordinary ... ..	83,797	2,805,976	1,587,037	1,236,201	5,213,011
					<u>6,390,503</u>
Pure and stud—Medium ...	87,162	1,377,815	610,411	774,379	2,849,767
Ordinary ... ..	158,191	6,349,386	3,549,476	3,163,657	13,220,710
					<u>16,070,477</u>
Pure and stud—Strong ...	56,696	1,256,319	678,609	830,203	2,821,827
Ordinary ... ..	100,710	4,439,861	2,590,877	2,181,377	9,362,825
					<u>12,184,652</u>
Total, Combing ... ..					<u>34,645,632</u>
	Clothing.				Total.
	Rams.	Ewes.	Wethers.	Lambs.	
Pure and stud—Superfine ...	15,787	282,440	162,032	174,679	634,938
Ordinary ... ..	27,674	755,318	528,723	400,184	1,711,899
					<u>2,346,837</u>
Pure and Stud—Medium ...	27,167	370,754	211,899	232,906	842,726
Ordinary ... ..	77,485	3,581,404	1,695,649	1,574,853	6,929,391
					<u>7,772,117</u>
Pure and stud—Strong ...	26,214	485,405	237,713	298,014	1,047,346
Ordinary ... ..	42,947	1,319,427	1,067,403	717,632	3,147,409
					<u>4,194,755</u>
Total, Clothing ... ..					<u>14,313,709</u>
Total number of Merino Sheep ...					<u>48,959,341</u>

(2.) *Long-woolled and cross-bred Sheep.*

Pure and stud—Lincoln ...	3,247	33,696	27,802	24,302	89,047
Ordinary ... ..	5,767	61,553	48,532	43,394	159,246
Total, Lincoln ... ..					<u>248,293</u>
Pure and Stud—Leicester ...	2,771	23,607	18,004	15,578	59,960
Ordinary ... ..	2,320	41,960	44,450	27,993	116,723
Total, Leicester ... ..					<u>176,683</u>
Pure and stud—Downs ...	484	3,910	2,437	2,855	9,686
Ordinary ... ..	645	6,881	4,624	4,312	16,462
Total, Downs ... ..					<u>26,148</u>
Pure and stud—Romney Marsh	110	267	90	87	554
Ordinary ... ..	.....	600	296	.....	896
Total, Romney Marsh ...					<u>1,450</u>
Total number, Long-woolled Sheep ...					<u>452,574</u>

(3.) *Crosses.*

Crosses of the above breeds (long-woolled) with Merino principally.	4,567	246,520	266,108	177,658	694,853
Total, crosses ... ..					<u>694,853</u>
Grand total ... ..					<u>50,106,768</u>

## Sexes and Classes.

Rams ... ..	778,313
Ewes ... ..	23,647,106
Wethers ... ..	13,501,656
Lambs .. ...	12,179,693

50,106,768

### 3. Sheep introduced and imported.

- (1.) From other districts in this Colony—Stud, 8,598; ordinary, 3,826,299; total, 3,834,897.
- (2.) Overland from other Colonies—Stud, 6,390; ordinary, 356,912; total, 363,332.
- (3.) By sea from other Colonies—Stud, 3,988; ordinary, 89; total, 4,166.
- (4.) From England and Countries and Colonies other than Australian—143; of these 87 were American Merino, 5 German Merino, 4 English South Downs, 20 Shropshire Downs, and 27 Lincoln. See Appendix B 3.

During the year 4,077 sheep passed through quarantine, and the Inspectors into whose districts they went reported that in almost every case the sheep when inspected after arrival at destination did not appear to have suffered from the effects of the dressings, of these 3,054 were disposed of at the annual sales of stud sheep, and were from the flocks of the several breeders mentioned in appendix E.

### 4. Long-woolled and cross-bred Sheep.

Amongst the long-woolled sheep the Lincoln is said, in a large majority of the districts, to give the best returns in wool and in weight of mutton, the cross-bred sheep being second.

### 5. The "Cast" of Fat and Store Sheep.

The annual "cast" of fat sheep for the ensuing season is estimated at 5,926,434, and store sheep, 7,020,696.

### 6. How Sheep are kept.

Paddocked	...	...	...	...	...	...	...	48,617,818
Shepherded	...	...	...	...	...	...	...	918,362
Both ways	...	...	...	...	...	...	...	570,558
								50,106,768

### 7. Condition of the Flocks.

In forty-five districts the sheep are said to be improving; the principal reasons given being—more attention to breeding, paddocking, introduction of high-class rams and ewes, more careful classing and culling, and good seasons.

In thirteen districts they are said to be stationary, and in two districts they are deteriorating. The reasons given are—effects of bad seasons, breeding from inferior ewes, bad management, and bad selection of rams.

### 8. Lambing.

The general average for the whole of the Colony of the paddocked sheep is returned by inspectors at 64½ per cent., and shepherded sheep at 54 per cent. In twenty-two districts the lambing was high, in twenty-five districts medium to fair, and in thirteen districts very low. The reason given for the high percentage is the favourable season and runs not overstocked, while the fair and low percentages are attributable to unfavourable season, poverty of ewes, want of food and water, and bad season after lambing, numbers of lambs having perished through heavy rains, and flocks harrassed by dogs.

The paddocked sheep show a higher percentage than the shepherded sheep by 10½ per cent.

### 9. The Clip.

Average per sheep.

*Lambs.*—The number of lambs shorn in the grease was 6,790,889; the number washed, 74,693; total lambs shorn, 6,865,582.

*Sheep.*—The number of sheep shorn in the grease was 36,553,856; hot water and spout, 80,000; creek-washed, 475,254; and scoured, 1,446,105.

The average weights of the clip are estimated as follows:—

	Lambs.		Sheep.	
	lb.	oz.	lb.	oz.
Grease	1	11½	5	13½
Creek-washed	1	9	3	3
Hot water and spout washed	.....	.....	4	2
Scoured	.....	.....	2	14

### Total Clip.

The total clip in the Colony for the year 1889, according to the number of sheep, would be 36,553,856 shorn in the grease, average clip, 5 lb. 13½ oz. per sheep = 213,611,596 lb.; 475,254 sheep, creek-washed, average clip, 3 lb. 3 oz. per sheep = 1,514,872 lb.; 80,000 sheep, hot water and spout, average clip, 4 lb. 2 oz. = 330,000 lb.; 1,446,105 sheep scoured, average clip, 2 lb. 14 oz. = 4,157,552 lb. Lambs—6,790,889 lambs shorn in the grease, average clip, 1 lb. 11½ oz. per lamb = 11,671,840 lb.; 74,693 lambs washed, average clip per lamb, 1 lb. 9 oz. = 116,707 lb.; total clip, 231,402,567 lb.; or an increase of 23,071,487 lb. on last years clip, and is accounted for by a greater number of sheep having been shorn in the grease this year than in 1888, and the heavier fleeces through the favourable season.

### Condition of Clip.

In twenty-one districts the clip is reported as sound and containing a plentiful supply of yolk; in twenty-six districts, sound, and containing a fair amount of yolk; in eleven districts, sound, but light in yolk; and in the two remaining districts, light and unsound. On the whole the clip was clean, but in a few districts the value of the wool was affected by grass-seed and burrs.

### Exportation of Clip.

The clip grown in the Colony of New South Wales is shipped principally to England, America, France, and Germany, from the ports of the three neighbouring Colonies, as well as from Sydney. The portion of our clip thus shipped from the other Colonies is often mistaken as the produce of those Colonies, more particularly for that of Victoria and South Australia.

The

The following is an estimate of the clip sent to Sydney, and also the proportion sent across the Borders and to Melbourne, Adelaide, and Brisbane, for the years 1888 and 1889:—

Port of Shipment.	1888.			1889.		
	Greasy.	Washed.	Total.	Greasy.	Washed.	Total.
	lb.	lb.	lb.	lb.	lb.	lb.
Sydney.....	148,681,473	3,410,500	152,091,973	161,240,577	3,101,814	164,342,391
Melbourne .....	38,421,221	163,327	38,584,548	54,265,699	1,519,199	55,784,898
Adelaide .....	14,369,559	.....	14,369,559	9,470,909	1,481,528	10,952,437
Brisbane .....	269,352	15,648	285,000	306,251	16,590	322,841
	201,741,605	3,589,475	205,331,080	225,283,436	6,119,131	231,402,567

This shows an increase in the quantity of wool shipped during the year from the Port of Sydney, of 12,250,418 lb., as compared with that shipped in 1888.

#### Classing the Clip.

In thirty-five districts the clip is reported as having been well classed. In the other districts it is not considered to have been so; the reasons being, owners do not think it pays, want of convenience, sheds not large enough to warrant expense, and the difficulty of obtaining competent woolsorters.

#### Wool-presses.

A great number of different kinds of presses are used; those most in favour are Ferrier's Patent and Williams' and Robinsons'; rack screw and pinion presses are used. There is still room for improvement in the mode of pressing, especially by the owners of small clips.

#### Woolpacks.

The woolpacks used are mostly Calcutta and Dundee, of various sizes, from 4 ft. 6 in. x 2 ft. 2 in. to 5 ft. 3 in., and the weight from 10 to 12 lb.

On fifty-three stations the wool is dumped before leaving.

#### 10. Sheep-brands and marks.

##### Ear-marking.

In most districts the system of ear-marking sheep is properly carried out, and may now be said to be approved by all the Boards.

##### Tattoo-marking.

This system of marking is mostly used by owners of stud-sheep, not as yet to any great extent in the case of ordinary flock sheep, but where tried, it has been found to be a good preventive to sheep-stealing.

### V.—DISEASES IN SHEEP.

#### 1. Scab.

The flocks in this Colony and in the Colonies of Queensland, Victoria, South Australia, and Tasmania are free from scab. It exists, but to a very slight extent, in New Zealand and Western Australia, and it is hoped that these Colonies will soon be declared clean. The importation of sheep into this Colony from New Zealand and Western Australia is prohibited.

#### 2. Anthrax.

In November last a communication was received from M. Pasteur through his representatives, Dr. Germont and M. Joir, offering the use of M. Pasteur's Vaccine of Anthrax in all the Colonies for a lump sum of £38,000. This was submitted to the Intercolonial Stock Conference held in Melbourne in November last, but was not entertained, as the Conference considered it would be the better course to allow M. Pasteur to appoint agents in the Colonies, who would deal directly with the owners requiring the vaccine, the Governments of the several Colonies giving them every facility for establishing and working these agencies. Although M. Pasteur's offer of his vaccine for a lump sum was declined and the other course recommended by the Conference, it is believed that the delegates were largely induced to make this recommendation because they considered the amount asked too high, and if a more moderate sum were asked, it is probable the Colonies would agree to contribute to its payment.

#### 3. Foot-rot.

In twenty-three districts the sheep have been more or less affected with foot-rot during the year; the reasons given being wet in the early part of the year, running on low rich pasture, and contagion. The principal remedies tried were careful paring, butyr of antimony and bluestone, bluestone and kerosene, arsenic, arsenic and lime, blue vitriol, sulphate of copper, carbolic acid, and nitric acid—with satisfactory results. Of these, bluestone and butyr of antimony have been most effective for hand-dressing, and arsenic in troughs.

#### 4. Fluke.

In nine districts the sheep were affected with fluke, through depasturing on low swampy ground, unsound country, and rank pasture. The remedies used were—arsenic, salt, tar, and turps, sulphate of iron, and Liverpool salt and sulphur—with good results; but the best course where it can be followed is to remove the sheep to salt bush country.

#### 5. Parasitic Worms.

In sixteen districts the sheep are reported as having been infested with worms, to an extent of (say) 7 per cent., attributed to,—rain in the early part of year,—to being affected from previous year,—to rankness in the grass,—and to unsound country.

Of these worms the most common and most injurious to the sheep have been the tœnia (the tapeworm), the anchylostomum (the thread-stomach worm), and the filaria (the lung worm).

Of the remedies used for the stomach and tapeworms, arsenic has been the most general, and with very satisfactory results. Turps and oil, sulphate of iron, and salt and tobacco have also been given with good results.

For the lung worms, a mixture of turpentine and oil is believed to be the best remedy. VI.—

## VI.—PIGS.

The number of pigs in the Colony, as returned at 31st December, 1889, is 237,276 being a decrease of 11,407 as compared with the returns for the previous year.

From the other Colonies, 55 have been introduced by sea.

Foreign pigs are prohibited.

*Diseases in Pigs.*

No disease whatever has been reported amongst pigs.

## VII.—DOGS.

Thirty-nine (39) foreign dogs, *i.e.*, dogs from England, America, France, Germany, and other places outside the Australasian Colonies, passed through quarantine during the year—exclusive of fifty-four ships' dogs which were quarantined during stay of vessels in port—and 615 Colonial dogs were introduced at the port of Sydney.

*Diseases in Dogs.*

*Rabies* is still reported as prevalent in Europe, and in London and in some other parts of England the regulations requiring dogs to be muzzled were, during the dangerous months of the year, strictly enforced.

Pasteur's method of treatment of hydrophobia continues in favour, and patients from almost every part of the world are sent to his Institute for treatment.

Rigorous quarantine regulations are absolutely necessary to prevent the introduction of this disease into these Colonies.

## VIII.—TRAVELLING STOCK.

1. *Trespass on Reserves.*

In twenty-four districts the driftways and reserves for travelling stock are reported as having been trespassed upon, more or less, by neighbouring lessees' and selectors' stock. In some instances the stripping of the reserves of pasture arises through their not being withdrawn from lease, and being used by the lessees of the run. In thirty-six districts they are reported as being entirely free from trespass. Inspectors suggest, in order to enable them to exercise proper supervision over these reserves, that the boundaries should be properly marked.

2. *Grass on Reserves and Driftways.*

In seven districts the inspectors report that there is not sufficient grass on the reserves and driftways in their districts to enable fat stock to reach market in good condition; in twenty districts that there is only sufficient in fair to good seasons; and in thirty-three districts that, as a rule, there is sufficient grass on these reservations.

From sixteen districts it is reported that sheep to the number of 2,019,256 have passed through during the year in search of grass and water. From seven districts the number of loafing sheep is given at 182,651.

3. *New Roads for Travelling Stock.*

In fourteen districts new roads are required for travelling stock, and in forty-six districts no new droving roads are recommended.

4. *New Reserves for Travelling Stock.*

In seventeen districts new reserves and alterations of existing ones for travelling stock are required. In forty-three districts there are sufficient reserves; but in a good many cases these reserves are now being curtailed in a way that will, I fear, be injurious to the stock traffic.

5. *New Wells, Tanks, or Dams.*

In twenty-five districts the inspectors report that new wells, tanks, or dams should be constructed by the Government at places which they indicate.

6. *Travelling Charges for Stock.*

In twenty-four districts travelling charges for stock have been collected on 134 separate occasions, the total amount collected being £10,646 15s. 2d., most of which has been refunded to date on appeal to the Boards.

7. *Laws relating to Travelling.*

In all the districts the inspectors report that the provisions of the amended Sheep Acts relating to travelling stock are working fairly well, but are at times evaded, and should be amended.

## IX.—REGISTRATION OF HORSE AND CATTLE BRANDS.

1. *Brands registered.*

The number of horse and cattle brands registered up to 31st December, 1889, was 61,790. The number of brands registered during the year 1889 was—horse brands (alone), 525; cattle brands (alone), 600; and horse and cattle brands, 1,296; making a total of 2,424, being an increase of 112 applications on the previous year.

This shows an increase of 112 in the total number of brands registered during the year as compared with 1888, and is accounted for by increased settlement. There is a decrease in the number of brands transferred and addresses changed, while there is a large increase in the number of brands cancelled.

2. *Brands transferred.*

The brands recorded during the year 1889 as transferred were—horse brands, 20; cattle brands, 24; horse and cattle brands, 94; total, 138.

3. *Brands cancelled.*

The brands cancelled (horse and cattle) in 1889 were 180.

4. *Addresses changed.*

The number of addresses of owners changed in 1889 was 97

### 5. *Compliance with the Act.*

In fifty-five districts the provisions relating to registration and the other requirements of the Act are reported as being duly carried out, and in the remaining five districts fairly so.

### 6. *Benefits of the Act.*

The inspectors, in alluding to the benefits of the Act, report that it prevents duffing, stock-stealing, facilitates identification, assists in recovering lost stock, and otherwise is a great convenience and protection to stock owners.

## X.—POUNDS.

### 1. *Number and inspection.*

There are 410 pounds in the Colony, some of which are at present closed for want of pound-keepers. The whole of the pounds are inspected periodically by the various inspectors of stock.

### 2. *State of Yards.*

Forty-one of the pound-yards are reported to be old; several require renewing, being unfit for the safe custody of stock; and the remainder are said to be in a fair and good condition.

### 3. *Keeping and depasturing Pound Stock.*

The provision made for the proper sustenance of impounded stock, according to the reports received, is, with a single exception, satisfactory. As a rule, pound-keepers have now paddocks for the stock.

### 4. *Management of Pounds.*

The pound-keepers are reported to be performing their duties, upon the whole, in a satisfactory manner, and the appointment of inspectors of stock as inspectors of pounds has had a very beneficial effect.

## XI.—NOXIOUS ANIMALS.

### 1. *The Districts in which the Pastures and Stock Protection Act is in force.*

The Act has been brought into operation in all the districts, and during the year work has been done to the extent shown in Appendices F 1 and F 2.

### 2. *Receipts and expenditure under the Act.*

The amount of assessment paid by stock-owners during the year 1888 was £24,938 4s. 6d., and the amount expended, £52,121 9s. 6d. The amount of assessment paid by stock-owners in 1889 was £33,257 0s. 3d., and the amount expended, £50,525 14s. 3d., the difference being accounted for by the subsidy granted by the Government to the Boards, and large amount to credit of some of the Boards at commencement of the year. Eleven districts are reported to be in debt to the amount of £1,834 2s. 3d.

In ten districts full rates were levied, in thirty-four districts less than full rates, while in sixteen districts no rates whatever were levied.

During the year the bonuses paid by the Boards for scalps ranged as follows:—For kangaroos, from 1d. to 1s.; wallaroo, 6d.; wallaby from 1d. to 1s.; paddymelon from 2d. to 1s.; Bandicoots, 2d. and 3d.; hares, from 2d. to 1s.; kangaroo rats, 2d. to 6d.; native dogs, from 10s. to 80s.; pups, 5s. to 10s.; bilbees, 2s. 6d.; opossum, 1d. and 2d.; wild pigs, 1s.; eagle-hawks, 2s. 6d. to 7s. 6d.; and emus, 6d. to 2s.

### 3. *Estimated number of Noxious Animals.*

The aggregate of the returns by inspectors of the estimated number of noxious animals in their districts shows that there are supposed to be 1,036,717 kangaroos, 3,064,961 wallabies, 25,333 native dogs, 2,744,810 hares, and 3,354 wild pigs in the Colony.

### 4. *Increase and Decrease.*

Kangaroos are reported to be increasing in fifteen districts, wallabies in twelve districts, native dogs in five districts, hares in twenty-two districts, and wild pigs in two districts. In twenty-seven districts kangaroos are reported to be decreasing, wallabies and native dogs in twenty districts, hares in six districts, while pigs in eight districts, and in the remaining districts they are said to be stationary.

### 5. *Number destroyed.*

The number of kangaroos destroyed during the past year was 495,673; of wallabies, 642,782; of kangaroo rats, 86,527; of paddymelons, 5,670; of wild pigs, 9,700; of hares, 329,683; of native dogs, 9,142; of eagle-hawks, 3,199.

### 6. *Steps taken for their destruction.*

In the majority of the districts, hunting with dogs, drives, shooting, and trapping have been adopted with satisfactory results. In thirty-six districts poison has been used with fair to best results, and only from one district has it been reported as not satisfactory.

### 7. *Amendments suggested in the Act.*

Owners are desirous that the Amended Stock and Pastures Bill speedily become law; and they suggest that all owners of stock, irrespective of number, should be liable to an assessment, as also owners of 5 acres of land and over; that hares be included in the list of noxious animals; that the Boards be empowered to cope with the rabbit nuisance; that the Government should grant larger subsidy; that uniform rates be levied; that the rate of bonus be the same throughout the Colony; that all returns of stock be made on the same day; that adjoining Boards assimilate bonuses; and that the provisions of the Act *re* defaulting Boards to be strictly enforced.

### 8. *Losses from Tame and Native Dogs.*

The losses in stock for the past year from the ravages of native dogs are estimated at 57,561 sheep, valued at £21,654; and from tame dogs, 41,067 sheep, valued at £17,252, making the loss from tame and native dogs together £38,906.

Appendix F 1 shows the work which has been done under the Pastures and Stock Protection Acts since they were passed, and how far the objects for which they were so have been attained.

A proposal has been made to discontinue the bonus for kangaroos; but if this is done the hunters will not kill the small kangaroos, and the number will increase.

## XII.—COMMONS.

1. *Number and extent.*

The number of permanent Commons in the Colony is 94, with an average extent of about 1,300 acres each. The number of temporary Commons is 230, with an average extent of 2,300 acres each.

2. *Number of Commoners, Stock, &c.*

The average number of Commoners to each Common is estimated at 96, and the average number of stock kept on each Common at 140.

In twenty districts the Commons are reported to be used for other purposes than that of grazing Commoners' stock.

## XIII.—MISCELLANEOUS.

1. *Artificial Grasses.*

In twenty-seven districts artificial grasses have been sown for pasture during the year to a small extent, in six districts to a large extent, and in remaining districts none; the most successful being lucerne, prairie, and rye.

2. *Number and Division of Runs.*

The number open or unenclosed runs in the Colony is 7,899; the number enclosed is 32,908; the number partially subdivided is 12,029; and the number properly subdivided is 20,784.

3. *Improvements, Fencing, Dams, Tanks, and Wells.*

The number of miles of fencing throughout the Colony is estimated at 1,462,511, at an average cost of (say) £40 2s. 6d. per mile, amounting to £58,650,054.

The number of dams used for stock purposes is estimated at 25,666, at an average cost of (say) £83 7s.; number of tanks, 27,345; average cost of each, £180 18s. 9d.; and the number of wells used is estimated at 3,338, at an average cost of £184 14s. 6d. each.

Cost of fencing, £58,650,054; cost of dams, £2,139,500; cost of tanks, £4,947,751; cost of wells, £616,624; making a total of £66,353,929, as representing the amount expended by way of improvements, &c.

4. *Plants and Weeds.*

In fourteen districts *trefoil burr* grows to a slight extent, in twenty-six districts to a large extent, and in twenty districts there is none reported.

In twenty-five districts *variegated thistle* is reported to a slight extent, in nineteen to a considerable extent, and sixteen districts are reported as free from it.

In twenty-four districts *black thistle* is reported to a slight extent, in twenty-three to a great extent, and thirteen districts are reported to be free from it.

In twenty-seven districts the land is reported as being slightly infested with *Bathurst burr*, in twenty-five to a large extent, and in eight the land is not infested.

In twenty districts other noxious weeds grow to a slight extent, in twenty-three districts to a large extent, and in seventeen districts there is none reported.

*Darling-pea, Roley-poley*, are reported to be growing in a few districts.

*Euphorbia Drummondii*.—Although this plant has been carefully experimented with, and shown so far to be non-poisonous, and put to a practical test by owners, reports still continue to be received of its causing the death of sheep.

5. *Cost of clearing Commons, Reserves, &c., of Weeds.*

The cost of clearing the permanent Commons of noxious weeds throughout the Colony is estimated by Inspectors at £44,595; the temporary commons, £29,484; the police paddocks, £3,538; the travelling stock reserves, £177,745; and the droving roads at £90,502; amounting in all to (say) £345,864.

6. *Examination of intending Applicants for appointment of Inspector.*

During the past year two examinations were held by the Stock Board of Examiners. The following table shows the result:—

Date of Examination.	Number of Candidates.	Names of successful Candidates.	Nature of Certificate issued.
1889.			
January 14th .....	5	{ A. A. Devlin .....	2nd class.
September 9th .....	4	{ D. C. Gordon .....	2nd „
		{ Geo. Day .....	2nd „
		Nil.	
Total .....	9		

It will thus be seen that nine candidates were examined, three of whom received 2nd class certificates.

7. *The Stock and Pastures Bill.*

It is hoped that the Government business will, in the coming Session of Parliament, admit of this measure being passed.

8. *The Chilled Meat Trade.*

As there is seemingly considerable disinclination on the part of many of our stock owners, and those connected with the pastoral interest, to give the establishment of this trade the practical assistance and support which are necessary for its successful initiation, I have thought it necessary to deal with the question at considerable length, and to restate a good many of the arguments which I have already adduced in its favour. [See Appendix G.]

9. *Intercolonial Stock Conference.*

The Conference, which met at Melbourne on the 1st November, was convened at the instance of the Premier of Tasmania, in accordance with the resolution passed at the Intercolonial Stock Conference held at Sydney in 1886, that a similar meeting should be held triennially in one or other of the Colonies.

On

On this occasion, the regulations in force in the several Colonies relating to the introduction of foreign stock, *i.e.*, stock from places outside the Australian Colonies and New Zealand, were first considered by the Conference, together with the infectious and contagious diseases affecting such stock.

These regulations were revised and amended, and where they could safely be so were so far relaxed.

The same course was followed with respect to the regulations relating to the interchange of Australian stock by sea and land between the Colonies, and to the diseases to which these stock are subject.

The nature, cause, and best mode of treating the different diseases in stock prevalent in the Australasian Colonies were then discussed, with the view to their prevention and eradication; and the tenor and form of the regulations best adapted for securing these objects were to a large extent settled by the Conference.

Besides dealing with these matters, the Conference, at the instance of some of its members, took up and discussed several subjects having a general but very important bearing on the pastoral interests in the Colonies, such as the establishment of an Australian Stock Institute, the encouragement of a chill or fresh meat trade, the erection of rabbit-proof fencing, an annual convention of stock owners, and a uniform code of regulations for all the Colonies. The resolutions of the Conference, will be found under Appendix H.

APPENDIX A.  
RETURN of Stock in the several Sheep Districts.

Districts.	Year 1888.					Year 1889.				
	Acrcage.	Horses.	Cattle.	Sheep.	Pigs.	Acrcage.	Horses.	Cattle.	Sheep.	Pigs.
Albury .....	865,284	6,888	15,037	606,486	.....	869,833	6,903	16,452	746,859	.....
Armidale .....	3,320,604	10,472	63,508	1,244,651	.....	3,297,880	10,979	63,722	1,460,853	.....
Bulranald* .....	5,125,777	2,690	4,431	1,076,105	.....	5,340,722	3,034	5,903	1,285,881	.....
Bathurst .....	1,331,873	14,826	36,287	533,986	.....	1,339,911	13,637	36,632	559,299	.....
Berrima .....	227,279½	3,074	22,230	26,750	.....	236,626½	4,023	25,433	28,505	.....
Bombala .....	544,953	3,538	14,682	361,700	.....	570,885	3,620	15,221	364,488	.....
Bourke .....	9,262,820	5,326	30,299	2,253,278	.....	8,871,925	6,113	26,829	2,299,812	.....
Braidwood.....	343,377½	3,038	28,796	59,114	.....	320,107	4,199	32,006	70,887	.....
Brewarrina .....	3,987,172	3,350	14,381	1,187,559	.....	3,847,811	3,713	15,430	1,187,627	.....
Broulee .....	259,765	2,701	20,819	1,483	.....	265,643	2,798	24,076	2,227	.....
Cannonbar.....	2,705,617	2,465	16,158	1,050,539	.....	3,159,031	3,523	16,326	1,106,341	.....
Carconr .....	1,064,001	8,047	16,877	704,570	.....	1,047,840½	7,825	17,082	807,831	.....
Casino .....	2,142,672½	16,264	140,199	701	.....	2,578,722½	18,201	156,359	1,857	.....
Cobar .....	6,760,240	2,490	7,927	1,612,447	.....	6,835,312	3,124	6,488	1,420,691	.....
Condobolin .....	5,589,932	3,230	7,405	1,761,696	.....	5,675,670	3,701	8,287	1,662,219	.....
Cooma .....	1,791,172	8,214	26,724	859,136	.....	1,658,097½	8,351	30,754	941,038	.....
Coonabarabran .....	2,250,565½	3,421	8,043	863,905	.....	2,449,487½	4,188	8,906	1,014,456	.....
Coonamble .....	2,765,511½	4,287	11,239	1,442,839	.....	2,771,694	4,873	11,504	1,597,480	.....
Corowa .....	1,140,620	4,019	6,755	945,028	.....	1,128,120½	4,274	6,746	937,207	.....
Demiliquin .....	2,553,574	5,043	7,391	1,392,176	.....	2,501,869	5,709	9,557	1,436,103	.....
Dubbo .....	3,147,359	7,172	19,720	1,198,672	.....	3,194,800	8,525	26,748	1,480,315	.....
Eden .....	336,584	3,725	40,596	2,132	.....	348,396	3,835	46,856	2,831	.....
Forbes .....	2,504,671½	7,107	18,607	1,436,438	.....	2,648,777	8,134	25,090	1,650,410	.....
Glen Innes .....	2,056,566	11,551	71,463	578,234	.....	1,861,612½	12,662	79,816	704,091	.....
Goulburn .....	875,434	8,780	40,861	380,164	.....	909,712	9,111	44,215	427,048	.....
Grafton .....	1,020,901	15,206	56,896	2,579	.....	1,027,326½	16,961	60,389	2,662	.....
Gundagai .....	1,684,173	11,496	57,417	1,135,070	.....	1,537,448½	10,841	48,436	946,054	.....
Hay .....	5,017,701	5,614	5,967	1,701,723	.....	5,077,457	6,679	10,002	2,030,160	.....
Hillston .....	4,737,832	3,000	3,832	1,105,774	.....	4,762,886	2,872	4,408	971,936	.....
Hume .....	1,324,922	5,759	22,610	678,113	.....	1,334,002½	5,874	23,971	578,908	.....
Ivanhoe .....	6,172,740	1,821	2,142	770,145	.....	6,315,421	2,081	2,280	915,081	.....
Kiama .....	321,912½	8,814	65,541	4,269	.....	296,417	7,797	61,869	3,047	.....
Maitland .....	603,556	15,059	56,232	7,247	.....	572,702	13,985	55,611	3,755	.....
Meintdie .....	9,770,975	3,658	2,179	1,014,715	.....	9,776,312	4,264	93,857	933,496	.....
Merriwa .....	721,840	3,525	13,563	385,984	.....	654,502	3,494	13,831	371,319	.....
Molong .....	1,583,202½	8,340	16,771	796,881	.....	1,808,274½	8,693	14,416	803,920	.....
Moree .....	2,887,242½	5,856	40,388	850,654	.....	3,059,418	5,954	40,535	1,069,212	.....
Mudgee .....	1,160,477	8,517	25,553	487,986	.....	1,221,058	8,475	29,696	542,817	.....
Murrumbundi .....	780,218	5,906	26,887	426,228	.....	786,457	5,897	28,584	438,595	.....
Narrandera .....	2,906,292	3,078	8,581	1,232,908	.....	2,983,065	3,519	12,405	1,468,373	.....
Narrabri .....	1,258,593½	2,710	5,447	498,655	.....	1,437,193	3,366	7,755	635,921	.....
Pieton .....	247,609½	3,624	21,017	6,034	.....	242,520½	3,767	22,138	5,382	.....
Pilliga .....	1,616,951	1,941	11,598	367,856	.....	1,619,440	2,038	12,613	492,876	.....
Port Macquarie .....	660,898	10,385	39,212	1,209	.....	617,550	10,887	42,571	1,314	.....
Port Stephens .....	632,531	8,057	48,617	1,483	.....	613,172	8,025	48,727	1,418	.....
Queanbeyan .....	937,886	3,909	19,833	461,613	.....	989,468	4,239	22,022	603,354	.....
Singleton* .....	779,781	11,712	68,120	97,506	.....	777,228	11,679	67,992	110,925	.....
Sydney .....	197,300	22,170	15,690	10,635	.....	197,550	22,779	15,937	10,028	.....
Tamworth .....	4,269,506	17,098	61,215	1,889,392	.....	4,168,467	17,770	74,505	2,256,976	.....
Tenterfield.....	1,800,195½	6,854	58,443	104,169	.....	1,776,628	5,938	62,909	114,433	.....
Urana .....	1,407,487½	2,313	5,475	970,982	.....	1,415,913½	2,659	6,600	1,076,339	.....
Wagga Wagga .....	2,753,528	10,554	21,832	1,567,582	.....	2,725,880	11,037	27,496	1,898,282	.....
Walgett .....	5,316,238	4,064	23,266	1,583,870	.....	5,518,021	4,467	31,839	1,642,564	.....
Wauauaring .....	11,399,262	3,121	12,497	1,119,304	.....	11,282,081	3,368	9,918	1,069,411	.....
Wyallda .....	3,354,647½	10,157	48,949	792,894	.....	3,674,645½	11,245	49,532	999,180	.....
Wentworth .....	6,981,747	1,779	1,670	665,903	.....	6,748,164½	2,047	1,826	631,606	.....
Wilcannia .....	12,608,725	5,914	5,714	1,812,063	.....	12,431,038	6,108	6,240	1,779,208	.....
Windsor .....	192,075	7,736	15,297	6,420	.....	200,657	7,313	15,405	4,663	.....
Yass .....	804,112	5,122	16,320	483,899	.....	832,114	5,524	15,988	551,324	.....
Young .....	2,091,181½	12,992	28,662	1,785,938	.....	2,167,658½	14,082	31,951	2,013,763	.....
<b>Total.....</b>	<b>163,109,652½</b>	<b>411,368</b>	<b>1,622,907</b>	<b>46,503,469</b>	<b>248,693</b>	<b>164,482,034½</b>	<b>430,777</b>	<b>1,741,592</b>	<b>50,106,768</b>	<b>.....</b>

\* These districts, towards the end of the year, were divided into the Districts of Balranald and Moulamein, and Singleton and Denman, respectively.

APPENDIX B1.  
FOREIGN Horses Imported.

Names and Addresses of Importers.	Where imported from.	Breeds.			Total.
		Blood.	Draft.	Hackney.	
C. Lowe .....	India .....	1	...	...	1
Sir C. Beresford .....	do .....	1	...	...	1
A. A. Dangar, Baroona, Whittingham .....	England .....	...	2	...	2
Admiral Fairfax, Sydney .....	do .....	...	...	3	3
— Jones, Victoria .....	America .....	...	...	7	7
W. Fleming, Sydney .....	do .....	...	...	2	2
Circus Company .....	.....	...	...	6	6
J. Douglas .....	.....	...	...	2	2
		2	2	20	24

APPENDIX B2.  
FOREIGN Cattle Imported.

Names and Addresses of Importers.	Breeds.						Total.	
	Shorthorns.		Herefords.		Devons.		Male.	Female.
	Male.	Female.	Male.	Female.	Male.	Female.		
Frank Reynolds, Esq., Tocal, Paterson .....	...	...	1	...	...	...	1	...
H. Barnes, Esq., Dyaraba, Richmond River .....	1	...	3	...	1	...	5	...
H. Beattie, Esq., Victoria .....	...	...	2	3	...	...	2	3
A. A. Dangar, Esq., Baroona .....	...	...	2	...	...	...	2	...
H. F. Smith, Esq., Kyogle, Richmond River .....	1	...	...	...	1	...	2	...
	2	...	8	3	2	...	12	3

APPENDIX B3.  
FOREIGN Sheep Imported.

Names and Addresses of Importers.	Merinos.				Coarse Woolled.				Total	
	Vermont.		Lincolns.		South Downs.		Shropshire Downs.		Male.	Female.
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.		
J. Deans, Esq., Riccarton, Christchurch, New Zealand .....	...	...	1	...	4	...	...	...	5	...
S. Wiseman, Esq., Cliffdale, Wingen .....	...	...	3	23	...	...	...	...	3	23
H. Beattie, Esq., Victoria .....	...	...	...	...	...	...	2	18	2	18
S. Robinson, Esq., Springfield .....	1	...	...	...	...	...	...	...	1	...
Exors. T. G. Webb, Esq., Springfield .....	1	3	...	...	...	...	...	...	1	3
Messrs. Morrison & Clark, Vermont, America .....	...	69	18	...	...	...	...	...	69	18
	2	3	69	18	4	23	4	...	2	18
									81	62

APPENDIX C.  
STRINGHALT IN HORSES.

*Paper read by Mr. E. Stanley, F.R.C.V.S. (New South Wales), at the Australasian Stock Conference, Melbourne, 1889.*

Mr. Chairman and Gentlemen,

Having been asked to prepare a short paper on this subject, I shall confine my remarks to the consideration of some theories promulgated as to the cause of this affection; and finally support my theory of Helminthiasis. First, as to the noxious plant theory, the common British flat weed or cat's ear, *Hypocheris Radica*, often erroneously called dandelion because it has a yellow flower, has the most supporters, who believe it causes stringhalt; for what reason I cannot understand. I know this weed is good and wholesome food, it covers immense geographical areas in New South Wales and in the other colonies, it has been eaten by thousands of horses year by year, and continues to be eaten where the stringhalt never existed; again, I have seen many cases of stringhalt where this weed has never been seen. How is it that the weed theorists during all the years the disease has been about have not made an extract or decoction of their plant? and so proved their case by producing the disease at will, simply by administering a concentrated dose of the plant; nothing could be more easy or convincing; the late Mr. Graham Mitchell, V.S., tried to do so, but he failed. Some New Zealanders attribute the disease either to the dandelion or to the Cape weed—African marigold (it has a yellow flower with a black centre); if so, why do they not make a decoction of the plant and prove it? These weeds are very common, and are valuable as food. Fungus on plants has been suggested, but has not been demonstrated in any way;

as a matter of fact, the symptoms and pathology do not accord with the toxic effects produced by fungi, or indeed any other weeds or plants. The medicinal ingredients of plants are well known to be expelled from the animal body in a very few hours, and when medicines capable of producing toxic effects are repeated time after time disastrous results must follow, and would be seen in the excreting organs; nothing of the kind is found in this disease, on the contrary affected horses actually recover while living on these weeds all through the various stages of the disease; therefore it appears that the plant theory is untenable and entirely without foundation.

I therefore still maintain that the disease is Helminthiasis, that is, caused by worms. It will be remembered that I reported at some length on this disease in July, 1886; since then I have seen the same affection at Moana, on the Murray River, in 1887, and again at Moss Vale this year, therefore I am able to confirm my opinion as to the parasitic origin of the disease. It is caused by worms infesting the mucous membrane of the horses' digestive organs, especially the intestinal canal, where, by setting up irritation of the bowels, they disturb the nervous system, thereby affecting the nutrition and action of certain sets of muscles, producing inordinate contraction whenever the animal moves; this I attribute to perverted nervous action, which is possibly aggravated by deterioration of the blood, produced by the ever increasing myriads of parasites; they are biting, perforating, and bleeding like leeches the highly sensitive mucous membrane during the whole time they are the tenants in possession; they not only deteriorate the blood by altering its constituents, but I believe they also *by virtue of their excretions and debris, eliminate toxic material*, which being absorbed into the circulation may assist in producing the disastrous effects on the nervous and nutritive systems which are so characteristic of this affection.

That toxic elements are manufactured in the blood by parasitic organisms is well known to scientists who are engaged investigating bacteria and other microbes in their relation to diseases.

In stringhalt parasitic worms are found in countless numbers, and of several distinct varieties, in the large and small intestines, invading their tunics, making innumerable sores, ulcers, and abscesses, accompanied by the products attending chronic inflammation, thus paralysing peristaltic action, they interrupt the natural nutritive functions of these important digestive organs; they are so overcrowded and voracious that they actually bore right through the bowels, and some are found as wanderers in the muscular walls of the abdomen; they stray about to become finally encysted in various places, and die; their debris creates still further trouble.

In passing I wish to note that I consider many of the larger and common worms found frequently in all animals that live on mucous or epithelial cells and food in the stomach and bowels are unimportant in this disease, therefore I exclude them. The arteries are free from stronguli, and I have never seen hæmatozoa in the blood in stringhalt; neither do I find disease in the cerebro-spinal organs; there is discoloration in the blood vessels, which is due to impure blood; the cerebro-spinal system is only temporarily deranged.

Having given the basis of my opinion, I am further confirmed by the symptoms, peculiarities, progress, and terminations of this affection.

I am in a position to state that Veterinary Surgeons Archibald Park, of Tasmania, William Scott, of Sydney, and Frederick William Day, of Randwick, confirmed my views; each of these gentlemen formed their own opinion after investigation and observations extending over three years, during which they have noted the various opinions brought forward in the Press and expressed by horsemen they have questioned. [*Opinions of these gentlemen read to the Conference.*]

The opinions of such well-known veterinarians carries much weight, and I feel satisfied that the treatment of the disease will never prove successful unless carried out in detail by those who understand its pathology and deal with it accordingly.

The test of diagnosis is that the line of treatment I advise proves successful, and effects a cure.

The impatient public, who do not understand the structure, use, or importance of the organs attacked, cannot grasp the direful effects produced by chronic disease, therefore fail to understand the great difficulty there is in expelling the parasites without injury to the animal, or the length of time that must elapse before nature can effect repairs; weeks and even months are required for nature to re-establish her sway, before a complete recovery can be proclaimed.

Veterinarians find this disease intractable and difficult to contend with, because the cases are too far advanced before their advice is sought.

The objects of treatment should be to expel the worms, purify the blood, then to assist nature in the restoration of the deranged organs, and avoid contamination.

Hence the line of treatment will consist of purgatives and anthelmintics and tonics, with change of locality, water, and food.

Horse-owners beyond the reach of veterinary skill I advise to trust nature and assist her by simple means, such as change of pasture and water (infested water should be boiled), provide good and wholesome food, and keep out of infected paddocks. Common salt, one ounce daily, alternated with a drachm of sulphate of iron, may be given with advantage; also give two or three times in a month a purgative of spirits of turpentine, three or four ounces, mixed with a pint of olive or other oil.

Further information may be obtained from my report to the New South Wales Government, July, 1886.

EDWARD STANLEY, F.R.C.V.S., London,  
Government Veterinary Surgeon, N.S.W.

#### APPENDIX D.

Department of Mines, Stock Branch, Sydney, 24 July, 1889.

Sir,

#### ANTHRAX IN CATTLE.

I have the honor to report having examined the diseased cattle in the district of Young, just across Cowra bridge, on the travelling stock reserve; they were the property of Mr. R. Hassall, store cattle, composed of cows and heifers, in good condition.

He started 355 from Mudgee, *via* Wellington and Molong; when about 10 miles on the road to Canowindra sickness broke out and cattle began to die, this continued to Cowra, where I saw several ill and dead; forty-three deaths had then occurred.

Riding

Riding through the cattle the following symptoms were observed:—Erect hair, empty stomachs, wild expression of eyes; in several cases well marked swollen patches could be seen, in one a thigh or shoulder, in others on the neck, rump, or on the back or ribs; they walk stiffly, often lame; traces of blood stains were on the tail and buttocks, blood was mixed with the black liquid dung.

The urine was seldom altered in colour; now and then blood trickled from the nostrils. These symptoms precede death for two or three days.

This is anthrax, the form known to Veterinarians as blackleg or charbon symptomatique.

A dozen or so lay dead on the Cowra reserve. I selected for examination three animals, recently dead, and found in each the typical pathological lesions of the disease, namely: Extensive patches of black bloody and yellow gelatinous effusions in various parts of the body, and also black bloody discolourations on some of the viscera, chiefly the rectum and colon; the serous membranes of the heart and liver were extensively infiltrated with black blood; the peritoneum had numerous patches of congested vessels, and the mesenteric membrane was thickened by a gelatinous fluid. The spleens were pale and small, in one the covering was distinctly congested, the lungs and kidneys were healthy in each case.

This is identically the same disease that killed so many cattle near Dubbo, in 1887.

In consequence of its fatal character curative treatment is almost useless, therefore preventive measures are advised.

In Europe this is done by inoculation, with a cultured or prepared virus from a diseased animal, but such virus is not obtainable in this Colony. Move the cattle from contaminated places on to fresh pasture, and rigorously enforce cremation of every carcass (it is dangerous to remove the skins). This is all that can be done with travelling stock. For cattle that are exposed to the disease and can be handled, I advise a few doses of saline medicine with the insertion of a medicated seton in the dew-lap.

I have, &c.,

EDWARD STANLEY, F.R.C.V.S.,  
Government Veterinarian.

A. Bruce, Esq.,  
Chief Inspector of Stock.

#### APPENDIX E.

The following lots of sheep, bred by the several New South Wales, Queensland, and Tasmanian owners were disposed of at the annual stud sales held in July, 1889.

Name of Breeder.	Address.	Number of Rams.	Number of Ewes.	Total.	
				Rams.	Ewes.
<i>Sold by Messrs. Brunner and Wolfe, on account of</i>					
TASMANIA.					
Messrs. Wm. Gibson and Son .....	Seone .....	434	24	.....	.....
Thos. Gibson, Esq. ....	Esk Vale .....	72	20	.....	.....
Robt. Taylor, Esq. ....	Valley Field. ....	45	.....	.....	.....
Robt. Viney, Esq. ....	Fernhill, Lymington .....	21	18	.....	.....
C. B. Grubb, Esq. ....	Strathroy .....	69	.....	.....	.....
H. Gatenby, Esq. ....	Rhodes .....	184	.....	.....	.....
A. M. McKinnon, Esq. ....	Mountford .....	36	.....	.....	.....
B. Archer, Esq. ....	Woodside, Cressy... ..	46	.....	.....	.....
F. W. Grubb, Esq. ....	Benges .....	43	.....	.....	.....
Q. F. Thirkell, Esq. ....	Darlington Park, Cressy .....	2	20	.....	.....
F. E. Lawrence, Esq. ....	Tasmania .....	16	.....	.....	.....
C. A. Parker, Esq. ....	Selma Conara .....	32	.....	.....	.....
R. Kermodie, Esq. ....	Mona Vale .....	84	18	.....	.....
D. J. White Church, Esq. ....	Middle Park, Antill Ponds .....	25	.....	.....	.....
J. F. Regney .....	Bona Vista .....	16	.....	.....	.....
Jas. Viney .....	Westwood .....	2	.....	.....	.....
J. W. Brumby, Esq. ....	Tasmania .....	30	.....	1,157	100

*Sold by Messrs. Goldsbrough, Mort, & Co. (Limited), on account of*

NEW SOUTH WALES.					
A. L. Faithful, Esq. ....	Springfield, Goulburn .....	9	.....	.....	.....
Thos. Armstrong, Esq., Executors late ..	Noorong, Deniliquin .....	14	.....	.....	.....
George Bruce, Esq. ....	Loombah, Molong .....	16	.....	.....	.....
B. K. Crace, Esq. ....	Gungahleen, Gungahlerra .....	5	.....	44	.....
QUEENSLAND.					
Messrs. G. Clark & Co. ....	East Tulgai, London .....	8	.....	.....	.....
Messrs. Marshall & Slade .....	Glengallan .....	22	4	.....	.....
Messrs. Hodgson & Ramsay .....	Eton Vale .....	4	.....	34	4
TASMANIA.					
Messrs. A. and G. L. Finlay .....	Douglas Park, Campbelltown .....	60	8	.....	.....
Jas. Gibson, Esq. ....	Bellevue, Epping .....	220	10	.....	.....
David Taylor, Esq. ....	St. Johnston, Campbelltown .....	85	9	.....	.....
W. H. Gibson, Esq. ....	Fairfield, Epping .....	118	18	.....	.....
T. Parramore, Esq. ....	Beaufront, Ross .....	128	.....	.....	.....
G. Parramore, Esq. ....	Wetmore, Ross .....	79	.....	.....	.....
J. B. Gibson, Esq. ....	Perth .....	56	10	.....	.....
G. W. Keach, Esq. ....	Chiswick, Ross .....	58	.....	.....	.....
Chas. Field, Esq. ....	Woodfield, Cressy .....	52	15	.....	.....
Wm. Gatenby, Esq. ....	Woodburn, Cressy .....	40	12	.....	.....
W. H. Bennett, Esq. ....	Bloomfield, Ross .....	80	10	.....	.....
Percy W. Archer, Esq. ....	Panshanger, Longford .....	38	11	.....	.....
D. McKinnon, Esq. ....	Dalnass, Erandale .....	31	.....	.....	.....
Jas. Cox, Esq. ....	Clarendon, Erandale .....	6	.....	.....	.....
E. Dowling, Esq. ....	Quorn Hall, Campbelltown .....	33	16	.....	.....

APPENDIX E—continued.

Name of Breeder.	Address.	Number of Rams.	Number of Ewes.	Total.	
				Rams.	Ewes.
<i>TASMANIA—continued.</i>					
H. S. Smith, Esq.	Harland Rise, Ervendale	3			
Thos. Gatenby, Esq.	Pisa, Lake River	68			
W. A. Gatenby, Esq.	Glasslough, Epping	42			
Arthur Gatenby, Esq.	Lemon Springs, Oaklands	20	6		
W. H. Ralston, Esq.	Woolmer's, Longford	34	16		
R. C. Gatenby, Esq.	Stewarton, Epping	15			
G. A. Jones, Esq.	Moorville	10	8		
Thos. Riggall, Esq.	Fomercotes, Ross	53	8		
R. J. Jones, Esq.	Biccarton, Campbelltown	22			
H. Scott Hewitt, Esq.	Tingal	22			
Messrs. Falkiner Bros.	Wickford	6			
Thos. G. Bisdee, Esq.	Sandhill, Jericho	10			
J. L. Smith, Esq.	Cambock, Ervendale	30			
Norman Gibson, Esq.	Tasmania	5		1,433	157
<i>Sold by Messrs Griffiths and Weaver on account of</i>					
<b>NEW SOUTH WALES.</b>					
Messrs. F. and A. Cox	Wallinga, Mudgee	4			
Messrs. R. and E. Rouse			8		
G. Rouse, Exors. of	Bragambil	15	12		
B. Haydon, Esq.	Murrurundi	2			
H. C. White, Esq.	Harilah, Mudgee	25			
James Lee, Esq.	Larras Lake, Molong	41			
J. D. Cox, Esq.	Cullenbone, Mudgee	13			
J. L. Suckling, Esq.	Barsham, Blandford	5		105	20
Total				2,773	281

APPENDIX F 1.

STATEMENT of the Operations of the Pastures and Stock Protection Boards during the year 1889.

	Amount of Assessment collected.			Amount Expended.	Kangaroo	Wallabies	Native Dogs.	Paddamellous.	Hares.	Kangaroo Rats.	Bandicoots.	Hawks	Wal-laroe.	Opos-ums.	Crows.	Emus.	Bil-bees.	Pigs.		
	£	s	d.																	
Albury	852	15	11	1,012	8	0	1,749		1	356	10,647	7,970								
Armidale	1,769	10	7	1,889	16	11		42,249	666											
Bathurst	80	18	0	877	17	11	3,946		129											
Berrima	927	13	5	1,509	10	10	34,621		162	25,054										
Bombata	426	10	6	324	9	7	17		98	1,478										
Bourke	930	14	3	1,082	6	11	21,128		148			87						242		
Braunwood	260	11	10	360	4	4		20,000	90	244										
Brewarrina	157	4	6	136	17	6														
Broulee				394	1	4	6	2,406	200		910	541	1,473							
Campanbar	867	1	1	471	13	0	14,550		50					9,394						
Carcoar	934	0	9	1,086	6	4	500	16,071	12	60,212										
Casino				68	2	11	941		207	72										
Cobar	016	13	3	1,216	13	11	36,468		441	36										
Condobolin	1,849	16	10	2,044	13	3	40,314		390	127						1,211				
Cooma	208	6	6	203	12	9	10		20											
Coonabarabran	877	13	11	939	10	0		16,680				40								
Coonamble	801	1	0	1,037	7	8	20,376		55											
Corowa	914	17	1	404	12	2	2,992		35	446										
Deniliquin	369	19	6	980	7	9	4,943			1,467	4,316	4,448		40,210	3,710		81	2,376		
Dubbo	463	5	0	901	2	0	70,911													
Eleon	193	6	6	174	10	11	838		151											
Forbes				950	8	0	18,960		412	100										
Glen Innes				821	13	10		5,478	152	4,584										
Goulburn	1,841	7	0	2,104	5	8		14,447	617											
Grafton				124	4	11	121	91,934	20	6,442										
Gundagai	2,426	1	7	3,254	3	9	147	487	187		78,741									
Hay	132	2	0	126	12	9	305	8,513	77		10,901									
Hillston	135	0	0	285	18	0	6,228		68	157										
Hume	691	17	0	959	14	4			225	129										
Ivanhoe	447	18	6	508	9	6	0,620		66	212										
Klarna	231	0	0	40	5	8			12	45										
Maitland				190	0	5	80	3,120	240											
Menindie	702	0	6	1,212	4	1			1,246											
Merrima	115	4	0	47	3	2														
Molong	20	0	4	467	14	10	35,732		288	81										
Moree	778	2	4	1,231	5	10	37	41,374	39											
Mudgee	767	0	8	1,100	7	3			69	2,180										
Murrurundi	642	14	7	1,039	3	1	7,728		104	37,393										
Narrandera	867	17	10	721	16	0	5,586		82	15,102										
Narrabri	287	7	9	1,746	8	3			65	3,880										
Pictou	87	12	0	149	12	1	96		58,431	135						1,338	124			
Pilliga	129	2	6	607	2	9	10,327		2,704	82								824		
Port Macquarie	188	12	11	59	13	9	117		1,204	66										
Port Stephens				190	9	5		1,600	400	300										
Queanbeyan				44	3	8	3,013		10,872	37										
Singleton	1,186	13	11	925	6	4		20,332	427				39							
Sydney	188	16	7	137	3	10			9	8,070										
Tamworth	1,638	18	5	1,890	7	6	49,310		58,389	411										
Tenterfield	1,008	4	6	1,617	6	9		35,426	322				70					4,488		
Urnna	66	1	11	473	15	0	6,043													
Wagga Wagga	1,062	12	4	1,810	10	7	18,735		468	61	1,151									
Walgett	248	7	9	356	11	3	1,133		10	7			94							
Wannaring	1,218	1	2	1,988	8	0	23,170		156	45			20							
Warialda	2,364	7	10	2,240	0	6	19,628		392									2,062		
Wentworth	199	17	2	1,335	7	4														
Wilcannia	95	16	11	834	5	10	582		447											
Windsor	217	13	9	214	13	4			390									8		
Yass	425	13	0	320	7	1	189		900	17										
Young	707	6	11	1,430	14	11	9,890		7,478	22										
Totals	33,257	0	3	50,525	14	3	495,673	642,782	9,142	5,670	329,683	86,527	1,473	3,264	29	49,604	4,139	11,283	124	9,700

## APPENDIX F 2.

STATEMENT of the estimated number of noxious animals in the Colony at 31st December in the years 1880 to 1889 inclusive; the number of the different kinds of noxious animals killed during these years; the amount of assessment collected; the amount of Government subsidy received, and the total expenditure for each of these years.

Year.	Kangaroos.		Wallabies.		Native Dogs.		Rabbits.		Hares.		Wild Pigs.		Amount of Assessment collected.	Amount of Government subsidy paid.	Amount of Expenditure.
	Estimated number.	Number killed.													
1880	6,484,000	.....	3,317,000	.....	30,000	.....	702300	.....	.....	.....	.....	.....	£ s. d.	£ s. d.	£ s. d.
1881	6,057,000	581,753	4,242,200	43,724	30,500	2,250	5092000	3,999	.....	.....	.....	.....	17,648 19 10	749 11 2	15,517 5 4
1882	4,833,000	1,452,320	3,623,000	347,342	30,800	6,980	2500000	188,257	.....	.....	.....	.....	45,772 12 8	25,299 19 2	61,191 14 3
1883	3,822,200	750,340	2,916,500	330,100	24,600	7,105	.....	.....	.....	.....	.....	.....	32,731 14 2	16,331 19 6	53,132 7 1
1884	3,007,000	1,403,233	2,765,700	478,609	23,300	7,336	.....	.....	.....	.....	.....	.....	48,069 15 8	21,604 10 8	69,121 0 0
1885	2,500,000	855,676	2,300,000	506,372	20,000	8,474	.....	.....	.....	.....	.....	.....	61,754 15 4	23,753 3 8	64,672 8 2
1886	2,226,700	1,106,478	2,952,000	594,603	33,600	3,560	.....	.....	301,500	28,623	2,400	562	41,585 0 0	16,168 3 0	67,783 0 6
1887	1,881,600	476,438	2,742,500	328,088	32,700	7,739	.....	.....	429,600	56,628	2,400	661	32,651 13 8	9,589 9 5	37,354 11 1
1888	1,338,880	667,436	3,184,700	653,285	31,405	9,619	.....	.....	2,044,430	176,732	3,480	12,041	25,474 2 10	9,117 7 0	62,121 9 6
1889	1,036,717	495,673	3,064,061	642,782	25,333	9,142	.....	.....	2,744,810	329,088	3,354	9,700	33,257 0 3	6,297 7 3	50,625 14 3
....	7,790,362	.....	3,930,415	.....	68,295	.....	192,296	.....	507,544	.....	23,889	.....	338,995 14 6	123,063 11 2	469,419 16 2

N.B.—The whole of the accounts of expenditure for 1889 are not yet to hand.

## APPENDIX G.

## THE CHILLED MEAT TRADE.

It is now some sixteen or eighteen years since the late Mr. T. S. Mort, to whom the Australian Colonies and New Zealand are indebted for the establishment of the frozen meat trade, endeavoured to form a fresh meat depôt at Lithgow, and although like a great many other public benefactors, he was himself unsuccessful in that enterprise, the trade in chilled meat has, in America, not only become firmly established, but is there fast supplanting the live stock trade, as there cannot be a shadow of a doubt it will before long do in Australia and throughout the civilized world.

So much for the late Mr. Mort's foresight, enterprise, and patriotism. His theory was that with the aid of artificial cold properly applied there need be no more waste, and although we have to lament that he has not lived to see the success of his proposals, their correctness and practicability are fully exemplified in the success of the chilled meat trade, but more especially in that of the frozen meat export from the Australian Colonies, New Zealand, and South America.

It did not take very much consideration after all that Mr. Mort did and said on this subject to see that the principles which he advocated were thoroughly sound, and adopting his views I have for the last ten or twelve years constantly advocated the establishment of a fresh or chilled meat trade, both on account of the numerous evils which attend the existing live stock trade and the advantages which must accrue from the change. These I have previously stated, but I think it will be of service to recapitulate them again.

## I.—THE EVILS OF THE LIVE STOCK TRADE.

1. *The suffering and cruelty inflicted on the Stock.*

Leaving entirely out of view the hardship which stock frequently undergo, even in the outlying districts (where as a rule the feed is comparatively good), in travelling to the nearest railway station, and following them from the time they are yarded there till they are killed at the abattoirs, the treatment to which they are now subjected in reaching Sydney from an outlying station like Bourke is cruel and wasteful in the extreme, for they are between seven and eight days without any food whatever, made up as follows:—

In yarding, trucking, and despatching, say, from Bourke, 10 hours; on the train to Homebush, unloading there and yarding, say, 40 hours; lotting, selling, and removal to paddock at Leichhardt, 15 hours; in waiting paddocks there (as a rule the cattle purchased at one sale remain in these paddocks until after next sale day and a fresh lot have been purchased before they are sent to the abattoirs), say, 84 hours; at the abattoirs waiting slaughter, say, 24 hours. Total, 173 hours.

That is 173 hours, or 7 days 5 hours without any food whatever, and sometimes without any water.

From this it will be seen that a considerable portion of some 1,500 head of cattle and 15,000 sheep are week after week subjected to the terrible torture of five, six, seven, and even sometimes more days starvation till the cattle are to be seen at the abattoirs with their heads hanging down, their bellies tucked up to their backs, and looking utterly miserable and wretched.

Nor is this all, the poor animals in trucking are terrified, beaten, and bruised, and when in the truck they push and horn each other, the stopping and shunting often throw them down, and some of them are not unfrequently trampled to death. The losses of cattle on the train, and the bruises on the ribs, hips, and rumps (so noticeable on their bodies when killed), show conclusively the cruelty now inflicted on the animals under the live stock trade, and with the terrible starvation which that system entails, cries aloud for a thorough change.

## II.—THE WASTE AND DETERIORATION OF THE MEAT.

1. *The shrinkage in weight.*

This alone is a very serious matter, for if quiet, fat cattle in England carefully driven short distances, and fed two or three times a day, waste, as it has been proved they do, on an average over 8 lbs. in twenty-four hours, it is certain that the loss in weight on our comparatively wild fat bush cattle must, in trucking

trucking on the train, and till they reach the killing pen—subjected as they are to the barbarous treatment and starvation from which they now suffer—waste nearly double that amount, and that the shrinkage in their case will amount to 12 or 14 lb. a day, which again for seven or eight days would on an average be at least 100 lb. per bullock, *i.e.*, one-eighth of the whole weight, and the very best of the meat.

### III.—THE DETERIORATION IN THE QUALITY OF THE MEAT.

It is notorious that the meat supplied in Sydney is, as a rule, inferior; no doubt a good deal of it may in favourable seasons like the present look well, and in some cases where the cattle have not had far to come to market, may possess a good deal of the flavour and nutrition so noticeable in first class country killed meat. But a large portion of the supply is comparatively tough, and void of flavour, and in bad and even only hard seasons, the beef supplied to the people of Sydney and suburbs is inferior, tough, and flavourless. It is, in fact, after the cruelty and starvation to which the stock are subjected, simply hard well-trained muscle with all the prime and most nutritious part of the meat gone, which not only renders it dear and innutritious to the consumer, but so far at least as the beef is concerned, utterly unfit for export to London; while as regards the frozen mutton now sent from Sydney to London—it on an average brings  $\frac{1}{4}$ d. per lb. less than the New Zealand.

### IV.—THE REMEDY IS THE ESTABLISHMENT OF A FRESH OR CHILLED MEAT TRADE.

#### 1. *How conducted.*

The remedy for this unsatisfactory state of things is now exceedingly simple. It lies in the improvement, or more correctly speaking, the preservation of the quality of our meat by artificial cold, which can be obtained at a comparatively trifling cost. On or near its own pastures, our meat is as good as any in the world; and we have only to convey it from the pastures to market without deterioration to have an article which is in every way fit for local consumption, and which we can with confidence offer in any market, either in a fresh, frozen, chilled, tinned, or salted state, and obtain a paying price for it. To effect this we would have—

- (1.) To kill the stock at the main centres of the stock traffic on the railways, as near the pastures on which they are fattened as possible; or, if they have travelled any distance, to keep them in paddocks near these centres where they can get plenty of good grass and water for six, eight, or even more days, till they are well rested and cooled down, and thoroughly free from fever.
- (2.) To send the meat, with as little handling as possible, to a chilling-room cooled down to 36 degs. Fahr. in winter and moderately cool weather; and in the Summer time down to 33 degs. (just above freezing), in order to have a good surplus of cold to meet the loss which takes place in the transit when the weather is warm, and thus do away as far as possible, with the necessity for providing ice by the way. The meat for consumption in Sydney could in this way afford to lose, say 30 degs. (the truck would then only be 53 degs.), and arrive perfectly safe. The cost of chilling would in the height of Summer be, say, 2s. 6d. per body of beef from Bourke or Hay, with the temperature at 100 degs. in the shade.
- (3.) To put it late in the day into non-conducting meat trucks (which would also be cooled down to the temperature of the meat, and send it by train at a speed of at least 20 miles an hour to market; and
- (4.) To run the truck, on its reaching Melbourne or Sydney, into a meat market provided with the necessary appliances for cooling and keeping the meat, and there, according to the state of the market, either dispose of it to the retail butchers, send it to the chill-room (where it can be kept perfectly sound for a fortnight) to wait a better market, or prepare it for exportation as frozen, chilled, tinned, or salted meat.

A proper chilled room to protect the meat should it not be sold on arrival is a *sine qua non*. It was the want of this that was one of the principal causes of the failure of the Orange Company to establish a fresh meat trade, for as the company had no means of protecting the meat when not sold, they had to take the price offered by the retail butchers, or allow it to stink. They were, in fact, largely at the mercy of the trade; whereas with a proper chill-room the salesman could put the meat in and wait a fortnight if necessary for better prices, to say nothing of the other outlets secured by a proper system of artificial cold.

#### 2. *The Advantages of a Fresh Meat Trade.*

Advantages which can be claimed for this trade—

- (1.) The great suffering and terrible starvation to which our fat stock are now subjected would cease.
- (2.) The risk and inconvenience from which the people in the suburbs now suffer, through the driving of the stock, would be at an end.
- (3.) There would then be very little slaughtering near Melbourne or Sydney, and the nuisance which abattoirs near these cities now occasion would cease.
- (4.) The owner would receive full value for stock, as he would be paid for every pound the carcass weighs, for the loose fat, for the hide or skin, and other saleable offal; and as his returns would in this way be far better, he would be able to supply the retail butcher with meat of a very superior quality at considerably less cost than the wholesale butcher now does.
- (5.) The appearance and quality, as well as the flavour and nutriment, of the meat will be thoroughly preserved; and after it is taken to the shops in the city, it will keep from thirty-six to forty-eight hours longer than abattoir-killed meat now will.
- (6.) The conveyance of the fat stock to market in the carcass will cost their owner considerably less than sending them alive; for a great deal of space is, so to speak, wasted in a truck in which live stock are conveyed; and thirteen bodies of cooled well-set beef could be put into the same space as nine live cattle, while the charge for the truck should in each case cost the same; or rather the meat ought to cost considerably less, as the truck in which it is carried can be loaded back with general merchandise, which the live stock truck cannot be.

(7.)

- (7.) The making the trade a fresh meat one would tend to prevent the spread of contagious and infectious diseases among stock, as it would do away with the necessity for bringing large numbers of stock (as the live trade does) together, and on the same ground, and thus save our stock-owners from the recurrence of the heavy losses they now sustain, from the diseases which are spread by fat stock going to market, and at the same time give the consumer cheaper, better, and healthier meat.
- (8.) Companies would be formed, at the different centres of the stock traffic, to kill the stock, chill the meat, put it in the refrigerating cars, and charge them when necessary with ice, on reasonable terms, while the meat would be consigned to the owners' agents, who would have stalls in the meat market; and in this way the producer would be able to offer his meat in an open well-regulated market, which would be within easy reach of the retail butchers as a class; and they again would be able to get an ample supply of prime well-set meat day by day as required.
- (9.) The meat would be thoroughly fit for export, which it now really is not; for our beef, and the greater part of our mutton, now, through wasting and deterioration, only rank as inferior in the London market, which practically prevents our sending it there; and unless we have this outlet, we will have glutted markets, low prices, depreciation in pastoral property, and hard times for owners. This advantage is, therefore, the most important of all, so far as owners are concerned.
- (10.) With a steady supply of artificial cold at a moderate cost (which will then be available) a salt beef trade will be established, and the extraordinary anomaly will no longer exist—that British and other shipping visiting the Australian ports should bring a sufficient supply of American salt beef to take them back again—while the beef in Australia on its own pastures is far better and cheaper than in America; the explanation being, that the use of cold and care in salting have enabled the Americans to obtain a monopoly of this most extensive and profitable business.

Nor would these be all the advantages which would be attained by the change. With the completion of the spacious meat market on the railway line at Darling Harbour, now being fitted up with salesmen's stalls and chill-room, we will very shortly see extensive Freezing, Tinning, and Salting Works erected in the vicinity of the market (they would create no nuisance whatever), and in this way the whole of the meat, and every part of it, will be turned to the best possible account, and the heavy losses which have been entailed on owners in by-past years through glutted markets will, to a very large extent, be avoided; for the meat thus killed up country will, as a rule, be of the primest quality and fit for any market in the world, and when the requirements of the Sydney trade are met the balance will, as the case may be, either be sold for freezing and shipment to London, or for tinning or salting, and the market cleared. If our fat stock trade were conducted this way, and due care exercised in its management, Sydney, with its large ocean-going steamers, cheap coal, and the railways running to Hay, Bourke, and Tenterfield, ought to do by far the largest meat export trade of any port in the Australian Colonies.

#### V.—SUCCESS OF THE FRESH MEAT TRADE.

##### 1. In America.

Mr. Gilderoy W. Griffin, Consul for the United States, who has done so much to make our resources known there, and to promote trade between the Colonies and America, kindly obtained from the Commissioner of Agriculture, Washington, an exhaustive and very valuable report on the fresh meat trade in the United States, which showed that the fat stock trade in America, in spite of the powerful vested interests which exist there, was fast becoming a fresh meat one. In the short space of six years the volume of the fresh meat trade from the Western to the Eastern States of America, which only began in 1880, had increased with great rapidity, and has by this time overtaken and passed that of the live stock trade; and the Commissioner of Agriculture in reply to the question whether the fresh meat trade is likely to increase, very tersely observed that, "It must continue to increase unless there should be a revolution in trade affairs, and in the desire of the people to obtain the best meat for the smallest outlay,"—a contingency which it would be simply absurd to suppose would ever arise.

During the five years, from 1881 to 1885, the growth of the trade in dressed meat was as follows:—From 1881 to 1882 the increase was 42·5 per cent. over the trade of 1880; in 1882 the gain was 52·3 per cent.; in 1883 it was 127·5 per cent.; in 1884 it was only 23·6 per cent.; and in 1885 it was only 25·2 per cent.

In 1888-9, under the heading of Dead Meat Imports, and Live Stock Imports, a writer in the *Mark Lane Express*, of the 6th January last, in alluding to the chilled meat trade, says:—"The dressed beef business has driven the (carcass) butcher out, and is the coming method of handling beef in America."

The chief centres from which dressed beef is distributed there, are—Chicago, Omaha, Kansas City, and St. Louis; and none of these centres are less than 1,000 miles from Boston and New York, while some of them are as much as 1,500 miles; yet this writer tells us that chilled meat kept at an average temperature of 36° Fah. is regularly sent by train from these places to Boston or New York, and from there across the Atlantic to London, Liverpool, and Glasgow, where it is sold to the retail butchers, to be sent out by them to their customers who cannot tell it from Scotch or English beef.

On this point a writer in the *Daily News* (London), of the 21st December last, says:—"From the main slaughter-houses in America the carcasses are run off by tramways into the coolers, where the temperature stands at 36 degrees, and from these coolers they are run out to the loading platforms, cut into quarters, and sent off in refrigerating cars and vessels. In about a fortnight's time the meat thus hurried off from Chicago may rattle into the Smithfield market looking as fresh and appetizing as the best Scotch beef, and all the tenderer and nicer it is said for the keeping."

Further on again this writer says:—"There are enormous numbers of us able to regale ourselves on the roast beef of old England brought straight from Chicago."

In support of the statement that the chilled meat trade is fast driving out the live stock, the writer already referred to in the *Mark Lane Express*, gives the returns of the export of fresh meat from America for the year 1887-8, and for eleven months of the year 1888-9 (the December returns not being received), and they completely confirm this assertion.

They are as follows :—

							lb.
In the year 1887-8 the export was	...	...	...	...	...	...	90,816,426
„ „ 1888-9 „ „	...	...	...	...	...	...	149,793,485
<i>or</i>							bodies.
In the year 1887-8 the export was	...	...	...	...	...	...	106,280
„ „ 1888-9 „ „	...	...	...	...	...	...	187,241
<i>or weekly,</i>							
In the year 1887-8 the export was	...	...	...	...	...	...	2,042
„ „ 1888-9 „ „	...	...	...	...	...	...	3,677

Showing the American fresh meat trade had in one year increased 65 per cent., and that there were now an average of 3,677 bodies of chilled meat sent from America to Europe every week, none of which had been conveyed in refrigerating trucks on its way to the seaboard a less distance than 1,000 miles, and some of it 1,500 miles; and in no case could the time, counting from the time the cattle were slaughtered in America till the meat was offered by the retail butcher to his customers be less than ten days, and more frequently twelve or fourteen.

How utterly ridiculous, therefore, it is to assert, as some of those connected with the live stock trade here do, that we cannot kill our fat stock at Bourke, or Hay, and send the meat down safely for sale in Sydney, a journey occupying only some twenty-two to twenty-six hours.

## 2. *In Australia, 1889-90.*

Notwithstanding that the evidence which is here adduced of the success of the fresh meat trade in America is overwhelming, and ought to convince the most sceptical, it is still asserted by some in the trade that, although that system has proved to be a success in America, it may not answer in Australia. Fortunately, we are not dependent on American experience; for, through the praiseworthy energy and enterprise of Mr. Robert Hudson, of the firm of Messrs. Hudson Brothers, of Sydney and Melbourne, the reports of the success of the fresh meat trade in America have been fully confirmed by the experimental trips which he has made with his refrigerating car from Narrandera and Narrabri to Sydney, both of which were thoroughly successful, not only as regards the condition of the meat on its arrival in Sydney, but also as regards the expense and the owner's net returns. These, however, are not all the advantages. Through the excellent quality of the meat, with all the flavour and nutriment in it, it would, when these come to be more generally known, fetch top prices both in the Sydney market as well as in London, when frozen and exported there.

## VI.—LIVE STOCK AND FRESH MEAT TRADE CONTRASTED.

### 1. *As regards the Stock.*

*The live stock trade.*—If the stock have to be conveyed any distance to market the trade entails great cruelty and seven or eight days starvation.

*Under the fresh meat trade.*—All this cruelty and barbarity is avoided. A great deal of the stock would have only short distances to travel to the killing and chilling depôts, and where they had to come from any distance they could be put in some of the paddocks which would be provided in the neighbourhood of the depôts till the fever induced by the journey had left them.

Every feeling of humanity cries aloud for the change from live stock to a fresh meat trade.

### 2. *As regards the Stock-owners.*

This is a matter of pounds, shillings, and pence, and as such the contrast will be best shown in figures.

With that view I have prepared a statement of a suppose case, where two fat bullocks of the same weight at Bourke are sent to Sydney; one of them is sent alive and sold at Homebush, and the other killed and chilled at Bourke, and the carcass sent with the profitable offal by refrigerating car to the Meat Market Sydney; and it will be seen that the advantages are very much in favour of the chilled meat trade,—the statement showing that there is a saving under the system of at least 10s. per bullock to the owner, while the indirect advantages to the stock-owner through the superior quality of the meat and the price it will bring in the London Market if frozen and shipped are of great moment to him.

### *As regards the Railway Commissioners.*

The direct advantages which would accrue to the Railway Department from the change by the adoption of a fresh meat trade would be a considerable saving in the loss now sustained in having to haul the sheep and a good many of the cattle trucks up country empty. This saving is estimated in the statement referred to at from 3s. to 4s. per bullock or say 30s. per truck per trip.

Then the change would be of considerable benefit to the Department in getting rid of the responsibility and trouble which the live stock trade entails.



*Item 10.*—The price of ice which depends on the cost of coal is calculated at 20s. a ton, at Dubbo, and 30s. at Bourke, or at an average of say 26s., which would make the cost of keeping each body cool by the way—something less than 2s. each; and when it is considered that in the Winter time, and running at night when little or no ice will be required,—it will be seen that the allowance for the cost of this item is a very ample if not an excessive one.

*Item 11.*—It may be that the estimates and calculations in the contrast here submitted are in some respect incorrect, and that the change from a live stock to a chilled meat trade may not be so advantageous as I suppose to the Railway Department; but I would in the interest of stock-owners and of the Colony at large, urge, for the many potent reasons I have advanced, that the Railway Commissioners should assist in the establishment of this new trade, and that they should not at first at least, until the trade is on a firm footing, ask to make it pay better than the live stock trade now does, seeing that the chilled meat trade will have many powerful vested interests to contend with, while there is no doubt but when it is established the export of frozen, tinned, and salted meat from Sydney will far exceed that from any other Australian port, and it must all be conveyed to Sydney by rail.

#### VII.—KILLING AND CHILLING DEPÔTS.

##### 1. *Who should erect Killing and Chilling Depôts.*

These depôts will as a rule be, it is believed, constructed by joint stock companies formed to a considerable extent by trades people in the towns near which the depôts are to be established, but principally, by the stock-owners in the areas from which the stock would be brought to the depôts for slaughter and chilling.

These companies again would act as agents for the stock-owners and dealers—would take delivery of the stock and kill and chill them,—and forward the carcasses on owners account to market in the refrigerating cars, for which they would supply the ice when required, charging a reasonable amount for their services, which would to some extent at least be paid for in offal.

##### 2. *Cost of Killing and Chilling Depôt and Plant.*

After consulting one of the leading mechanical engineers in Sydney, who has given this matter special study both here and in America, I understand that the cost of the necessary buildings and of a complete chilling and ice making plant, together with yards, slaughter-houses, appurtenances, land, &c., for an establishment capable of dealing with, say, 120 cattle, or 1,200 sheep a day, and supply the necessary ice for transit, would be from £11,000 to £12,000.

##### 3. *Working Expenses of Depôt.*

The working expenses again of such a depôt, including interest on cost of plant, wages, coal (at from 30s. to 40s. per ton), water, ammonia, sundries, &c., would, I understand, bring the cost of chilling a body of beef, weighing, say, 800 lb., to 2s., or about  $\frac{1}{3}$  of a farthing per lb.

#### VIII.—WHO SHOULD PROVIDE THE REFRIGERATING CARS.

While, again, it is taken for granted that the tradespeople in the more important towns will co-operate with stock-owners in the surrounding country in the formation of companies for the erection of killing and chilling depôts—it is here supposed that the Railway Commissioners will find the necessary refrigerating cars and carry the meat at a reasonable rate—the killing and chilling companies not only providing the cold for chilling the meat as slaughtered, but also the ice for keeping the cars cool by the way.

An endeavour was made to form a Metropolitan Company for the purpose of renting the meat market and chill-room at Darling Harbour from the Railway Commissioners, and, where necessary, assisting the up-country killing and chilling companies in the construction and working of their depôts; and the promoters of the Metropolitan Company proposed that they should find the refrigerating cars, that the cars should be hauled by the railway at a stated rate per ton, and that the Commissioners should have the use of the cars for back loading.

It will, I think, however, be seen that there are several serious objections to this arrangement, and among others the following may be mentioned:—

- (1.) It would take a great deal of capital to provide the necessary cars; and shortness of funds is one of the principal drawbacks to the formation of the proposed Metropolitan Company.
- (2.) The question of who should make the repairs to the cars would be a difficult one to settle, and it would, I am afraid, be at times impossible to say who should do so.
- (3.) The Commissioners would be able, besides conveying the fresh meat, to make much more use of the refrigerating cars than the company in carrying milk, dairy produce, fruit, and game to Sydney, and fish and other perishable articles up country.

It would seem, therefore, that the best arrangement would be for the Commissioners to find the refrigerating cars; and if a killing and chilling depôt were erected, say, at Narrandera, by a company, there would be little or no risk in the Commissioners providing the necessary cars for the traffic; for, in the first place, the experience of America and other parts of the world all goes to show that the fresh meat trade, if carried out with ordinary care and energy, must be a success; and in the second place, supposing the fresh meat trade proved a failure, all the cars which would be required for the traffic from this centre, and even from a good many other centres, could be utilized by the Department, without ice, in carrying meat, milk, game, fish, and other perishable articles, to and from such railway stations as Orange, Bathurst, Cooma, and Goulburn. Or even if that course were necessary (which it is not reasonable to suppose it ever could be), it would not cost the Department very much to alter the refrigerating into ordinary cars.

At any rate, the risk to the Railway Department (supposing the Commissioners provide the cars) in changing from a live stock to a fresh meat trade, would be infinitely less than that of the companies which erected killing and chilling depôts; while it is plain that, until this trade is established, the meat market at Darling Harbour, which is said to have cost the Department some £80,000, cannot be utilized, and the Commissioners will have to submit to the inconvenience and scanty net returns which they complain the existing live stock traffic entails on the Department.

## APPENDIX H.

## AUSTRALIAN STOCK CONFERENCE.

*Conference of Chief Inspectors of Stock, Veterinary Surgeons, and Stock Breeders of the Australasian Colonies, held in Melbourne in November, 1889.*

## REPORT.

The Conference commenced its sittings on the 1st November, and concluded its labours on the 14th November.

It was called together at Melbourne by the Hon. the Premier of Tasmania, with the concurrence of the Victorian Government, with the view of assimilating the regulations in force in the colonies for the prevention of diseases in stock.

The following were the representatives of the several colonies :—

<i>New South Wales</i>	...	{ Mr. J. De V. Lamb, Stock Breeder. Mr. A. Bruce, Chief Inspector of Stock. Mr. E. Stanley, F.R.C.V.S., Government Veterinarian.
<i>Victoria</i>	... ..	{ Mr. C. M. Officer, M.L.A., Stock Breeder. Hon. J. Buchanan, M.L.C., Stock Breeder. Mr. R. Stirling, Chief Inspector of Stock.
<i>Queensland</i>	... ..	{ Mr. J. Tolson, Stock Breeder.
<i>Tasmania</i>	... ..	{ Mr. W. H. Bennett, M.H.A., Stock Breeder. Mr. T. A. Tabart, Chief Inspector of Stock. Mr. A. Park, M.R.C.V.S., Government Veterinarian.
<i>New Zealand</i>	... ..	{ Mr. C. Cowan, M.H.R., Stock Breeder. Mr. R. C. Pasley, Inspector of Sheep.
<i>South Australia</i>	... ..	{ Mr. A. D. Handyside, M.P., Stock Breeder. Mr. C. J. Valentine, Chief Inspector of Sheep.

Western Australia was unrepresented, but a letter was handed in by Mr. Valentine, which had been received by the Government of South Australia from the Government of Western Australia, saying that they would adopt any additional regulations suggested by the Conference.

The following is a copy of the circular letter, dated 3rd August, 1889, by which the Conference was called together :—

“ Sir,

Premier's Office, Hobart, 3rd August, 1889.

I have the honor to transmit herewith, for the consideration of your Government, copy of a letter addressed to me by the Chief Inspector of Stock in this Colony, suggesting that, in accordance with the terms of a resolution passed at the Australasian Stock Conference, held at Sydney in September and October, 1886, recommending triennial conferences, steps be now taken to arrange a meeting of delegates, to comprise Chief Inspectors of Stock, Government Veterinary Surgeons, and representatives of flock-owners, in Melbourne, at an early date.

I shall be glad to learn that your Government acquiesce in the proposed arrangement.

I have, &c.,

P. O. FYSH.”

All the delegates were present, with the exception of Mr. Tolson (Queensland), who, it was announced, would arrive in time for the next meeting.

The delegates were introduced to the Honorable J. L. Dow, Minister for Agriculture, by Mr. David Martin, Secretary for Agriculture.

Mr. Dow, in opening the Conference, welcomed the delegates, and expressed his conviction that the result of their deliberations would be of great importance and benefit to all the colonies.

The Minister having declared the Conference opened, both he and Mr. Martin withdrew, and Mr. C. M. Officer, M.L.A., was unanimously elected Chairman.

## RESOLUTIONS PASSED BY THE CONFERENCE.

*Preliminary.*

1. That each Colony represented have three votes.
2. That where a Colony is represented by the Chief Inspector of Stock and another delegate, the former shall have two votes.
3. That a notice of motion must be in the hands of the Chairman not later than the day preceding the proposed discussion thereof, unless the matter is considered urgent by the Conference.
4. That no member of the Conference be allowed to speak on any subject under discussion for more than 10 minutes, but that such time may be extended 5 minutes or a still further period by the indulgence of the Conference; but the mover of any motion shall have the right to reply.
5. That the Conference meet each day (Saturdays and holidays excepted) at 10 a.m., and sit until 12.30 p.m.; re-assemble at 2.30 p.m. and sit until 4.30 p.m.
6. That eight members shall constitute a quorum.
7. That the following be the subjects for discussion :—
  1. Regulations regarding the introduction of foreign animals. Foreign diseases, *i.e.*, diseases not known in Australia.
  2. Regulations regarding the introduction of Australian animals—
    - (a) By sea.
    - (b) By land.

3. Regulations regarding disease—
- |               |                                  |
|---------------|----------------------------------|
| (a) Scab,     | (g) Pleuro-pneumonia,            |
| (b) Catarrh,  | (h) Tuberculosis,                |
| (c) Fluke,    | (i) Stringhalt,                  |
| (d) Worms,    | (k) Coccidium and Actinomycosis, |
| (e) Foot-rot, | (l) Horse-mange (Queensland).    |
| (f) Anthrax,  |                                  |
4. The rabbit pest.  
 5. Chilled-meat trade.  
 6. Stud-sheep book for Australasia.  
 7. And any other subject which may be suggested and agreed to by members of the Conference.  
 8. That the term Australasian Colonies comprises the Colonies on the continent of Australia; also Tasmania and New Zealand; and that the term Foreign includes all other parts of the world.

*Animals and things prohibited.*

9. That the following foreign animals and things be prohibited :—
- (i.) Cattle and sheep from all foreign countries and colonies other than Great Britain and Ireland, unless they have been fourteen days in Great Britain or Ireland.
  - (ii.) Swine from all foreign colonies and countries.
  - (iii.) Goats, deer, antelopes, llamas, buffalo, and any other ruminants from all foreign colonies and countries, unless for a zoological society.
  - (iv.) All fodder and litter with which foreign animals have been in contact from any foreign colony or country, or from any foreign vessel.

*Introduction of foreign animals.*

10. That the following foreign animals be admitted subject to regulations framed on the resolutions of the Conference.
- (i.) Horses from any colony or country.
  - (ii.) Camels from any colony or country.
  - (iii.) Cattle and sheep from Great Britain or Ireland.
  - (iv.) Goats, deer, llamas, antelopes, buffalo, and any other ruminants from any colony or country, if intended for a zoological society.
  - (v.) Dogs from any colony or country.
11. That the following be included among the regulations under which foreign animals and things not prohibited may be admitted into any Australasian Colony :—
- (i.) That twenty-four hours' notice be given by the owner of the animals of his intention to land them.
  - (ii.) That the animals be accompanied by a declaration by the owner and certificate by the inspector or by a qualified veterinary surgeon in the district from which they start.
  - (iii.) That no animals, nor any fodder, fittings, or effects with which foreign stock have been in contact, be landed without the written permission of the inspector.
  - (iv.) That notice be given to the owner when any stock are ailing or about to be destroyed.
  - (v.) That notices be given personally, or left at the person's residence or place of business, or sent by registered letter.
  - (vi.) That four weeks' notice be given to the Chief Inspector of Stock of an owner's intention to introduce foreign stock.
  - (vii.) That all cattle and sheep exported to Australasia be shipped from the ports of London or Glasgow.
  - (viii.) That the Agents-General for the several colonies be asked to appoint one (*i.e.*, the same) registered veterinary surgeon at each port of shipment, to examine all stock intended to be exported to any of the colonies; such veterinary surgeon to give a certificate of health to accompany the animals.
  - (ix.) That animals intended to be introduced into any of the colonies, and all other animals on board the same vessel, be examined by the veterinary surgeon appointed by the colonies, and with respect to which he shall certify that they are all free from infection, and that in their case these regulations have been complied with.
  - (x.) That the skins of all animals which may have died or been slaughtered on board any foreign vessel during the voyage, and not destroyed or thrown overboard, be salted and securely packed in cases or casks, and not landed.
  - (xi.) That a declaration be obtained from the captain of the vessel as to the health of foreign stock on board on arrival in port.
  - (xii.) That all foreign animals while in any port in the colonies be securely confined and fastened up to the satisfaction of the inspector, and shall not without his sanction be touched or handled except by their attendants.
  - (xiii.) That foreign animals intended to be landed in the colonies be examined by a veterinary surgeon and an inspector of stock, who shall report to the Chief Inspector of Stock whether or not such or any other animals on board such vessels are infected.
  - (xiv.) That if foreign animals (except camels) are infected they be destroyed or disposed of, as the Minister directs.
  - (xv.) That camels found on arrival to be infected with scab shall be dressed as the Chief Inspector directs.
  - (xvi.) That if foreign animals are not prohibited, and are reported free from infection, and if the Chief Inspector be satisfied that they are not infected, they may, after being washed and disinfected when necessary, as he shall direct, be landed for quarantine on sufficient bond and guarantee.

(xvii.)

(xvii.) That all foreign animals be conveyed by water, at the owner's risk and expense, to quarantine, and remain for the terms respectively prescribed for the different kinds of animals, at their owners' risk and expense, and that they be washed, dipped, or disinfected, as the Chief Inspector of Stock shall direct.

(xviii.) That the quarantine for the several animals shall date from day of landing, and shall be as follows:—

- (a) For horses, 14 days.
- (b) For cattle (including buffalo), 60 days.
- (c) For sheep, 90 days.
- (d) For camels, 90 days.
- (e) For goats, deer, antelopes, llamas, and any other ruminants, 60 days.
- (f) For dogs, 6 months.

(xix.) That all foreign sheep landed in the colonies forthwith receive two or more dressings with tobacco and sulphur, or with lime and sulphur.

(xx.) That on the expiry of the term of quarantine prescribed for foreign animals, they be examined by a duly qualified veterinary surgeon and an inspector of stock, and released on the order of the Chief Inspector.

12. That dogs on board a vessel in any Australasian port not intended to be placed in quarantine be kept securely confined and fastened to the satisfaction of the inspector, and the owner shall give a bond that the dogs shall be so kept; but the inspector, if he deem it necessary, may place them in quarantine.

13. That dogs be quarantined in the Government quarantine grounds only.

14. That foreign stock be not transhipped without the permission in writing of an inspector, and that no foreign stock be put on board any Australasian vessel unless they have undergone quarantine and otherwise complied with the regulations referring to foreign stock.

15. That foreign stock, and the stalls and pens used by them, and the attendants' clothes and effects on board a foreign vessel in any Australasian port be disinfected as the Chief Inspector may direct.

16. That Australasian stock coming into direct or indirect contact with foreign stock, or with infected stock, be deemed infected stock.

17. That if the inspector is doubtful as to the freedom of any stock from infection, he may temporarily detain them on board ship, or in some convenient place, at the owner's expense, where they may be dressed or disinfected as the inspector directs.

#### *Interchange of Australian Animals.*

18. That no colony be deemed to be a clean colony in which scab exists or has existed within the next preceding two years, and no sheep nor sheep-skins shall be introduced except from a clean colony.

19. That no sheep shall be imported except by vessels that have not traded to any but a clean Australasian colony within the next preceding six months, nor by any vessel which shall within that period have had any sheep on board from any colony or country other than a clean Australasian colony, and the captain of the vessel shall when required make a declaration to that effect.

20. That all stock intended to be landed shall be accompanied by a declaration from the owner and a certificate by the inspector or a qualified veterinary surgeon at the port from which such stock were shipped that they are not infected, and had not during the next preceding twelve months been infected, and that they are from a clean colony.

21. That if the inspector be doubtful as to the freedom of any stock from infection, he may temporarily detain them on board ship or in some convenient place at the owners' expense, and they may be dressed or disinfected as the inspector may direct.

22. That if on examination by the inspector or a qualified veterinary surgeon and the production of the necessary declaration and certificate, the inspector considers the stock free from infection, he may allow them to land.

23. That if the stock be found to be infected they may be destroyed or otherwise disposed of, as the Minister directs, without compensation.

24. That where an outbreak of disease occurs in any colony the neighbouring colonies may, pending the expense and risk of the outbreak being definitely ascertained, at once issue a prohibition against the introduction of stock from such colony; and that the duration of the prohibition depend upon the amount of risk arising from such outbreak.

25. That sheep imported into any colony, and certified by an inspector of that colony as free from infection, may be introduced into any other colony if found to be so by the inspector of the colony into which the sheep are being imported.

26. That Australasian dogs, accompanied by a declaration by the owner and a certificate from the inspector or veterinary surgeon, be allowed to land on the permit of a Customs officer.

27. That no Australasian stock be transhipped in any Australasian port without the permission of the inspector.

#### *Diseases in Animals.*

28. That this Conference considers that M. Pasteur's vaccine of anthrax is effective, and recommends that assistance be given him in establishing agencies in all the colonies, with a view to those owners who require the vaccine obtaining and using it.

29. That the travelling, selling, or offering for sale, or slaughtering for food, of any animals affected by the diseases known as tuberculosis and actinomycosis, or the using of cows affected by tuberculosis and actinomycosis for dairy purposes, be punishable by law; and that there be a more thorough inspection of dairy cattle in use in populous districts.

30. That the Conference expresses its belief in the efficacy of inoculation as preventive of pleuro-pneumonia.

31. That the Conference affirms the principle of compulsory inoculation for pleuro-pneumonia where the disease appears.

32. That there be no restrictions against the free interchange of inoculated cattle, bearing the inoculation ear-mark, but that a declaration by the owner that the cattle have been duly inoculated accompany them.

33. That all sheep infected with catarrh be destroyed; that the owners be recompensed to the extent of two-thirds the value of sound sheep at the date of destruction; and that the run or place on which the sheep were pasturing be strictly quarantined for six months.

34. That, as the conditions are so various in the different colonies, each colony should legislate for itself, where practicable, on the subjects of fluke, worms, and foot-rot in sheep.

35. That the Governments of Western Australia and New Zealand be urged by the Governments of the colonies represented at the Conference to take more energetic steps than those at present adopted for the speedy eradication of scab.

36. That steps be taken by the several Australasian colonies to thoroughly eradicate ticks and lice in sheep.

37. That any animals found to be infected with glanders, farcy, foot-and-mouth disease, rinderpest, sheep-pox, swine fever, rabies, trichinosis, or any other infectious or contagious disease not existing within the colonies be at once destroyed.

38. That it is desirable that an efficient and competent staff of inspectors of stock be maintained in each colony, to prevent the introduction and to arrest the spread of scab or any other contagious or infectious disease; and that the Governments of Queensland, South Australia, and Western Australia, exercise the greatest possible vigilance with respect to their northern ports to prevent the introduction of diseases from Eastern, Indian, or Chinese ports.

The symptoms, nature, and cause of the diseases, Stringhalt in horses and Horse-mange, were discussed by the Conference, but no decision was arrived at with respect to their proper treatment.

It was decided not to recommend legislation for Horse-mange.

#### *Additional.*

39. That regulations in regard to the travelling, movements, or conveyance of animals be left to be dealt with by each colony within its own boundaries.

40. That all drafts of laws or regulations dealing with the diseases of animals be, as far as practicable, submitted by the Government framing them to the Governments of the other colonies for remark before they become law; and that proofs of any papers or reports relating to pastoral matters, which would be likely to be of benefit or interest to stock-owners generally, be also forwarded, in order that the other Governments may, should they see fit, order a supply of copies for distribution.

41. That this Conference affirms—(a) The desirability of establishing a laboratory or institution for the purpose of investigating and experimenting upon any diseases to which stock are or may become liable, particularly, in the first instances, pleuro-pneumonia, anthrax, and tuberculosis. (b) That the institution be a permanent one, and to be supported by the respective colonies becoming parties to the arrangement *pro rata*, according to the number of stock, sheep, cattle, and horses returned for the year preceding the assessment. (c) That a permanent board of direction be formed, to be composed of members to be appointed by the Government of each contributing colony. (d) That a competent European scientist be engaged as director, who shall deliver an annual course of lectures to students, and who shall be allowed to charge fees for so doing. (e) That the laboratory or institution shall be called the Australasian Stock Institute, and that it be located in the Colony of New South Wales.

42. That the inspectors of the various slaughter-houses and dairies shall, as far as possible, be qualified veterinary surgeons.

43. That in the opinion of this Conference a commission of experts should be appointed to investigate and report on all specific diseases known to exist throughout the Continent of Australia, New Zealand, and Tasmania, viz.:—Tuberculosis, actinomycosis, coccidium, Australian stringhalt, ophthalmia, pleuro-pneumonia, anthrax, and coast disease.

44. That the Conference recommends that the several Australasian Governments be asked to assist in giving encouragement to the fresh-meat trade by erecting suitable market buildings and chilled chambers, establishing killing and chilling depôts at the principal centres of stock traffic, putting on the necessary refrigerating cars, carrying the meat at a reasonable rate, and adopting a uniform railway gauge.

45. That it is most desirable that a stud-book for horses, cattle, and sheep be kept in each colony as a register; and as the best means to accomplish this end the different representatives present be requested to communicate with their principal agricultural societies, and endeavour to prevail upon them to keep such register.

46. That the means hitherto in use in the different colonies that are infested with rabbits have not had the effect of materially reducing the number of those animals, and that, in consequence, the period of being relieved from the pest is still uncertain, thereby entailing continued loss to the pastoral and agricultural industries of the Australasian colonies; and that joint action should be taken by the Governments of the different colonies to offer a bonus for a scheme that will lead to the more rapid extermination of the pest than at present in use holds out the prospect of.

47. That the resolutions, 1 to 8, hereunder, passed by the Royal Commission and reported to the Government of New South Wales, be the measures recommended as altered for adoption by this Conference for dealing with the rabbit pest.

- (1) That the responsibility for the destruction of rabbits, whether on freehold or on leasehold land, must rest on the landholder. That with respect to unoccupied Crown lands, the State must accept similar responsibility.
- (2) That the rabbit pest has made the continuance of the system of annual leases of Crown lands impossible.
- (3) That no finality in rabbit destruction will be obtained without making the erection of rabbit-proof fences compulsory.
- (4) That there are very large areas of land so poor that the erection of rabbit-proof fences around individual holdings might cause financial failure. That the department administering the Rabbit Destruction Acts should be empowered to permit the fencing of such poor holdings in groups. That in dealing with land of very poor carrying capacity, the State should show special consideration to the lessees in respect of tenure.
- (5) That in all infested country, but especially in such poor districts, simultaneous operations for the destruction of rabbits should be made compulsory.

- (6) That netting 42 inches wide (3 feet above and 6 inches in the ground), with a mesh of  $1\frac{1}{2}$  inch, forms a practically efficient barrier against the incursions of rabbits.
- (7) That the system of compulsory trapping, with professional trappers and State bonuses, is radically bad.
- (8) That legislative measures should be taken compelling landowners or lessees in districts infested by rabbits to join, subject to the above provisions, in payment of the cost of rabbit-proof netting fences or in the addition of such netting to existing fences.

48. That the Conference, taking into consideration the importance of the subjects that have come before them for discussion and decision, are of opinion that an Australasian Stock Conference should be held triennially at the chief city of one of the colonies, and they respectfully offer this recommendation to the several Governments.

49. That the Conference desire to call the attention of stock-owners to the fact that the cattle-owners in the United States of America hold an Annual Convention of Delegates from all the States in the Union, to discuss matters of general interest to them as a class, with very great benefit; and would suggest that a similar convention of delegates, chosen by the stock-owners in the several colonies, be held annually in one of our chief cities, each colony to send, say, three delegates, as may be agreed upon.

50. That a uniform code of regulations, embodying the resolutions passed by this Conference, be adopted by all the colonies, and that the framing of such regulations be placed in the hands of the Victorian Government.

51. That a copy of the proceedings of this Conference be forwarded to the Government of Western Australia, and that they be asked to adopt and act upon the resolutions agreed to.

C. M. OFFICER,  
Chairman of the Conference.

14th November, 1889.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

STOCK BOARD.

(RETURN OF EXAMINERS OF, AND STOCK INSPECTORS.)

*Ordered by the Legislative Assembly to be printed, 17 July, 1890.*

[*Laid upon the Table in reply to Question No. 12, on 17 July, 1890.*]

Questions.

DR. ROSS asked THE SECRETARY FOR MINES AND AGRICULTURE,—

- (1.) Will he give the names of the members composing the Stock Board of Examiners?
- (2.) Have any of the members composing the Stock Board of Examiners at any time undergone the necessary examination to qualify them for such a position; if so, will he state when and where they passed such examination, or if any of them possess credentials from any Examining Board, showing that they are competent to hold such a position?
- (3.) What are the subjects intending applicants for the appointment of Inspectors of Stock are supposed to possess before submitting themselves for examination before this Board; and where and how do such applicants obtain the necessary information to enable them to go up for examination?
- (4.) The names and number of Inspectors of Stock now employed in the Government service who have passed this alleged necessary examination; also, the names and number of those who have passed but are not employed; also, the salary each receives respectively?
- (5.) Have the respective candidates to pay any fee for such examination; and will he state the nature of such examination, and what it consists of?
- (6.) Will he give a list of the names of those who have passed this necessary examination, and who are waiting for an appointment in the Government service?
- (7.) Does the passing of such examinations by candidates and Inspectors of Stock entitle them to rank as veterinary surgeons, or to give advice on diseases and distempers belonging to stock?

Answers.

- (1.) John de V. Lamb, Esq., Chairman of the Board of Sheep Directors, Sydney.  
Alexander Bruce, Esq., Chief Inspector of Stock.  
Edward Stanley, Esq., Government Veterinarian, F.R.C.V.S., London.
- (2.) The Government Veterinarian, Mr. Stanley, holds the Diploma as a Fellow of the Royal College of Veterinary Surgeons, London. The other members of the Board have been selected because of their very large experience.
- (3.) The subjects are:—
  1. A practical knowledge of horses, cattle, sheep, and pigs, and their care and management.
  2. A thorough knowledge of the Acts and Regulations which an Inspector of Stock is appointed to see carried out.
  3. A thorough theoretical and practical knowledge of the diseases in stock known to exist in any of the Australian Colonies or New Zealand.
  4. A general knowledge of the principal infectious and contagious diseases in stock existing in other colonies or countries not known in these colonies.
 Besides this, testimonials are required from applicants as to character.  
It is not considered a matter for the Board to inquire as to where or how applicants are to obtain the necessary information.

(4.) There are twenty-one Inspectors now employed, who have passed the required examination, and their names and salaries are as follows:—

Name.	Salary.	Name.	Salary.	Name.	Salary.
A. James ...	... £285	W. G. Dowling ...	£285	E. Stanley ...	... £335
G. S. Smith ...	285	J. L. Henderson ...	285	(Also £270 as Government Veterinarian.)	
R. W. Dawson ...	285	T. Cadell ...	275	G. Day ...	... 15s. per day
P. L. Smith ...	285	E. W. Procter ...	275	C. Lyne ...	... £285
J. W. Chanter } ...	300	H. J. Sealy ...	285	E. May-Steers ...	... 275
(Acting) } ...		J. Wilks ...	385	M. J. C. Tully ...	... 385
T. W. Medley ...	285	E. G. Finch ...	285	C. W. Dargin ...	... 285
T. Watson... ...	385	J. Yeo ...	275		

There are fifteen gentlemen who have passed, but are not employed as Inspectors, viz. :—

B. O. Meek, V.S.,	D. C. Gordon,
Alfred Welman,	J. W. Boulton,
John Fraser,	C. J. Vyner,
H. A. Gethings,	J. W. McKellar,
N. Silverthorne, V.S.,	G. W. Lee,
Sydney T. Cox,	H. E. Palmer,
A. H. Farrand,	J. A. T. Rochfort.
A. A. Devlin,	

(5.) There is no fee. The latter part of this question is answered by the reply to Number 3.

(6.) The names are given in the reply to Number 4.

(7.) Certainly not. The passing of the examination merely renders them eligible to apply for the office of Inspector of Stock in terms of the Regulations issued under the Diseases in Sheep Acts.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**SHEEP TRUST FUND.**

(RETURN OF MONEYS RECEIVED AND DISBURSED SINCE INCEPTION.)

*Ordered by the Legislative Assembly to be printed, 8 October, 1890.*

RETURN to an *Order* of the Honorable the Legislative Assembly of New South Wales, dated 17th September, 1890, That there be laid upon the Table of this House,—

“ A Return of all moneys received and disbursed in connection with the  
“ Sheep Trust Fund since its inception.”

(Mr. Lyne.)

RETURN of all moneys received and disbursed in connection with the Sheep Trust Fund since its inception, under Act 30 Victoria No. 16.

Year.	Receipts.	Expenditure.	Year.	Receipts.	Expenditure.
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Balance from Acts 27 Vic. No. 6 and 29 Vic. No. 3.....	7,866 18 7	.....	1881 .....	14,157 10 2	12,571 16 10
1867 .....	12,751 1 10	10,724 0 0	1882 .....	11,907 7 3	13,464 14 8
1868 .....	8,324 2 9	10,895 13 0	1883 .....	11,303 3 5	14,698 2 11
1869 .....	5,439 9 0	9,553 9 2	1884 .....	11,925 11 10	18,785 7 8
1870 .....	9,348 18 5	10,019 11 10	1885 .....	19,891 5 3	19,226 5 6
1871 .....	9,328 11 2	9,207 0 10	1886 .....	23,022 15 2	20,161 9 2
1872 .....	9,011 13 6	9,637 15 9	1887 .....	16,514 9 2	19,602 1 10
1873 .....	10,686 15 6	10,891 8 6	1888 .....	19,368 19 4	18,937 2 10
1874 .....	11,305 14 9	10,476 5 9	1889 .....	19,969 18 3	19,555 5 4
1875 .....	12,549 19 10	10,566 16 10	1890, to 17th Sept.	20,689 18 0	15,836 2 5
1876 .....	11,028 14 10	11,657 12 2			
1877 .....	10,233 2 6	12,096 0 6			
1878 .....	13,916 0 0	9,275 14 5	Balance.....	.....	319,510 6 1
1879 .....	11,963 17 1	10,209 12 7			6,463 15 11
1880 .....	13,379 4 5	11,470 15 7			
				325,974 2 0	325,974 2 0

The Treasury,  
24th September, 1890.

J. PEARSON,  
Accountant.

[3d.]

704—

[870 copies—Approximate Cost of Printing (labour and material), £1 7s. 7d.]

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

STOCK.

(RETURN SHOWING NUMBER OF, IN EASTERN, CENTRAL, AND WESTERN DIVISIONS.)

*Ordered by the Legislative Assembly to be printed, 20 August, 1890.*

RETURN showing Number of Stock in the Eastern, Central, and Western Divisions, at 31st December, 1889.

Divisions.	Horses.	Cattle.	Sheep.
Eastern .....	295,839	1,322,138	14,685,285
Central .....	95,465	329,339	22,686,529
Western .....	89,473	90,115	12,734,954
Total.....	480,777	1,741,592	50,106,768

Department of Mines, Stock Branch,  
Sydney, 30th May, 1890.



1890.

—  
 LEGISLATIVE ASSEMBLY.  
 NEW SOUTH WALES.

—  
**LOSS OF STOCK BY FLOODS.**

(RETURN OF, IN BOURKE, WALGETT, AND BREWARRINA DISTRICTS)

—  
*Ordered by the Legislative Assembly to be printed, 20 August, 1890.*  
 —

RETURN showing the Approximate Loss of Stock through Floods in the Bourke, Walgett, and Brewarrina Districts.

District.	Horses.	Cattle.	Sheep.
Bourke ... ..	.....	17	17,500
Walgett ... ..	250	500	350,000
Brewarrina ... ..	25	50	100,000
Total ... ..	275	567	467,500



1890.

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LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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IMPORTED STOCK ACTS OF 1871 AND 1884.  
(REGULATIONS UNDER.)

Presented to Parliament, Pursuant to Act 35 Vic. No. 6.

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IMPORTED STOCK ACT OF 1871 AND THE IMPORTED STOCK ACT AMENDMENT ACT  
OF 1884.  
QUARANTINE AND DRESSING OF AUSTRALIAN IMPORTED SHEEP.

Department of Mines, Stock Branch, Sydney, 18 February, 1890.

His Excellency the Governor, with the advice of the Executive Council, has been pleased to cancel so much of the Regulations of 22nd May, 1888, issued under the abovenamed Acts, relating to the Quarantine and Dressing of Australian Sheep imported from a clean Colony, as will admit of sheep from Tasmania, and intended to be offered at the sales of Stud Sheep in Sydney, arriving by special steamer in the charge of their owners or their servants, being introduced into this Colony, if found on inspection to be free from disease, without being subject to quarantine or dressing.

SYDNEY SMITH.

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1890.

## NEW SOUTH WALES.

# IMPORTED STOCK ACTS.

(REGULATIONS UNDER THE.)

Presented to Parliament, pursuant to Act 48 Vic. No. 12, sec. 4.

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
(L.S.) Council, Knight Grand Cross of the  
CARRINGTON, Most Distinguished Order of Saint  
Governor. Michael and Saint George, Governor and  
Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS by section 10 of the "Imported Stock Act of 1871," the Governor is empowered, by Proclamation in the Government Gazette, to restrict or absolutely prohibit for any specified time the importation or introduction of any stock, fodder, or fittings from any other colony or country in which there is reason to believe any infectious or contagious disease in stock exists; and whereas there is reason to believe that certain infectious and contagious diseases exist in some of the countries in Europe, Asia, Africa, America, and in colonies other than the Australian Colonies: Now, therefore, I, CHARLES ROBERT, BARON CARRINGTON, the Governor aforesaid, do, by this my Proclamation, hereby absolutely prohibit for a period of two years from the date hereof the importation or introduction into this Colony of the stock, articles, or things mentioned in Schedule A hereto, except from the countries and colonies therein named, and under the conditions therein specified, and subject to the Regulations issued under the abovenamed Act, and the "Imported Stock Act Amendment Act of 1884."

## SCHEDULE A.

## IMPORTED STOCK ACT OF 1871 AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

*Foreign Stock and Things Prohibited from being Imported or Introduced.*

Stock.	From what colony or country.
Cattle and Sheep .....	From all foreign countries and colonies, except from Great Britain and Ireland, unless such cattle or sheep shall have been 14 days in Great Britain or Ireland.

## SCHEDULE A—continued.

Stock.	From what colony or country.
Swine .....	From all foreign colonies and countries.
Goats and Deer, Antelopes, Llamas, Buffaloes, and other Ruminants.	From all foreign colonies and countries, unless they are imported for a Zoological Society, when they may be landed and quarantined as provided by regulation.
Fodder and Litter .....	From any foreign colony or country, or from any foreign vessel, with which foreign animals have been in contact.

Given under my Hand and Seal, at Government House, Sydney, this thirtieth day of July, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

SYDNEY SMITH.

GOD SAVE THE QUEEN!

*Note.*—The foreign stock undermentioned are not within the terms of the above prohibition.

*Foreign Stock not Prohibited.*

Stock.	From what colony or country.
Horses .....	Any colony or country.
Camels .....	Any colony or country.
Cattle .....	From Great Britain and Ireland.
Sheep .....	From Great Britain and Ireland.
Goats and Deer, Antelopes, Llamas, Buffaloes, and other Ruminants.	From any colony or country, if they are intended for a Zoological Society; otherwise they are inadmissible.
Dogs .....	From any colony or country.

Department of Mines,  
Stock Branch,  
Sydney, 31st July, 1890.

**IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.**

It is hereby notified for general information that Nos. 3, 4, 9, 12, 14, 15, 21, 22, 23, 24, 27, 29, 30, 31, 35, 39, 40, 43, 48, 51, and 52, and also sub-sections (1), (5), and (7), of Regulation 59, and sub-sections (2) and (3) of 61 of the Regulations of 22nd May, 1888, issued under the abovenamed Acts are hereby cancelled, together with the Regulation of 18th February last, issued under the said Acts; and that the following Regulations under the abovenamed Acts have been made by His Excellency the Governor, with the advice of the Executive Council, and are now published, for general information, in lieu of the Regulations hereby cancelled, and shall be read and construed with the unrescinded Regulations of 22nd May, 1888.

SYDNEY SMITH.

**PART A.—GENERAL.**

Owners to give notice of arrival of stock.

1. If any stock are brought by sea to a port or place in this Colony, the owner thereof shall, within twenty-four hours of their arrival, give the inspector at or near such port or place notice to the effect of Form 1 hereto: Provided that the notice hereby required may be dispensed with, if the Master of the vessel by which such stock are brought make and deliver to the Customs Officer first boarding his vessel a declaration to the effect of Form 4 or 9 hereto, according as such stock are either Foreign or Australian stock.

**PART B.—FOREIGN STOCK.**

2. If an owner intend to introduce any foreign stock into this Colony other than dogs, he shall give the Chief Inspector of Stock at least four weeks' notice of his intention, to the effect of Form 2 hereto.

*I.—Foreign stock prior to leaving port of shipment.*

Foreign horses, camels, cattle, sheep, swine, and goats to be accompanied by certificate from Inspector for District from which they come.

3. All foreign horses, camels, cattle, sheep, swine, and goats intended and permitted to be introduced into this Colony, shall be accompanied by a declaration from the breeder or owner, and by a certificate to the effect of Form 3 hereto, from the Inspector or Veterinary Surgeon for the District from which they start for the port of shipment, that they are not, nor have within the next preceding six months been, infected with any infectious or contagious disease.

*II.—Foreign stock on arrival, and while in the waters of this Colony.*

Stock while in New South Wales waters to be properly confined.

4. It shall be the duty of the Master of the vessel, on board of which there are any foreign stock, as well as of the actual owner thereof, to cause all such stock to be kept securely confined, penned, chained, or fastened up, as soon as such vessel is in the waters of this Colony; and no person except the attendant on such stock shall touch or approach or handle the same without the permission of the Inspector; and while the vessel remains therein all such stock shall be kept and treated, to the satisfaction of the Inspector, so as that they shall not be able to stray from such vessel nor to come in contact with any person other than their attendant, nor if the stock be dogs to come in contact with other dogs which may come on board such vessel, and the Inspector may, if he deem necessary, place any dogs whether intended to be landed or not in quarantine at their owner's risk and expense.

Master on arrival to make declaration.

5. On the arrival of a foreign vessel the Master and the attendant on the stock on board such vessel shall make and deliver to the Customs Officer, first boarding such vessel, a declaration to the effect of Form 4 hereto.

Master to give bond to keep ship's stock, &c., securely.

6. If there be on board a vessel any foreign stock for ship's use or any other stock which are not intended to be landed in this Colony, the Master of such vessel shall execute and deliver to the Inspector a bond by himself, and two sureties to be approved by the Chief Inspector of Stock, to the effect of Form 5 hereto, that he will keep such stock securely confined, penned, or fastened up as prescribed by these Regulations, and the Inspector shall direct.

Foreign stock not infected, if intended to be landed, to be sent to quarantine.

7. If foreign stock intended to be landed, and not prohibited, are reported to be free from infection, and if the Chief Inspector is satisfied that they are not infected, and that the requirements of the abovenamed Acts and these Regulations have been complied with, he shall, on obtaining from the owner or consignee of such stock a bond and guarantee, duly executed by the owner or consignee and two approved sureties, in the terms of Form 6 hereto, grant the prescribed order for the removal of such stock to quarantine, without which no stock shall leave the vessel by which they arrived.

Stock to be taken by water to quarantine, and kept at owner's risk and expense.

8. All such foreign stock, including dogs, found on inspection to be free from infection shall, where necessary, before leaving the vessel, be washed and disinfected as the Chief Inspector shall direct, and shall be conveyed by water, at the owner's risk and expense, to the quarantine set apart for such foreign stock, and shall remain in quarantine for the terms respectively prescribed hereunder for the different kinds of such stock, during which they shall be kept at their owner's risk and expense, and shall be washed, dipped, and disinfected as prescribed by these Regulations, and as the Chief Inspector of Stock shall direct.

*III.—Landing, quarantine, disinfecting, and dressing of foreign stock.*

Quarantine of foreign stock.

9. Foreign stock, including dogs, permitted to be introduced shall be conveyed to and remain in the quarantine set apart for foreign stock, for the periods specified in Form 7 hereto.

As to foreign sheep in quarantine.

10. All foreign sheep landed in this Colony shall forthwith receive three dressings with tobacco and sulphur or with lime and sulphur, at intervals of from ten to fifteen days between each dressing; and the medicaments shall be of the strength and the bath at the temperature and for the duration herein-after prescribed in regard to imported Australian sheep required to be quarantined and dipped under the abovenamed Acts and Regulations thereunder.

*IV.—Charges for inspection and risk of transport and quarantine of foreign stock.*

Charges and expenses in relation to foreign stock to be borne by owner.

11. All charges and expenses connected with the veterinary inspection or treatment, and the landing, conveying, detaining, feeding, dressing, disinfecting, and reconveying of any stock, or with the destruction, or other dealing with any stock or fodder under the said Acts or any regulations thereunder, through or in relation to any owner's stock, shall be borne by the owner of such stock, and such charges and expenses shall be at the rates stated respectively in Form 8 hereto, in so far as therein specified, and shall be payable on demand; and such charges and expenses shall be calculated on the whole number of stock inspected, disinfected, conveyed, or dressed at the one time, whether they belong to the same owner or not.

*V.—Foreign stock for ships' use and for transhipment.*

No foreign stock to be transhipped without permit and not on to Australian vessels.

12. No foreign stock shall be transhipped in the waters of this Colony without the permission, in writing, of the Inspector: And no stock, other than stock from a clean Australian Colony, brought by any vessels into the waters of this Colony, shall be transhipped from such vessel to any of the vessels usually or occasionally trading between any of the Australian Colonies until such stock, if allowed to be landed, shall have performed the quarantine, and otherwise complied with the provisions of the abovementioned Acts and these Regulations.

**PART C.—AUSTRALIAN IMPORTED STOCK AND THINGS.**

*VI.—General, as regards Australian imported stock and things.* Declaration and certificate to be produced to Inspector examining stock.

13. If an owner intends to introduce any Australian imported stock other than sheep into this Colony, he shall produce to the Inspector examining the same a declaration duly certified by the Inspector or veterinary surgeon of the port or place from which such stock were shipped to the effect of Form 3 hereto.

Master's declaration that vessel is a clean vessel.

14. On the arrival of an Australian vessel the Master shall make and deliver to the Customs Officer first boarding his vessel a declaration to the effect of Form 9 hereto.

*VII.—Special as regards Australian horses and dogs.*

Imported Australian horses and dogs to be admitted by Customs Officer on declaration and certificate from Inspector.

15. All Australian horses or dogs imported from any of the Australian Colonies, if they are apparently free from disease and are accompanied by a declaration, duly certified by the Inspector or Veterinary Surgeon of the port from which such horses or dogs were shipped, to the effect of Form 3 hereto—may be landed on the permit of the Officer of Customs in charge of the vessel by which such horses or dogs are so imported.

Horses and dogs not accompanied by certificate, how admitted.

16. If any Australian horses or dogs imported from any of the Australian Colonies are not accompanied by a declaration and certificate, as provided by the next preceding Regulation, such horses or dogs shall not be landed until the owner thereof shall have made a declaration to the effect of Form 3 hereto, and paid to the Inspector, a fee of five shillings for inspecting such horses, and two shillings and sixpence for inspecting such dogs.

VIII.—*Australian sheep.*

What is to be deemed a clean vessel.

17. No sheep shall be imported except by a clean vessel; and no vessel shall be deemed a clean vessel which shall, within the next preceding six months, have traded to a place not in a clean Australian Colony, nor any vessel which shall within the period hereinbefore mentioned have had any sheep or sheep skins on board from any place not in a clean Australian Colony.

Quarantine and dressing of Australian imported sheep.

18. Sheep from any clean Australian Colony which are accompanied by a declaration and certificate, to the effect of Form 3 hereto, and a declaration by the master of the vessel by which such sheep are imported, to the effect of Form 9 hereto, may, if found on inspection to be not infected, be landed, and, if other than those arriving from Tasmania by special steamers and in the charge of their owners or their servants,—shall be taken by a conveyance to the quarantine station for such sheep, where they shall be quarantined and dipped under the supervision and direction of the Inspector; and the length of such quarantine, the medicaments to be used in dipping, the temperature and duration of the bath, the dipping, and the fees to be charged for the keeping and dipping of the sheep, shall be as follows, viz. :—

Quarantine.

- (1.) The sheep shall remain in quarantine until they shall have been dipped as herein prescribed.

Medicaments.

- (2.) The medicaments to be used in dipping shall be good sound tobacco, or tobacco leaves and flowers of sulphur, at the rate of 1 lb. of each to every 5 gallons of water, the tobacco to be put into boiling water and infused for five hours at least, and the sulphur to be added to the infusion in the dip.

Temperature.

- (3.) The temperature shall not be less than 100 nor more than 110 degrees Fahrenheit.

Bath and duration.

- (4.) The sheep shall swim and be completely immersed while in the bath, and the bath shall last from one to two minutes, according to its temperature, and as the case may require.

Number of dippings.

- (5.) The sheep shall receive one dipping.

Charges.

- (6.) The rates to be charged for the keeping and dressing of sheep in quarantine shall be as set forth in Form 8 hereto.

Admission of Tasmanian sheep without dipping, in certain cases.

19. Sheep from Tasmania arriving by special steamers in the charge of their owners or their servants, which are accompanied by a Declaration by their owner and certificate by an Inspector in that Colony to the effect of Form 3 hereto, and with respect to which the Master of such vessel shall have made a Declaration to the effect of Form 9 hereto, may be introduced into this Colony, if found on inspection to be free from infection, without being subject to quarantine or dressing.

How imported Australian sheep are to be admitted overland from other Colonies.

20. Sheep imported from any clean Australian Colony into any other clean Colony, and intended to be introduced overland into this Colony, may be admitted if their owner produce to the Inspector for this Colony at the border, a certificate under the hand of an Inspector for the Colony from which they are intended to be introduced to the effect, that when such sheep were introduced into that Colony they were certified to be free from infection by an inspector of the Colony from which they were imported, and that such sheep have been once dipped as required by No. 18 of these Regulations, unless they shall have been brought from Tasmania by special steamer, and thereby exempt from dipping; but all such sheep, unless they have been imported, and, where prescribed, quarantined and dressed as herein provided, shall, on crossing the border, be placed in quarantine, and kept and dipped in the same manner in every respect as prescribed with regard to Australian imported sheep required to be dipped at Sydney.

How Australian imported sheep which have not complied with all the Regulations are to be admitted.

21. Should any Australian sheep be imported into this Colony by a vessel other than a clean vessel, and such vessel is an Australian vessel, or should any such sheep not have been examined in the Colony from which they were exported, as prescribed by these Regulations, then such sheep may, with the sanction of the Minister, be admitted and shall remain in quarantine for twenty-one days, and shall in every such case receive three dippings at intervals of not less than ten days.

22. If any person fail to comply with or offend against any of the foregoing Regulations, for which a penalty is not already specially provided, he shall, on conviction for every such offence, be liable to a penalty not exceeding £20.

## FORMS.

## Form 1.

## IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

Notice of arrival of stock.

To Inspector of Stock,

189 .

TAKE notice that the  
belonging to  
of more particularly described in the Schedule  
below, are expected to arrive by the vessel named, at or about  
the time therein stated (or have arrived).  
Owner or his Agent.

## SCHEDULE.

No.	Description of stock.	Wherefrom.	By what vessel, and where lying.	When expected.		For what purpose.
				Date.	Time.	

N.B.—A separate notice must be given for each owner's stock.

## Form 2.

## IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

Notice of intention to introduce Foreign Stock.

To the Chief Inspector of Stock,  
Sydney.

TAKE notice that it is my intention to introduce into the Colony of New South Wales the Foreign Stock more particularly described in the Schedule below.

(Owner).

Dated at  
this                      day of                      , 189 .

## SCHEDULE REFERRED TO ABOVE.

No.	Sex.	Des- cription	Breed, colour, brands, & marks.	Name and address of owner.	Where from and by what vessel	When expected to arrive.	Consignee.

## Form 3.

## IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

Declaration and Certificate of Health.

I [name and address] do solemnly and sincerely declare that the undermentioned stock are, to the best of my knowledge and belief, free from all infectious and contagious diseases, and have not within the next preceding six months been in direct or indirect contact with stock infected with any such diseases, and are the produce of [Particulars of numbers, sexes, kinds, and brands of the stock].  
And I make this solemn declaration, conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled "An Act for the more effectual abolition of Oaths and Affirmations taken and made in various Departments of the Government of New South Wales and to substitute Declarations in lieu thereof and for the suppression of Voluntary and Extra-judicial Oaths and Affidavits."

Made and signed before me, at  
this                      day of                      189 . }  
(Signature of Magistrate.)

J.P.

I have examined the stock referred to in the above declaration, and have no reason to doubt its correctness in any particular.

V.S. or Inspector of Stock.

Date  
Address

Form 4.

IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

Form of Declaration by Master of Foreign Vessel.

No. of Stock shipped.	Description.	Sex.	Breed, colour, brands, and marks.	Where from.	Sickness or deaths during voyage.	Cause of sickness or death.	Date of outbreak of disease.	Date of last death.

I, \_\_\_\_\_, master, do hereby solemnly declare that the above statement is true with regard to the stock shipped on board the \_\_\_\_\_, which is now lying at \_\_\_\_\_, and for which \_\_\_\_\_ are agents. And I moreover solemnly declare that such stock have been duly examined by me, and that such stock, fodder, fittings, and effects are likely to be infected (or not likely to be infected).

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 189 .  
(Signed) \_\_\_\_\_ Master.

Form 5.

IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

Masters of Vessel's bond and guarantee.

To the Chief Inspector of Stock, Sydney.

We \_\_\_\_\_ of \_\_\_\_\_, and \_\_\_\_\_ of \_\_\_\_\_, do hereby request that the imported stock which arrived on the \_\_\_\_\_ by the ship \_\_\_\_\_ from \_\_\_\_\_ and of which \_\_\_\_\_

is the owner (or consignee) more particularly described in the Schedule below, and which are not intended to be landed in the Colony of New South Wales, may, if, found free from infection, be allowed to remain on board such vessel during her stay in port under the conditions set forth in the regulations under the abovenamed Acts, which we agree to carry out, and by way of guarantee, we hereby hold ourselves, and each of us, our heirs, executors, and administrators, firmly bound to the Chief Inspector of Stock in the sum of \_\_\_\_\_ to be paid to him or his assigns on demand for any breach or non-compliance in regard to the carrying out of these regulations with respect to the stock mentioned in the Schedule below.

Witness to signatures, Name } Master of vessel.  
Address }  
Name } Surety.  
Address }  
Name } Surety  
Address }

Dated at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_ 189 .

The consideration of this obligation is such that if the said \_\_\_\_\_ during the stay in port of the ship \_\_\_\_\_, commit or allow to be committed any breach of the regulations in respect to the stock specified in the above Schedule shall on demand forfeit for each and every such offence the amount £ \_\_\_\_\_, mentioned in this bond, and if no breach of the regulations has occurred with regard to the stock on board such ship at the date of her leaving this port, then this obligation is to be void or else to remain in full force.

SCHEDULE REFERRED TO ABOVE.

No.	Sex.	Description.	Brands and marks.	Owner.	Consignee.

Form 6.

IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

Importer's bond and guarantee.

To the Chief Inspector of Stock, Sydney.

We \_\_\_\_\_ of \_\_\_\_\_, and \_\_\_\_\_ of \_\_\_\_\_, do hereby request that the imported stock which arrived on the \_\_\_\_\_ by the ship \_\_\_\_\_ from \_\_\_\_\_ and of which \_\_\_\_\_ is the owner (or consignee) more particularly described in the Schedule below, may if found free from infection, be removed to quarantine under the conditions set forth in the regulations under the abovenamed Acts, which we agree to carry out, and by way of guarantee, we hereby hold ourselves, and each of us, our heirs, executors, and administrators, firmly bound to the Chief Inspector of Stock in the sum of \_\_\_\_\_ to be paid to him or his assigns on demand for the cost and expense incurred in carrying out these regulations with respect to the stock mentioned in the Schedule below.

Witness to signatures, Name } Owner or  
Address } Consignee.  
Name } of Surety.  
Address }  
Name } of Surety.  
Address }

Dated at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_ 189 .

The condition of this obligation is such that if the said \_\_\_\_\_ from time to time duly pay on demand the cost of inspection, disinfection, dressings for scab (if made use of), housing, disinfecting the vessel or conveyance in which the transshipment, or conveyance to or from the quarantine ground, takes place of certain stock mentioned in the said Schedule, and all other costs and charges of every kind and sort in connection with such stock incurred or to be incurred from the arrival of such stock in New South Wales, until the same die, or be destroyed, or sold, or lawfully removed from the quarantine ground, including in case of death, or destruction the cost of destroying the carcasses, and in case of sale the expenses of the sale, then this obligation is to be void or else remain in full force.

SCHEDULE REFERRED TO ABOVE.

No.	Sex.	Description.	Brands and marks.	Owner.	Consignee.

Form 7.

IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

Length of Quarantine of Stock.

Stock.	Quarantine.
Camels .....	90 days.
Cattle .....	60 days.
Sheep .....	90 days.
Pigs .....	90 days.
Goats .....	60 days.
Antelopes .....	60 days.
Deer .....	60 days.
Llamas .....	60 days.
Buffaloes .....	60 days.
Any other ruminants .....	60 days.
Dogs .....	6 months.

} For Zoological Gardens only.

Form 8.

IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.

SCALE OF TRANSPORT AND QUARANTINE CHARGES AND EXPENSES.

Veterinary Surgeon's Fees for inspection.

Foreign horses and cattle.

	£	s.	d.
For one or two head, a fee of .....	1	1	0
Three or four head, each .....	0	10	0
For every additional head over four head, an additional fee of .....	0	5	0

*Foreign sheep, goats, pigs, or dogs, and Australian sheep.*

	£ s. d.
For one and not exceeding four head .....	1 1 0
Any number from 5 to 10 head .....	1 11 0
"    11 to 25 " .....	2 1 0
"    26 to 50 " .....	2 11 0
"    27 to 100 " .....	3 1 0

If over 100, the charge instead of per number to be by the day or half-day, as the case may be, at the rate of £3 3s. per day.

*Charges for Transport of Stock to and from Quarantine.— Payable each way.*

	£ s. d.
<i>Foreign horses or cattle.</i>	
For one head .....	1 0 0
For every additional head arriving on board the same vessel .....	0 5 0

*Foreign sheep, goats, pigs, or dogs.*

When conveyed with cattle, every sheep, goat, dog, or pig .....	0 1 0
When conveyed without cattle, any number from 1 to 20 .....	1 0 0
When conveyed without cattle, any number from 21 to 50 .....	1 15 0
When conveyed without cattle, any number from 51 to 100 .....	2 10 0
When conveyed without cattle, any number from 101 and upwards .....	3 0 0
For every trip to either quarantine with forage or other loading .....	1 0 0
For unnecessary detention over 1 hour, per hour .....	0 10 0

*Charges for sustenance and in quarantine of foreign animals, per night.*

Cattle, per head .....	0 3 0
Pigs, each .....	0 1 0
Young pigs under 2 months old .....	0 0 3
Sheep, per head .....	0 0 6
Dogs, per head .....	0 0 6
Pups, up to 3 months old .....	0 0 3

*Keep of Australian sheep in Quarantine.*

Sustenance and attendance per sheep per night .....	0 0 6
---	-------

*Dipping Foreign and Australian Sheep—each dressing.*

	£ s. d.
1 sheep .....	0 10 0
2 sheep, and not more than 5 sheep, per sheep .....	0 5 0
6 sheep, and not more than 10 sheep, per sheep .....	0 3 0
11 sheep, and not more than 20 sheep, per sheep .....	0 2 0
21 sheep, and not more than 40 sheep, per sheep .....	0 1 6
41 sheep, and not more than 100 sheep, per sheep .....	0 1 0
101 sheep, and not more than 200 sheep, per sheep .....	0 0 9
201 sheep and over, per sheep .....	0 0 6

N.B.—Besides the charges and expenses specified above for inspection, transport, sustenance, and dipping, the cost and expense of disinfecting stock, or the vessel by which they arrive, or the fittings thereof, or the effects of their attendants, as well as all other charges and expenses of every description incurred through the importation of foreign or Australian stock, shall be paid by their owner to the inspector.

**Form 9.**

**IMPORTED STOCK ACT OF 1871, AND THE IMPORTED STOCK ACT AMENDMENT ACT OF 1884.**

*Form of Declaration by Master of Australian vessel.*

No. of Stock shipped.	Description.	Sex.	Breed, colour, brands, and marks.	Where from.	Name and address of Owner or Agent.	State of health of stock, i.e., infected or not infected.

I, \_\_\_\_\_, master, do hereby solemnly declare that the above statement is true with regard to the stock shipped on board the \_\_\_\_\_, which is now lying at \_\_\_\_\_, and for which \_\_\_\_\_ are agents; and further solemnly declare that such vessel has not within the next preceding six months traded with or been at any port or place not in a clean Australian Colony, and that such ship has not during that time had any foreign stock nor any sheep or sheep skins, or wool on board from any port or place not in a clean Australian Colony.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 189 .  
Signed \_\_\_\_\_ Master.



1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## BOVINE TUBERCULOSIS IN THE SOUTH COAST DISTRICT.

(REPORT OF THE BOARD OF HEALTH ON).

*Ordered by the Legislative Assembly to be printed, 9 October, 1890.*

The Secretary, Board of Health, to The Principal Under Secretary.

Sir, Board of Health Office, 127, Macquarie-street, Sydney, 19 September, 1890.

I have the honor, by direction of the Board of Health, to inform you that the enclosed papers on the above subject were considered at a meeting of the Board, held on the 17th instant, when the following resolution was adopted:—

The Board adopts the memorandum of the President, and directs that it be forwarded, with all papers, for the information of the Colonial Secretary. The Board considers the matter of very great public importance, and is of opinion that it is desirable that the papers be published.

I have, &amp;c.,

EDMUND SAGER,

Secretary.

[Enclosures.]

## MEMO. BY PRESIDENT.

THE Government Veterinarian, in a letter dated 21st March, 1890, directed the attention of the Board of Health to the prevalence of bovine tuberculosis in the South Coast District, and stated that this disease was locally known as "coast cough," and was treated as being of little importance.

The Board deemed an inquiry into this matter necessary, and Mr. Stanley was directed to visit the Coast District, examine into the general condition of the dairy cattle, and with a view of establishing the fact that "coast cough" is due to tuberculosis, to obtain possession of animals producing milk and suffering from "coast cough," and having caused them to be slaughtered to make *post mortem* examinations and forward the pathological specimens to the Health Office for detailed examination.

Mr. Stanley was unable to carry out the instructions of the Board immediately, but on the 19th of May and four subsequent days he visited a number of the dairies in the Municipal District of Kiama, and received assistance from the officers of police stationed in the district in carrying out the instructions of the Board. The Kiama District was selected because the local authority under the Dairies Act objected at that time to carry out the provisions of that Act, but there was reason to believe that the condition of the cattle in this district was in no wise exceptional, but that "coast cough" existed among dairy and other cattle in all the districts along the Southern Coast being, however, more prevalent in the flat and swampy places than in the more elevated districts. The dairies were found generally in a highly unsatisfactory condition as to cleanliness and sanitary regulation. Mr. Stanley states that "with three exceptions there was no attempt at sanitary arrangements, and even at these three improvements are necessary, the others were all in a neglected state and filthy, the milkers have to wade in mud to fetch each animal up to milk. Cleanliness in milking, such as washing the udders or hands, is not practised. Few premises include a store, and when they do, many objectionable articles are kept in it." Out of 776 cows, in eighteen dairies, twenty-five were found seriously diseased, some being found in almost every herd.

Five cows were selected for *post mortem* examination, four of these being typical cases of "coast cough" disease, and one of "diseased jaw," resembling actinomycosis, and specimens were obtained from all. A specimen from a cancerous growth, of which three other instances in dairy cattle were seen, was obtained, and, as at a slaughtering-place and at two of the butter factories, swine were found to be suffering from a disease also suspected to be tubercular in character, and known locally as "the pants." Three of these animals were secured *post mortem* examination, and specimens obtained. In all these cases the owners willingly gave the cattle for slaughter, and were anxious to ascertain the exact nature of the disease from which they were suffering and the best means of dealing with them. All the specimens, eighteen in number, were forwarded to the Health Office, carefully labelled and identified, and they were distributed thence to the Hon. H. N. MacLaurin, M.D., Professor Wilson, of the University of Sydney, and Dr. Gibson, of Windsor, for detailed and microscopic examination.

From the reports of these gentlemen it appears that the specimens taken from four dairy cattle showed unmistakable examples of tubercular disease, that of the specimens from swine, one showed a condition of "caseous broncho-pneumonia, probably tubercular in character," and in the others, clusters

of bacilli were found, believed to be those of tubercle, that four specimens from one dairy cow showed actinomycosis, and one specimen, also from a dairy cow, epithelial cancer. The detailed reports on these specimens are appended. It appears, then,

- 1st. That the disease known as "coast cough" is really bovine tuberculosis, and that animals suffering from it are the subjects of tubercular disease, although there are no swellings or other external manifestations of the malady.
- 2nd. That bovine tuberculosis, manifesting itself by "coast cough, or by other symptoms, is extensively prevalent among dairy cattle in the South Coast District.
- 3rd. That actinomycosis and cancer are also to be found among dairy cattle in this district.
- 4th. That infective disease, probably tuberculosis, is to be found among swine fed on skim milk from butter factories, and is not improbably due to the use of milk from tuberculous cattle.
- 5th. That all these diseases are identical with diseases occurring in human beings, and are, so far as is at present known, incurable.

It has been established beyond all doubt, by observation and experiment, both in Europe and America, that milk from cows affected with tuberculosis in any part of the body, contains, in a large proportion of cases, the tubercle bacillus, this being present whether there is disease of the udder or not, and that tuberculosis is conveyed to calves, pigs, and other animals by means of milk from tuberculous cattle.

The communicability of bovine tuberculosis to animals by means of the milk of tuberculous cows was conclusively demonstrated by Herr Gerlach, Director of the Veterinary School of Hanover, who induced tuberculosis in calves, lambs, and pigs, by feeding them on milk from tuberculous cows, and Mr. George Fleming and other observers have made numerous experiments to the same or an allied purpose. ("The Transmissibility of Tuberculosis." Med. Chir. Review. Vol. 54, p. 461).

It is more difficult to establish absolute proof of a communication of bovine disease to man since the experimental test is out of the question, but Dr. Creighton, Demonstrator of Anatomy in the University of Cambridge,\* traces twelve cases in man to infection from the cow, and relies on the evidence of identity of the diseased products, whilst evidence from other sources renders it as certain as anything can be without absolute scientific demonstration that the disease is communicable, and is communicated from cows to man, milk being the infective medium.

In view of these facts, and with the knowledge that a large part of the milk produced in the South Coast District finds its way to Sydney, and is distributed by large milk companies, the Board of Health is strongly of opinion that the provisions of the Dairies Supervision Act should be strictly enforced in this district. Under existing conditions the milk supply from the South Coast District is, apart from the question of typhoid fever, likely to be more dangerous to health, especially in the case of children, than that produced in suburban dairies in districts where the Dairies Supervision Act is properly administered.

The extensive prevalence of tuberculosis in the South Coast District is also important, in view of the absence of any Act or regulations, except those in force at the Sydney Abattoirs, prohibiting the slaughtering of diseased cattle and the sale of the flesh for food. Tuberculosis is by no means confined to dairy cattle, and even in the case of these, when they cease to give milk, and are not in bad condition, they are slaughtered for food.

The attention of the Board of Health is frequently called to cases of tuberculosis and cancer in cattle sold at the Homebush Sale-yard, and in the majority of cases these cattle are traced by the police to suburban districts, where the owners, if not interfered with, slaughter and sell them for food.

F. NORTON MANNING,  
President.

16/9/90.

(\* "Bovine Tuberculosis in Man." London, 1890.)

*Re* Tuberculosis in dairy cattle, Kiama District.

To the Secretary, Board of Health,—

Sydney, 21 March, 1890.

Sir,

I have the honor of bringing under the notice of the Board of Health the extensive prevalence of the bovine disease tuberculosis in the Kiama dairying districts.

The disease is locally known as "coast cough," and it is ignorantly treated, as being of little importance.

I would suggest that the local authorities responsible for carrying out the Dairies Supervision Act might have instructions to enforce clause 10, *re* "the supply of milk which shall have been produced from any diseased animal."

They might be informed that the disease known as "coast cough," and which is very often clearly indicated by lumpy, that is, tubercular enlargements of the throat glands, &c., is the disease under the Dairies Act, Tuberculosis.

That the disease is infectious, contagious, hereditary, and incurable; therefore, it is the duty of all local authorities to use their influence to exterminate the disease, which can only be done by destroying the animals, both flesh and milk being unfit for food either for man, pigs, or poultry.

I have, &c.,

EDWARD STANLEY, G.V.S.

Board of Health Office, 127, Macquarie-street, Sydney, 31 March, 1890.

I SHALL be glad if Mr. Stanley will take an early opportunity of visiting the Coast (Kiama) District, and examining into the general condition of the dairy-cattle. He should also select an animal, or animals, producing milk, suffering from "coast cough," and having obtained possession, by purchase or otherwise, make a *post mortem* examination, and forward the pathological specimens found to this office for examination.

The Government Veterinarian.

F. NORTON MANNING.

The Secretary, Board of Health,—  
MEMO from the President duly received.  
instructions.

I will visit Kiama at an early date and carry out the

EDWARD STANLEY, G.V.S.

Police

Police Station, Kiama, 22 May, 1890.

SERGEANT BRAYNE respectfully reports *re* attached, that Mr. Stanley has been here since Monday last, at noon, inspecting dairies every day; the sergeant has accompanied him and given all the assistance he could. Diseased cattle have been found at almost every dairy visited, and some very bad cases of tuberculosis and cancer. He has made five *post mortems*, and takes about twenty specimens with him to Sydney to-morrow. Dairy premises generally were very dirty.

Mr. Stanley appears very well pleased with the assistance rendered by the police.

Mr. Stanley has also visited some of the butter factories and piggeries, and has made three *post mortems* on pigs which have a disease among them.

C. BRAYNE,

Sergeant.

James Ryeland, Esq., Superintendent of Police, Sydney.  
Board of Health.—EDM. FOSBERY, B.C., 27/5/90.

Forwarded to the President of the

*Re* Kiama Dairies, &c.

To the President, Board of Health,—

Sir,

Sydney, 25 May, 1890.

Acting on your instructions, dated March 31st, I proceeded to Kiama on the 19th instant, and inspected cattle and dairies on that and the following days, viz., 20th, 21st, 22nd and 23rd, riding about the district principally on the Gerringong Road, and hilly parts round Kiama, as time only permitted my visiting Jamberoo one day. I was accompanied by Police Sergeant Brayne or a constable, their assistance as pilots, showing me the nearest routes from place to place saved me time, and their knowledge of the owners and their cattle paddocks was very necessary, as I had no volunteer willing to show me about. Owing to the hilly character of the country and the cows being dispersed throughout the paddocks, I could only inspect them on horseback during the morning, but every afternoon from 3 to 5 I always arranged to meet them herded at the dairies. I inspected eighteen dairies and 776 cows belonging to them; twenty-five of these animals were seriously diseased, some being detected in almost every herd.

I selected five cows for *post mortem* examination, four of them being typical cases of "coast cough" disease, and one with diseased jaw resembling actinomycosis.

A detailed account I give with the pathological specimens sent herewith for microscopic examination.

The cows in the elevated places were in splendid condition, those on the flats and swamps were in good store order, but will fall away as winter progresses, then the tuberculous ones can be more readily observed.

At a slaughtering place, and also at two of the butter factories, I noticed that the swine were suffering from an analagous disease locally known as "the pants," from their difficult respiration due to lung disease. They also suffer from putrid sores on various parts of their bodies.

I secured three for *post mortem* examination, and have preserved specimens for further investigation.

I have to thank the owners for having provided subjects for dissection, and I promised to inform them of the exact nature of the diseases, with the best means of dealing with them. With regard to the dairy premises, with three exceptions there was no attempt at sanitary arrangements, and even these three require improvements; the others were all in a neglected state, and filthy. Where the cattle are accommodated, very few had more than five or six bails, so that the milkers have to wade in mud to fetch each animal up to milk. Cleanliness in milking, such as washing the udders or hands, is not practised. The cans and buckets usually stand in the open air; very few premises include a store, and even where they do, many objectionable articles are kept in them. It is necessary that isolated stores for milk and dairy utensils should be provided, as the milk is frequently stored all night and in many cases all day on Sunday.

I append a detailed list of the dairies inspected, but there are many more in the district that I had not time to visit.

I may, perhaps, be permitted to suggest that registration should not be granted so long as diseased cows or pigs are kept, nor until suitable premises are provided. Water is abundant in creeks and wells, and stone suitable for flooring is widely distributed throughout the district. The surface of the ground is favourable for drainage, and further, the business is a lucrative one: the dairymen are wealthy, so that I see no excuse for the present neglect, which only shows the necessity for the 'Dairies' Supervision Act.

I have, &c.,

EDWARD STANLEY, F.R.C.V.S.,

Government Veterinarian.

P.S.—The local name for tuberculous cattle is "coast cough" disease; some call it "lumpy-jaw," others "cancers in the throat."—E.S.

Read meeting of the Board of Health held this day. Consideration postponed until reports on specimens of diseased animals obtained by Mr. Stanley had been received from Hon. Dr. MacLaurin, Dr. Gibson, and Professor Wilson.—E.S., Secretary, 4/6/90.

*Pathological Specimens.*

K.'s cow:—No. 1 A, lymphatic glands (thoracic); 1 B, liver.

W.'s cow:—No. 2 A, lungs; 2 B, uterus.

F.'s cow:—No. 3 A, tubercles from costal pleura; 3 B, lymphatic gland (bronchial); 3 C, parotid salivary gland; 3 D, tubercle (deposit on the heart).

H.'s cow:—No. 4 A, lung; 4 B, kidney (slightly affected); 4 C, liver.

E.'s heifer:—No. 5 A, intestinal lymphatic glands, and piece of small intestine; 5 B, slice of tumour (deep-seated) taken from near the bone (chronic); 5 C, a mass of the same growth from the external surface (recent); 5 D, section of diseased jaw-bone.

No. 6, lungs of swine.

No. 7, intestinal lymphatic glands and one tumour (swine).

No. 8, cuticular cancerous growth on a fire-brand.

*Post mortem*

*Post mortem Examinations No. 1.*

Mr. K.'s—5 years old, dairy cow, been milking, now drying off. Evidence of disease—a frequent cough, hide-bound, rough dry hair, and losing condition. No external tumours were visible.

The lungs had patches of tubercles in all stages, many being broken down, in the interlobular tissue, the pleura and peritoneal membranes were thickly studded with tubercles, and the thoracic and intestinal mesenteric glands were generally diseased. The liver, kidneys, and throat glands were not affected. See specimens No. 1.

*Post mortem No. 2.*

Mr. W.'s—10 years old cow, bred in the locality, at present in full milk and fair condition. Evidences of disease are several tumors, involving the glands of the throat, some of which have suppurated and healed. She coughs on moving hurriedly. The parotid glands, also the sublingual thoracic and mesenteric lymphatic glands, the lungs, liver, uterus, and intestines were studded with tubercular growths. As the butcher expressed it, she was rotten with the disease. See specimens No. 2.

*Post mortem No. 3.*

Mr. F.'s—3 years old cow, in full milk, bred by owner, with first calf, she was in good condition. Evidence of disease was tumefied enlargements of the throat glands, cicatrices from healed abscesses, and tumours near the shoulder-point, there being diseased bronchial glands. Extensive disease was found in the parotid submaxillary and thoracic lymphatic glands, patches of tubercles in the lungs, costal pleura, and liver, with traces on the bowels. Several of the mesenteric and other lymphatic glands were healthy. See specimens No. 3.

*Post mortem No. 4.*

Mr. H.'s—3 years old, now being milked, with second calf, is in fair condition, and bred in the locality. Evidence of the disease—Very large tumours on the throat and coughing on exertion; extensive chronic disease in the parotid, submaxillary, bronchial, and thoracic glands; many patches of disease in the liver and lungs. The mesenteric glands were healthy, but the intestines were studded with tubercles, also traces in the kidneys, and large growths were on the heart; the femoral lymphatic glands were both a mass of broken-down tubercles, and one mammary gland had lost its function of secreting milk, but I could not detect tubercular growths in its structure. See specimens No. 4.

*Post mortem No. 5.*

Mr. E.'s—3 years old, barren Alderney heifer, bred locally:—Is healthy looking, fat, and ripe for the butcher. Evidence of disease was an immense enlargement of the right ramus of inferior maxillary, with tumors attached; some cicatrices after suppuration, and a large, cancerous-looking bunch of tumours, engorged with blood, and from which a purous discharge escaped. On examination I found the disease involved the whole of the right molar sockets, having ulcerous sores on the buccal membrane, which had communicated with abscesses. The tongue and fauces were free from the disease, also the large lymphatic glands and the parotid: the internal organs were healthy, excepting only one deposit, as large as a horse bean in the lung tissue, and traces in the small intestines, and in one or two of the intestinal lymphatic glands. To the naked eye this case closely resembles actinomycosis. The carcass was very fat, and splendid looking beef, and the owner secured it for his own family use. See specimen No. 5.

*Post mortems Nos. 6, 7.*

On three swine—two at Mr. W.'s slaughter-house, fed on offal; one at Mr. H.'s, joining the Pioneer Factory, fed on milk. They were half-grown store pigs; had fetid ulcerous sores, that seem to originate from subcutaneous abscesses; their respiration was panting, and when moved coughed severely; all were in fair store condition, which indicated chronic disease. In each case the lungs, parotid, and lymphatic glands appeared to be in a tuberculous condition, also the intestines. The mouths and fauces appeared healthy. See specimens Nos. 6 and 7.

*Pathological specimen No. 8.*

From a cancerous growth on a milking cow's rump, the site of a fire-brand mark. Specimen No. 8. The other cases of cancers in the orbital regions I left for another investigation.

*Kiama District.—21st May, 1890.*

## G. E.

Cows—Twenty-five milking, in fair condition. Premises—Poor sheds, and very dirty yards and surroundings. Site—Hill-side. Drainage—None attempted. Water—Spring well. Store—None. Business—Milk sent to Sydney. Utensils—Clean. Remarks—Intends to see if sick cow will make up for beef.

Diseased—One red cow apparently suffering from general tuberculosis.

## W. E.

Cows—Forty milking. Premises—Shed, six bails, yards and all filthy. Site—Between hills. Drainage—None made. Water—Spring well. Store—None. Utensils—Very old, fairly clean. Business—Milk all sent to Sydney. Remarks—Great want of cleanliness.

Diseased—Light roan cow, tubercles in throat.

## J. P.

Cows—Twenty-five milking, in fair condition. Premises—Filthy yards and sheds for three bails. Site—Sloping ground. Drains—None made. Water—Spring well, badly situated below the yards. Store—None. Business—Milk delivered at factory. Remarks—No attempt is made to clean cows' bags or milkers' hands.

Diseased—Roan cow, tubercle off side face and throat. Red and white, lump on front of nose (nasal bone), probably an injury. Light roan, cancer growth on rump.

## T. L.

Cows—Twenty-seven milking, in very good condition. Premises—Good sheds, three bails, stone floor, wants cleaning out. Site—Hilly, good drainage. Water—Spring well, good situation. Store—Good building, the best in the district (sheet-iron and timber). Utensils—Clean. Business—Butter maker. Remarks—This place shows what can easily be done in the shape of buildings; they might be kept cleaner and sweetened by whitewash.

Diseased—One big red cow, lost three-quarters. Suspected to be tubercled.

10th May, 1890.

Mr. E.

Cows—Thirty milking, ten dry. Premises—Shed with four bails, yards rough and dirty. Situation—Hill top. Drainage—Surface. Water—Spring well. Business—Butter factory, churn, and rear calves. Utensils—Clean. Remarks—Healthy-looking, stock in good condition.

Diseased—One dry heifer, actinomycosis in lower jaw.

Mrs. G.

Cows—Twelve milking, in fair condition. Premises—Poor cottages, very neglected, wretched hovel, filthy yards. Site—Hill-top. Drainage—None attempted. Water—Tanks, roof catchment. Store—None; verandah used. Utensils—Clean; sheeting used for strainer. Business—Retail milk in the town. Remarks—At present quite unfit for registration.

Diseased—None seen.

22nd May, 1890.

Mr. C.

Cows—Seventy, milking, in good condition. Premises—Shed for six bails, yards and surroundings were very filthy. Site—Top of Hill. Store—None. Utensils—Clean; under a tree. Water—In tanks and from creek. Business—All milk goes to factory. Remarks—Untidy and neglected place; cleanliness is not thought of.

Diseased—Brindle cow, very bad tubercle throat (in the yard milking); others hinted at, as being left in paddock; I had not time to visit them.

H. F. N.

Cows—Fifty milking. Premises—Shed for five bails being filthy hovels; yard rocky, and could be easily cleaned. Site—Hill-side. Water—Carted from creek. Store—None. Utensils—Clean in open shed. Business—All milk goes to factory. Remarks—Proper and clean premises very much needed, and cleanliness of milkers also.

Diseased—I saw none diseased, as my visit was expected; they were left away in paddock.

Jamberoo.—22nd May, 1890.

S. V.

Cows—Twenty-seven cattle, in poor condition. Premises—Shed five bails, and yards all very dirty. Site—Bad on flat low ground. Water—From creek by carting. Store—None. Utensils—Set about in the open. Business—All milk to factory. Remarks—Undesirable situation and water supply; very dirty and neglected surroundings.

Disease—Red cow with black muzzle has a very suspicious cough.

T. F.

Cows—Seventy milking, in fair condition. Premises—Shed for seven bails; yards and surroundings filthy dirty. Site—Hill-side. Utensils—Clean in a dirty open store. Business—All milk to factory. Remarks—A large business, and well-to-do man; place neglected; drains and altogether very dirty.

Disease—Old roan cow; bad tubercles in throat; another very much wasted chronic tuberculosis.

22nd May, 1890.

T. H.

Cows—Forty-six milking. Premises—Shed, five bails; surroundings neglected and dirty. Site—Hill-side. Drainage—None made. Water—Spring well, and by gravitation through pipes. Store—End of building open. Utensils—Old galvanized, and worn thin. Business—Milk to factory. Remarks—Pigs here, and at the Pioneer Factory adjoining, have the same disease.

Disease—White cow bleeding cancers in orbit; white cow with red head tubercles in throat; roan cow very bad; tubercle throat; killed; pigs ill; one killed.

Mr. C.

Cows—About 100 milking in poor condition. Premises—Good shed for thirty cows; cement floors; wants cleaning out and lime washing; yards and surroundings filthy. Site—Low; sloping to the swamps. Drainage—Neglected. Water—From creek by hydraulic lift. Store—Unclean, and containing much rubbish, machinery, &c. Utensils—Clean. Business—All milk goes to factory. Remarks—Neglected premises, and very unclean, and lots of diseased cattle.

Disease—White-spotted cow, tubercle throat; brindle cow, old; same disease; young white cow, same disease; yellow and white cow, same disease; red cow very bad with same disease; old red cow with same disease.

R. F.

Cows—Forty-seven milking, in fair condition. Premises—Shed, with five bails, all very dirty. Site—Hill-side. Drainage—None formed. Water—Well spring. Store—Open shed used for vessels milk-room a dirty place, with man's sleeping-room in it. Utensils—Unwashed and dirty. Business—Milk goes to factory, but is often stored at night and on Sundays. N.B.—This is the usual district practice.

Disease—Red cow, ulcerating tubercles; very bad throat; killed.

G. W., JUN.

Cows—Fifty milking, in good condition. Premises—Shed, with five bails; good stoned yard, but all very dirty. Site—Hill-side. Drainage—None formed. Water—Well spring. Store—In-house, with copper, saddlery, &c. Utensils—Clean. Business—Milk goes to factory.

Disease—Red cow, bad case tubercle throat; white cow, bleeding cancer in orbit.

21st May, 1890.

E. M'C.

Cows—Fifty-two milking, in good condition and healthy. Premises—Large shed, seven bails, yard, &c., dirty. Water—Tanks and spring well. Store—Clean. Utensils—Clean; use a separator. Business—Butter-maker.

Disease—None.

P.

## P. S.

Cows—Thirty milking, in fair condition. Premises—Poor shed, four bails, very dirty; also yards and general surroundings unclean. Store—None. Utensils—Lying about the place. Water—Spring well. Drainage—None attempted. Business—Half milk to Sydney, half to factory. Remarks—A troublesome and unclean place.

Disease—Red cow, second calf very bad case tuberculosis; would not kill—said it was injury.

## D. W.

Cows—Fifty-five milking, in fair condition. Premises—Shed, seven bails, yards, stores fairly clean. Site—Hill-side. Drainage—None formed. Water—Spring well. Store—Partly open end of shed used. Utensils—Clean. Business—Half milk to Sydney, and half to factory.

Disease—Yellow cow tubercle face and throat (killed); red and white cow, off side jaw and sub-maxillary glands tubercle; white cow, bleeding cancers in orbit.

## I. K.

Cows—Twenty milking, in good condition. Premises—Low situation, three bail sheds, very dirty surroundings. Drainage—Surface into creek. Water—Spring well. Store—Large; smells unwholesome, lined with bags, wants air, light, and lime-washing. Utensils—Zinc and tin; clean. Business—Butter factory. Remarks—Cleanliness required.

Disease—None seen.

Sir.

Board of Health Office, 127, Macquarie-street, Sydney, 3 June, 1890.

I have the honor to acknowledge receipt of yours of the 31st ultimo, and have this day forwarded you samples of diseased animals, as per other side. You will see that there are—Firstly, four specimens from one cow; secondly, two specimens from another; and, thirdly, one specimen from a pig.

These specimens were collected by the Government Veterinarian (Mr. Edward Stanley) in the Kiama District (the first and second from dairy cattle, and the third from a pig fed on milk at a butter factory), and they are labelled in accordance with the views of Mr. Stanley from casual observation.

If you should find tubercle in one or two of the specimens from the first case, it may be unnecessary to examine the whole four from the same case.

I have, &c.,

EDMUND SAGER,  
Secretary.

Dr. John Gibson, Windsor.

NOTE.—Similar letters were addressed to the Hon. Dr. MacLaurin and Professor Wilson.

Report on specimens received from the Board of Health, Sydney, on Tuesday, 3rd June, 1890:—

*Specimens received.*

- First*:—No. 3a—Tubercle, costal pleura, bovine.  
 „ 3b „ bronchial glands, bovine.  
 „ 3c „ parotid gland, „  
 „ 3d „ heart, bovine.  
*Second*:—No. 1a—Tubercle, lymphatic glands, bovine.  
 „ 1b „ liver, bovine.  
*Third*:—No. 6—Tubercle, lung, swine.

In accordance with your instructions, on discovering tubercle bacilli in three of the specimens from the first case, I did not examine the fourth specimen from the same case. All the other specimens I have examined most carefully, microscopically, omitting any detailed description of the naked-eye appearances, as these had, to a very large extent, become altered by the methylated spirit in which they had been preserved. Sections of the different specimens were stained in picro-carminic to demonstrate the ordinary structure, and Liehl-Neelsen's method was followed for the detection of tubercle bacilli, as this method is now looked upon as being the most satisfactory. According to this method the sections are allowed to stain for twenty-four hours in the following stain:—Fuchsin, 1 grm.; Acid Carbolie, 5 C.C.; Alcohol, 10 C.C.; Aq. Dist., 100 C.C. They are then decolourised in 25 per cent. aqueous solution of sulphuric acid, and washed in absolute alcohol until no more colour comes away, then washed in a large basin of water to remove any trace of acid still remaining, and afterwards mounted through oil of cloves in the usual way. If deemed necessary, a contrast stain, such as methylene blue, may be used. The tubercle bacilli, stained in this way, appear at first of a brilliant red colour, but after a time they assume a brownish tinge, which remains for some considerable time until after the lapse of some days or months all colour fades from them and they cannot be seen.

The following is my result of my examination of the various specimens:—

First:—No. 3a.—Tubercle, Costal Pleura, Bovine.

*Picro-carminic stained sections*:—Pleura much thickened, and caseous in some parts of the sections, with calcareous change here and there. Small cell proliferation and tubercle follicle formation outside the caseous portions. Giant cells were seen here and there in the small cell area.

*Liehl-Neelsen stained sections*:—Examined by a  $\frac{1}{2}$ -inch oil immersion lens these sections contained great numbers of tubercle bacilli scattered all over the section. Dense masses of bacilli were seen occupying the interior of giant cells, and groups of them in rosette form in many of the lymphoid cells.

No. 3b.—Tubercle, Bronchial Gland, Bovine.

*Picro-carminic stained sections*:—In the sections examined there were two caseous-looking masses, each about the size of a small pea. A third smaller mass was also seen. The larger masses were sharply defined, and appeared to the naked eye to have a well developed fibrous capsule. In cutting them the knife encountered gritty, calcareous particles. The caseous-looking nodules presented all the appearances of tubercular structure somewhat advanced, centre caseous, partly calcareous, surrounded by an area of small cell proliferation, containing tubercle follicles and giant cells. Scattered over the section a few smaller tubercular nodules were seen.

*Liehl-Neelsen stained sections*:—By the  $\frac{1}{2}$ -inch oil immersion lens enormous numbers of tubercle bacilli were seen in the caseous portions, between the lymphoid cells of the tubercle follicles and in the giant cells.

No.

## No. 3d.—Tubercle, Heart, Bovine.

*Picro-carminic stained sections*:—Beautiful tubercular structure, numbers of tubercular nodules, composed of several tubercle follicles and giant cells. The tubercular process in the sections examined was evidently of a somewhat chronic nature, as most of the nodules were found to be surrounded by dense fully-formed fibrous tissues. Some nodules were caseous in the centre, whilst several had become calcareous. No trace of cardiac muscle was observed.

*Liehl-Neelsen stained sections*:—The chronic nature of the tubercular process noted in the examination of the picro-carminic sections led me to infer that I should not be able to discover very many tubercle bacilli in the specially stained sections, and such proved to be the case. With the  $\frac{1}{2}$ -inch oil immersion lens tubercle bacilli were found, but in very small numbers. I had to examine very carefully indeed before I succeeded in finding any. In one giant cell I counted as many as five tubercle bacilli; but that was in one instance only. All the tubercle bacilli observed in this specimen were in the giant cells, and as a rule only one bacillus was to be seen after examining numbers of giant cells.

## Second:—No. 1a.—Tubercle, Lymphatic Gland, Bovine.

*Picro-carminic stained sections*:—The greater part of the section was caseous in the specimens under examination. The centre of many of the caseous nodules was calcareous. The so-called hyaline-fibroid degeneration, which is so often seen in tubercle nodules, was present in some parts of the section. Outside the caseous portions there were several typical tubercle follicles. There were well marked small cell proliferation and beautiful giant cells.

*Liehl-Neelsen's Sections*:—Tubercle bacilli present in the sections examined, but very few in number. Great care and patience were required, in examining for bacilli, to find any. In one section, after the most careful examination, only four tubercle bacilli were seen—one each in two giant cells, and two in the caseous portions.

## No. 1b.—Tubercle, Liver, Bovine.

*Picro-carminic sections*:—To the naked eye, a well-defined caseous mass was seen at one margin of the section examined, surrounded by what appeared to be a firm capsule. Under the microscope this mass was found to consist of several tubercle follicles, which had coalesced and become caseous, and in parts, calcareous. There was a capsule composed of fully formed fibrous tissue. Within the capsule and external to the caseous parts were numerous typical tubercle follicles with giant cells and small cell proliferation. In close proximity to the outer aspect of the fibrous capsule, and in part appearing as a prolongation from it, a few tubercle follicles were seen occupying some of the portal spaces. Here and there throughout the section one found collections of small round cells—evidently tubercle follicle formation in quite an early stage—situated within certain of the hepatic lobules. The liver cells otherwise appeared normal.

*Liehl-Neelsen stained sections*:—Very few tubercle bacilli found. There were one or two in the lymphatic spaces between the lymph cells, and one or two in giant cells, some with well developed spores. In this, as in the case of No. 1a, very considerable difficulty was experienced in finding tubercle bacilli.

## Third:—No. 6.—Tubercle, Lung Swine.

*Picro-carminic sections*:—One or two caseous nodules visible to the naked eye. At one extremity of the sections examined a rounded mass was seen. The centre was caseous, and outside this there was a zone of small cell proliferation. From this area small cells extended outwards for a short distance along the walls of the pulmonary alveoli. Several of the alveoli in the immediate neighbourhood contained catarrhal cells. This nodule appeared to be in relation to one of the smaller bronchioles. A second nodule was seen at the other extremity of the section, the caseous centre of which had dropped out during the process of cutting and mounting. There were also a few smaller nodules apparently in relation to some of the smaller bronchioles. These smaller nodules consisted of small round cells. Broncho or catarrhal pneumonia was present to a limited extent in the pulmonary tissue in the neighbourhood of these nodules. In addition, there was some degree of small cell proliferation around many of the bronchioles and smaller branches of the pulmonary vessels, pointing to lymphatic irritation. There was considerable œdema of the inter-lobular connective tissue. No giant cells nor tubercle follicle formation were observed.

*Liehl-Neelsen stained sections*:—After the most careful staining and examination no tubercle bacilli were found. But it must not be inferred from this that the condition of caseous broncho-pneumonia which was present in the specimen under consideration was non-tubercular, because of course it is well known that in many cases of undoubted tuberculosis even the best observers fail to detect any tubercle bacilli in some specimens they examine. In these cases pathologists do not rest satisfied with a mere microscopic examination; but proceed to inoculate certain of the lower animals (rabbits, guinea pigs, mice, &c.), with some of the suspected tissue, and note whether, in these animals, tuberculosis develops after the inoculation. I well remember a somewhat similar instance to the one now under consideration coming under my notice whilst I was acting as assistant to Professor Greenfield of the Edinburgh University. A piece of pleura from a pig with the ribs attached was brought to us to be examined for tubercle. There were numbers of caseous nodules in the specimen, but neither Professor Greenfield nor myself could detect any tubercle bacilli. Being satisfied in our own minds that the specimen was tubercular, I was requested to inoculate some of the caseous material into some rabbits, &c., with the result that rapid acute tuberculosis supervened, thus confirming our opinion.

In the specimen No. 6, I did not rest satisfied with staining and examining sections of the lung tissue, but I got some of the caseous material, spread it out, on cover glasses, and stained for tubercle bacilli, but could not detect any.

Should the Board deem it necessary, and should they grant me the requisite permission, I have still some of the caseous material with which I could inoculate some animals, and thus prove conclusively the tubercular or non-tubercular nature of this case. At present all that I can affirm regarding it is that there is a condition of caseous broncho-pneumonia, probably tubercular in its nature.

In conclusion, I must express my regret that the unusually heavy calls, of a rather busy practice, together with the care required in the examination of specimens No. 1a and No. 1b, and especially No. 6, have prevented my sending this report sooner.

I have, &c.,

JOHN GIBSON, M.D.

Dear

Dear Dr. Manning,

University of Sydney, 14 June, 1890.

I enclose a short report on the specimens sent. There can be no doubt from the histological characters of the specimens "2a" and "2b," that they are tubercular, as I found very numerous and typical giant cells, surrounded by tubercular small-celled exudations and caseating areas in the centres of the cellular exudations. The giant-cells are quite pathognomonic.

I think it right to state also that I went through the more tedious process of staining for tubercle bacilli, but from some cause or other the results were negative, though I have not the slightest doubt that there were plenty of bacilli present. I may say that it is a common enough occurrence to have such an apparent failure as reagents have a way of being inconstant in their activity.

Although I unhesitatingly pronounce on the tubercular character of the specimens referred to, I shall be glad to repeat the tests for the bacilli (as I have plenty of material left), if you, for any reason, wish me to do so.

Yours, &c.,

J. T. WILSON.

Dr. F. Norton Manning.

90-3,266.

University of Sydney, 16 June, 1890.

REPORT on specimens sent from office of Board of Health, along with letter from Dr. F. Norton Manning, dated 2/6/90.

Specimen labelled "No. 2a. Tubercle, lung, bovine," in spirits of wine. Sections cut and stained some with picro-carmin, and others with hæmatoxylin. Microscopic examination shows in some places fairly normal lung structure; in other places are large areas of caseating inflammatory material, surrounded by a fibro-cellular structure, exhibiting typical tubercular structure centred round giant cells as foci.

Specimen labelled "No. 2b. Tubercle, uterus, bovine," also in spirits of wine. Sections of the tissue treated as above. Here also were rounded caseous areas, surrounded by zones of tubercular inflammatory exudations, as in lung, and containing typical giant cells. The sites of these tubercular caseous nodules were chiefly in the submucous tissue of the uterine wall.

Specimen labelled "No. 8. Cancer, cuticular, bovine," also in spirits of wine. Sections cut and stained as above showed the structure of typical squamous epithelioma. The main mass of the tumour consisted of a fibrous strand, enclosing in its meshes large areas of epithelial cells, sometimes simply packed together, but in very many places arranged concentrically around a centre of corneous epithelial material, giving the typical "cell nest" or "epithelial globe" appearance.

J. T. WILSON.

Sir,

Macquarie-street, Sydney, 25 June, 1890.

I have the honor to inform you that of the specimens you sent me I have as yet been able to examine only No. 5 A, marked bowel and gland.

The sections obtained from this show numerous unmistakable specimens of the actinomycosis fungus, and the animal from which it was taken would seem to have been in an advanced stage of the disease.

The method of demonstration adopted is a modification of Plant's, staining with Neelsen's fluid, and contrast staining with picric acid.

I took an opportunity of showing the specimens to Dr. W. H. Goode, who happened to visit me while I was at work.

Actinomycosis, or ray fungus, is a very important disease of cattle which has attracted a great deal of attention of late years. I believe its existence has not been recognised in Australia till the other day, when I demonstrated the presence of the ray fungus in a specimen belonging to Mr. Stanley which he was good enough to give me for examination.

Actinomycosis has been for the most part confounded with tuberculosis, until of late years, but those forms of the disease which attack the jawbones and tongue have been very commonly described as cancer.

Like tubercle, actinomycosis is also found in the human subject, affecting the viscera, and occasionally being associated with empyema; it bears a great likeness to consumption.

The importance of this disease among cattle cannot be overrated. I think the Board might add it to the list of diseases already gazetted, and I think it would not be unreasonable for the Board to direct or to undertake an inquiry into the prevalence of the disease throughout the Colony.

I have, &c.,

H. N. MACLAURIN.

The Secretary, Board of Health.

Dear Sir,

Macquarie-street, 10 September, 1890.

Of the remaining specimens I have to report as follows:—

4 A., bovine lung, contains tubercle bacilli; 4 C., Kidney, gave negative results; 5 A., 5 B., bovine glands, maxilla, &c., contain actinomyces.

Yours, &c.,

H. N. MACLAURIN.

E. Sager, Esq.

Macquarie-street, 16 September, 1890.

No. 7.—Swine glands.

Dear Sir,

This has required a long and tedious examination by various modes of staining before definite results could be obtained.

At last I have succeeded, by Gramm's method, in demonstrating several clusters of bacilli which I believe to be those of tubercle; but I have only found them in one of the very numerous sections which I have stained: this explains the delay and difficulty in discovering them.

I am, &c.,

H. N. MACLAURIN.

E. Sager, Esq.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

DISEASES IN STOCK.

(PETITION FROM MAYOR AND OTHERS OF NEW LAMBTON, PRAYING FOR INTRODUCTION OF A BILL TO DEAL WITH.)

*Received by the Legislative Assembly, 10 July, 1890.*

To the Honorable the Speaker and Members of the Legislative Assembly of New South Wales, in Parliament assembled.

The Petition of the undersigned, Mayor, Aldermen, and Council Clerk of the Borough Council of New Lambton, New South Wales,—

HUMBLY SHOWETH:—

1. That at present there are a number of Acts in force dealing with diseases in stock in various ways, but they are not effectual in the object desired, and some stringent and comprehensive measure that would place the power in the hands of the local authorities would, it is considered, be a boon to the general community.

2. Your Petitioners, in consideration of this fact, therefore, pray that your Honorable House will be pleased to have a comprehensive Bill brought in during the present Session of Parliament, dealing with the subject of contagious diseases in animals throughout the Colony, so as to prevent stock so infected being sold in the public saleyards, and to stamp out such disease wherever found.

And your Petitioners, as in duty bound, will ever pray, &c.

*[Here follow 10 signatures.]*



1890.

LEGISLATIVE ASSEMBLY,  
NEW SOUTH WALES.

AGRICULTURAL COLLEGES.

(INFORMATION RESPECTING.)

*Ordered by the Legislative Assembly to be printed, 5 June, 1890.*

[Laid upon the Table in accordance with a promise made in answer to Question No. 2, Votes 18, 5 June, 1890.]

Questions.

- (2.) MR. FULLER *asked* THE SECRETARY FOR MINES AND AGRICULTURE, -  
(1.) Has the Government received any recommendation from Mr. Pudney in regard to the purchase of sites for the purpose of establishing agricultural colleges?  
(2.) If so, what sites have been recommended?  
(3.) How many appointments have been made under the Department of Agriculture (if any) who have been appointed; and what salaries are being paid?

Answers.

- (1.) Mr. Pudney reported on several sites for experimental farms offered to the Government on purchase.  
(2.) He has not recommended any of these sites.  
(3.) Director, H. C. L. Anderson, £800; Inspector (temporary), R. L. Pudney, £350; Statistical Clerk, A. P. Reynolds, £200; Clerk, W. Preedy, £180; Clerk (temporary), A. A. Dunningcliff, £130; Clerk (temporary), G. Valder, £130. Probationer, W. H. Clarke, £50. Professional Staff:—Chemist, Dr. Helms, consulting, £150; Vegetable Pathologist, Dr. Cobb, consulting, £100; Entomologist, A. S. Olliff, consulting, £100; Economic Botanist, F. Turner, consulting, £50.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**METROPOLITAN AGRICULTURAL SOCIETY.**

(RETURN SHOWING AMOUNT RECEIVED FROM GOVERNMENT.)

*Ordered by the Legislative Assembly to be printed, 11 June, 1890.*

RETURN showing the amount of money received from the Government by the Metropolitan Agricultural Society since its formation, as Subsidies and as Special Grants.

Year.	Subsidies.		Conditions on which Subsidies were obtained.	Special Grants (unconditional).		Special Grants (Conditional).		Total.	
	£	s. d.		£	s. d.	£	s. d.	£	s. d.
1869.....			.....	100	0 0	+1,000	0 0	1,100	0 0
1870.....			.....	4,000	0 0	.....	.....	4,000	0 0
1873.....	1,136	5 0	Society's share of <i>pro rata</i> distribution of annual grant.*	.....	.....	.....	.....	1,136	5 0
1874.....	816	4 7	do do	.....	.....	.....	.....	816	4 7
1875.....	744	9 0	do do	.....	.....	.....	.....	744	9 0
1876.....	890	9 4	do do	.....	.....	.....	.....	890	9 4
1877.....	1,107	13 8	do do	.....	.....	.....	.....	1,107	13 8
1878.....	949	4 8	do do	.....	.....	.....	.....	949	4 8
1879.....	496	10 8	do do	.....	.....	.....	.....	496	10 8
1880.....	209	18 9	do do	.....	.....	.....	.....	209	18 9
1881.....	301	17 9	do do	.....	.....	.....	.....	301	17 9
1882.....	317	7 4	do do	5,000	0 0	+4,635	16 5	9,953	3 9
1883.....	194	10 3	10s. for every £1 raised by private contribution.	.....	.....	.....	.....	194	10 3
1884.....	1,108	3 0	£1 for every £1 raised by private contribution.	.....	.....	.....	.....	1,108	3 0
1885.....	3,396	5 10	do do	.....	.....	.....	.....	3,396	5 10
1886.....	622	4 6	do do	.....	.....	.....	.....	622	4 6
1887.....	693	19 0	do do	1,500	0 0	.....	.....	2,193	19 0
1888.....	1,129	14 0	do do	7,000	0 0	.....	.....	8,129	14 0
1889.....	461	4 3	10s. for every £1 raised by private contribution.	250	0 0	.....	.....	711	4 3
1890.....	323	1 6	do do	500	0 0	.....	.....	823	1 6
£	14,899	3 1		18,350	0 0	5,635	16 5	33,884	19 6

\* Distribution based on private contributions. † £1 for every £1 raised by private contribution.

The Treasury, New South Wales,  
11th June, 1890.

J. N. OATLEY,  
Sub-Accountant.



1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## ITALIAN SETTLEMENT AT THE RICHMOND RIVER, KNOWN AS "NEW ITALY."

(REPORT BY THE DIRECTOR-GENERAL OF FORESTS ON.)

*Ordered by the Legislative Assembly to be printed, 26 November, 1890.*

The Director-General of Forests to The Colonial Secretary.

Sir,

Forest Department, 28 October, 1890.

In accordance with instructions received from you, I recently visited the settlement known as "New Italy," and which is situated some 7 or 8 miles from Woodburn, in the Richmond River District, and have now the honor to report my impressions of the settlement, and to make such suggestions in regard to it as have arisen therefrom.

I interviewed several of the leading members of the community, and to them explained the object of my visit, and of your earnest desire for their welfare and prosperity; and they desired me to convey to you their appreciation of your kindness and sympathy.

I find that there is a population of something like 250 Italians in the settlement, of which, perhaps, about 100 are adults, and that the several selections have been taken up contiguous to each other, thus making the community united, and the members of it within easy reach of each other.

From information received, and also from what came under my own observation, there is no doubt but that these Italians are a hard-working, sober, industrious, law-abiding people, and are proving themselves excellent colonists in every respect. They are thoroughly united in themselves, and give no trouble to the neighbouring settlers.

With regard, however, to the site of the settlement itself, I regret that it is not within my power to speak so favourably. The soil in places is of a somewhat cold and apparently uninviting nature, and requires a considerable amount of labour to subject it to profitable cultivation. Only a few miles further away, and nearer the Richmond River, a character of soil of a more suitable nature for *general tropical agriculture* could easily have been obtained. For the cultivation of various products, however, the site is all that could be desired, but the variety of these is limited in consequence of the special character of the soil and its want of *humus*.

The soil is excellently well adapted for the cultivation of the vine for the purpose of wine-making, and this fact has been recognised and acted on by most of the settlers at New Italy. On all the selections visited by me, from one to two and three acres of land had been carefully cultivated, and showed very fine crops of various kinds of vines. A considerable amount of wine is made by the settlers annually, but, as yet, principally only for their own consumption. There are great possibilities in connection with the making of light wines on the soil of New Italy, but systematic action is necessary for the production of a good article. This will no doubt come about in due time.

The land is heavily timbered, and requires a very considerable amount of labour to clear it, and hence the area of land at present under cultivation in the settlement is not very great, as the whole of the work has to be done by the Italians themselves, in consequence of their being unable to employ outside labour.

There is a State Public School in connection with this settlement. A Mr. Morgan is the teacher, and he informed me that the attendance of Italian children was good, very regular, and averaged about thirty-five pupils per day of various ages. All the children who had been born in the Colony and attended school were capable of speaking the English language very well indeed, and in several cases acted as interpreters between their parents and myself.

From my conversations with these Italians, and also judging from the excellent manner in which they have carried out the improvements already carried out upon their selections, it is evident to me that they have, as a body, decided to permanently settle upon the land.

According to your instructions, I entered carefully into the subject of the probability of establishing the industry of sericulture in this settlement, and have much pleasure in reporting that, in my opinion, it is one of the most important which could be undertaken in connection with it. I find that all the original settlers (*i.e.*, those who came from Italy proper) are well acquainted with the various ramifications of the industry; and it is therefore only a matter of application in order to make it the staple

production of this people. The soil, climate, and situation are all well adapted to the successful production and culture of the white mulberry, the leaves of which tree form the principal food of the silk-worm. Therefore, from the fact that the people themselves are well acquainted with the industry, and also from the fact that the work is one in which both women and children are peculiarly fitted to take part, it appears to me that sericulture should become the main support of these people. I may say that they one and all expressed the opinion that they would prefer the work of sericulture to any other.

Taking all these matters into consideration then, I have respectfully to recommend that every encouragement should be given by the Government to the settlers of New Italy to establish a thorough system of reproductive sericulture in their midst; and in connection with this I have much pleasure in herewith forwarding a full report upon the subject from Mr. Champ. who, in accordance with your desire, accompanied me on my visit to the settlement. I will not at present go into details as to how this might be done, as these can be fully gone into later on, should you approve of the suggestion. I may say that there would be little or no difficulty in raising 300,000 mulberry plants in our nurseries next season for distribution amongst the Italians.

I have, &c.,

J. EDNIE BROWN,  
Director-General of Forests.

(Enclosure.)

To the Director-General of Forests,  
Forest Department, Sydney,—

72, Newtown Road, Sydney, 24 October, 1890.

Sir,

Having, as requested, visited the Italian settlement in the county of Richmond, N.S.W., known as New Italy, for the purpose of ascertaining its suitability to the introduction of sericulture, I beg to report as follows:—

#### *The Mulberry-tree.*

I find that the soil, though poor compared with that of some of the surrounding country, is suitable for the cultivation of the mulberry-tree, and that in the one or two instances where these trees have already been planted they have thrived well.

These few trees planted by the Italians, though not of the best sort for sericulture (they being one of a Chinese species of black mulberry), showed a very good growth and abundance of leaves, besides a quantity of fruit, and it can therefore be taken for granted that the white mulberry, which is much more prolific in leaves, less nourishment being taken up in the fruit, would give a still better return of leaves. The climate, as is well known, is exceptionally suited for the growth of this tree.

From trees pointed out to me amongst these few referred to as being only two years old, I should judge there could be plucked some 3 or 4 lb. of leaves, whereas in most other countries, and in the more southern portions of this continent, it would probably take four years before such a return could be obtained.

I would here point out that too rich a soil is not always the best for the production of good silk, or rearing worms, though of course the tree itself grows more luxuriantly. This same luxuriant growth, however, is inclined to produce a too succulent leaf, and, if great care be not taken, to endanger the health of the worms in their latter stages, when they eat voraciously.

I therefore think that the soil of New Italy, combined with the splendid climate the country possesses, would grow a mulberry-tree well suited to silk-culture.

#### *The Silk-worm.*

The climate would be very suitable indeed for the rearing of the silk-worm, I should say even more so than it is in other parts of Australia, where worms have already been most successfully raised, experimentally.

The cool nights, absence of hot winds and drought, and the general even temperature of the summer would be most conducive to the general health of the worm.

The trees too, are long in leaf, and would enable many "crops" or hatchings to be obtained; a most important item in the pecuniary success of the undertaking, as of course the more times in a year the magnaneries and trees, can be utilised the greater the proportionate return.

#### *Labour.*

As regards the obtaining of a sufficient quantity of concentrated labour, that would be at the same time suitable and efficient, to enable the industry to be started on such a scale as would show its worth, I consider that under no circumstances could a more favourable spot be found in these Colonies than New Italy, for I find on interviewing these Italians that the whole of the adults have had, more or less, some experience in their own country of this culture, one man informing me that his wife had had twenty years, experience in an Italian "filature."

As can be easily understood, this would be a great help in successfully introducing the industry.

Having put the question to them, they seem to be united in opinion that the industry would do well, and all appear to be most anxious to take the matter up if they are enabled to do so, expressing the opinion that more money could be made and quicker returns obtained from sericulture than from viticulture, in which latter they are already doing some little cultivation.

There are about forty Italian families in this settlement, all bound close together by national ties and co-operating in every way for their general advancement, and, as I have already mentioned, all with some knowledge of sericulture, but they are so far without the means of utilising this knowledge.

They are an industrious, thrifty community, judging from what they have already done, in a small way, on their selections in other cultures, with the limited means at their command, and were they in a position to carry on the culture of silk, would be capable, as a body, of producing some comparatively handsome results.

*Quantity*

*Quantity and value of Cocoons that might be produced.*

Approximately, I should say these people would be capable, as far as their labour is concerned, of producing the following quantity and value of silk-cocoons:—

There are (say) forty families, and most of these are composed of eight or ten individuals, but, supposing an average be taken of only four per family that could attend to the industry. A 10-oz. silk-worm-house or "magnanerie" would take four people, if needs be, juveniles, to attend to it during the education of the worms. Forty families of four each would, therefore, be capable of taking charge of forty 10-oz. "magnaneries," or, in other words, of rearing 400 oz. of eggs or "grain."

These forty "magnaneries" should give about  $\frac{1}{2}$  ton of cocoons per "magnanerie," valued at the present time at from £100 to £150 per ton.

Taking an average (say) £125 per ton, the produce of the forty "magnaneries" or 400 oz. eggs would be, therefore, £2,500. This would be for one crop only, or for work extending over a period of about six weeks.

But supposing, to take a small estimate, three crops are produced, and that two months are taken to rear each one, which allows a good margin for operations connected with the fresh hatchings, and getting previous crops ready for export, &c., there would be a production of cocoons, in six months, value about £7,500. Compared with what these men are now earning and producing, I am sure this would be to them a fortune.

*Quantity of Trees requisite to produce above results.*

In order to obtain the above results there would have to be some considerable quantity of mulberry-trees grown and silk-worm grain obtained, far more, I am confident, than these people are in a position to secure, however hard they may work.

I should estimate that to produce the above quantity of cocoons, and rear the necessary number of worms, viz., 400 oz. grain, some 250,000 young trees would be required, and might be planted in (say) 300 or 400 acres of land, though every year that is added to the age of these trees would mean a much larger silk-productive capacity.

In this district, from what I have seen and referred to above, a two-year-old tree would produce at least 3 lb. of leaves per picking.

This would give a total of 750,000 lb. for the above number of trees.

It takes about 20 lb. leaves to produce 1 lb. cocoons, giving about 37,500 lb. cocoons, or about the equivalent of the above product of 400 oz. grain, viz., 40,000 lb. = 20 tons—1 oz. grain producing about 100 lb. cocoons.

*Assistance that might be given.*

I think this might be divided into three heads—

1. Tree-planting.
2. Distribution of silk-worm grain.
3. The building, or assisting the building, of "magnaneries."

1. I should strongly recommend that such a plantation as I mention above be made by the Government and at the same time as many trees given to the Italians as they are able to plant on their own selections.

A nominal sum might be charged for the leaves plucked from the main plantation.

I may add that mulberry-farming is carried on upon a large scale in other countries as a distinct business, the leaves being sold, somewhat as I suggest above, to the cocoon-producers.

2. Good healthy silk-worm grain might be secured and distributed in proper quantities as soon as the trees are ready.

Such grain could, I believe, be obtained by arrangement from Dr. Cleland, of Adelaide, South Australia, and Mr. George Thorne, of Castle Hill, New South Wales.

Both of these gentlemen have very fine races of worms, quite free from any disease, and thoroughly acclimatised.

They have only small quantities at present, but with proper notice I have no doubt arrangements could be made with them for multiplying the grain, instead of their "choking" the bulk of their cocoons, as they are in the habit of doing.

This would be infinitely preferable to importing grain, as you can never be certain of what you are getting.

3. "Magnaneries" might be erected and let to the rearers at a small rental, or, according to circumstances, they might be assisted to erect them on their own selections.

But in any case it would be advisable to avoid, if practicable, the rearing of worms by individuals in small quantities, in improperly-constructed rooms, as these people would undoubtedly be tempted to do without assistance, owing to their pecuniary inability to procure better accommodation, and in order to get a quick return, thus producing an inferior article, and possibly discouraging others from attempting the industry.

These "magnaneries" might be constructed at small expense of "dab wattle" or mud walls, with thatched or bark roofs and gauze openings. This would be, independently of the cheapness, better, in my opinion, than possibly more expensive material, for keeping the interior at a suitable temperature. I observed a very good building (residence) built by one of the Italians (Antoniolli), of similar material.

It is impossible to say now what the exact cost of such buildings would be, but they need be only of the simplest structure and roughest material; in fact, a simple shed, care always being taken, however, to have proper ventilation and light—two important items. The fittings also, although they need be only of rough material, must be constructed in a proper way, and great care taken to avoid the attacks of any kind of vermin.

The outside measurement of a 10-oz. "magnanerie" should be about 60 feet by 20 feet.

It would be very advantageous to have a "magnanerie" in connection with the above plantation, belonging to the Government, devoted to the production of sound "grain" for distribution, which could at the same time be used for giving instruction to those who needed it.

*General Remarks.*

I may add that there is little doubt that, were once the industry proved to be a success in this district, and the people shown the basis upon which to work, sericulture in its various branches would spread further afield by private enterprise.

I have here only dealt with the production of cocoons, which, however, would find a ready sale on European markets, or even in India, and can, after proper desiccation, be press-packed and exported in bales, as is other produce.

Reeling the cocoons into silk, however, should, of course, undoubtedly be ultimately undertaken, but would require proper "plant" and more or less skilled labour, some of which latter, I am convinced, could be obtained amongst these Italian women. It would, however, be better to first prove the cocoon-raising a success.

In concluding, I beg to again allude to the one or two points that make New Italy almost a unique place in these Colonies for the successful introduction of sericulture:—

A perfect climate.

A suitable soil.

A small but concentrated population of Italians all more or less cognisant of the culture, and willing to work at it.

Large families of children, which would be only too glad to work and supply the juvenile labour, so requisite for sericulture.

I am, &c.,

REGINALD CHAMP.

Reginald Champ, Esq., to The Director-General of Forests.

Sir,

Sydney, 4 November, 1890.

Referring to my report concerning the introduction into this Colony of sericulture, I would point out that if the Government intends taking any steps in the matter, it would be well to do so *at once*, as regards one important item, viz., the multiplying of the available "grain" in the Colonies, as the worms are even now about to spin, and will in the ordinary course be "choked" or killed, if other arrangements be not made.

The two gentlemen I alluded to in my report, viz., Dr. Cleland, of South Australia, and Mr. Thorne, of this Colony, would be, I am sure, quite willing to make any reasonable arrangement with a view to the above, and thus a season would be saved.

I am, &c.,

REGINALD CHAMP.

Forwarded to the Hon. the Colonial Secretary respectfully requesting that this letter be read in connection with my report upon the subject.—J.E.B., D.-G. Fts., 8/11/90. The Principal Under Secretary, B.C., 9/11/90.

1890.

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LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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VINE DISEASES ACTS FURTHER CONTINUATION BILL  
(MESSAGE No. 71.)

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*Ordered by the Legislative Assembly to be printed, 5 December, 1890.*

---

ALFRED STEPHEN,

*Message No. 71.*

*Lieutenant-Governor.*

In accordance with the provisions contained in the 54th section of the Constitution Act, the Governor recommends for the consideration of the Legislative Assembly the expediency of making provision to meet the requisite expenses in connection with a Bill to continue the "Vine Diseases Act of 1886" and the "Vine Diseases Act Amendment Act of 1888" for a further period of one year.

*Government House,*

*Sydney, 5th December, 1890.*

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1889.

NEW SOUTH WALES.

ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR  
EXTERMINATION OF RABBITS IN AUSTRALASIA.

PROGRESS REPORT,  
MINUTES OF PROCEEDINGS,  
MINUTES OF EVIDENCE,

AND

APPENDICES.



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Presented to Parliament by Command.

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SYDNEY: CHARLES POTTER, GOVERNMENT PRINTER

1890.

38 (7)—a



## Commission.

VICTORIA, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen,  
Defender of the Faith, and so forth,—

To our trusty and well-beloved—

HENRY NORMAN MACLAURIN, Esquire, M.D.,	}	New South Wales.
WILLIAM CAMAC WILKINSON, Esquire, M.D., M.P.; and		
EDWARD QUIN, Esquire,		
HARRY BROOKES ALLEN, Esquire, M.D.,	}	Victoria.
EDWARD HAREWOOD LASCELLES, Esquire,		
ALFRED NAYLOR PEARSON, Esquire, F.R.Met.Soc., F.C.S., A.I.C.,		
ALFRED DILLON BELL, Esquire, New Zealand.		
EDWARD CHARLES STIRLING, Esquire, M.D.,	}	South Australia.
ALEXANDER STUART PATERSON, Esquire, M.D.,		
JOSEPH BANCROFT, Esquire, M.D., Queensland.*		
THOMAS ALFRED TABART, Esquire, Tasmania.		

Greeting:

WHEREAS the Government of our Colony of New South Wales has invited the Governments of our Colonies of Victoria, New Zealand, South Australia, Queensland, Tasmania, and Western Australia to nominate skilled and experienced persons to make, in association with the above-mentioned representatives of our first-named Colony, an inquiry and a report on the matters hereinafter specified: And whereas the Governments of our said Colonies of Victoria, New Zealand, South Australia, Queensland, and Tasmania have respectively made such nominations accordingly: And whereas the Government of our said Colony of Western Australia has declined to make a nomination to such Commission: Now know ye, that we, reposing great trust and confidence in your ability, zeal, industry, discretion, and integrity, do by these presents authorize and appoint you or any three or more of you, as hereinafter mentioned, to make a full and diligent inquiry as to whether or not the introduction of contagious diseases amongst Rabbits by inoculation or otherwise, or the propagation of diseases natural to Rabbits, for the purpose of destroying them, or promoting their destruction, will be accompanied or followed by danger to human health or life, or to animal life other than Rabbits, or to interfere injuriously with the profitable carrying on of the agricultural or pastoral pursuits followed by the tillers or occupants of public or private lands in our Australian Colonies; if either or any of the above means are dangerous—to what extent; if not so dangerous as to justify absolute prohibition, under what conditions and restrictions should such inoculation or propagation be permitted to be introduced and carried on, and generally to inquire into and report to us upon the several methods or means proposed or that may be proposed to the Governments of our several Colonies concerned for the purpose of checking or suppressing the Rabbit pest in the said Colonies, and which may be referred to you by us for the purpose of inquiring into and reporting upon by you: And we do by these presents grant to you, or any three or more of you, at any meeting or meetings to which all of you shall have been duly summoned, full power and authority by all lawful ways or means to call before you all such persons as you may judge necessary, by whom you may be the better informed of the truth in the premises, and to require the production of all such books, papers, writings, and all other documents as you may deem expedient, and to visit and inspect the same at the offices or places where the same or any of them may be deposited, and, generally, to inquire of the premises: And you will be provided with such clerical and other assistance as may be deemed necessary for enabling you duly to execute this our Commission: And our further will and pleasure is, that you do within one month after the date of this our Commission, or as soon as the same can be done, using all diligence, certify to us, in the office of our Colonial Secretary of our said Colony of New South Wales, under your or any three or more of your hands and seals, what you shall find touching the premises: And we hereby command all Government Officers and other persons whomsoever within our said Colony of New South Wales, that they be assistant to you and each of you in the execution of these presents: And we do hereby empower you to elect one of your number to be President of this our Commission, which said Commission we declare to be a Commission for all purposes of the Act 44 Victoria No. 1, intituled "*An Act to regulate the taking of Evidence by Commissioners under the Great Seal*."

In testimony whereof, we have caused these our Letters to be made Patent, and the Great Seal of our Colony to be hereunto affixed.

Witness our right trusty and well-beloved Councillor, CHARLES ROBERT BARON CARRINGTON, Knight Grand Cross of our Most Distinguished Order of Saint Michael and Saint George, our Governor and Commander-in-Chief of our Colony of New South Wales and its Dependencies, at Government House, Sydney, in New South Wales aforesaid, this sixteenth day of April, in the fifty-first year of our Reign, and in the year of our Lord one thousand eight hundred and eighty-eight.

(L.S.) CARRINGTON.

By His Excellency's Command,  
HENRY PARKES.

Entered on record by me, in Register of Patents, No. 13, pages 175-G, this sixteenth day of April, one thousand eight hundred and eighty-eight.

For the Colonial Secretary and Registrar of Records,  
CRITCHETT WALKER,  
Principal Under Secretary.

\* At a meeting of the Royal Commission, held in Melbourne on 13th October, Henry Tryon, Esq., presented a document under the great seal of the Colony of New South Wales appointing him an additional member of the Commission, representing the Colony of Queensland,

## Commission.

VICTORIA, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen,  
Defender of the Faith, and so forth,—

To our trusty and well-beloved—

HENRY TRON, Esquire.

Greeting:

WHEREAS by an instrument under the Great Seal of our Colony of New South Wales, bearing date the sixteenth day of April last, we did appoint certain gentlemen therein named to make a full and diligent inquiry as to whether or not the introduction of contagious diseases amongst Rabbits by inoculation or otherwise, or the propagation of diseases natural to Rabbits, for the purpose of destroying them, or promoting their destruction, will be accompanied or followed by danger to human health or life, or to animal life other than Rabbits, or to interfere injuriously with the profitable carrying on of the agricultural or pastoral pursuits followed by the tillers or occupants of public or private lands in our Australian Colonies; if either or any of the above means are dangerous—to what extent; if not so dangerous as to justify absolute prohibition, under what conditions and restrictions should such inoculation or propagation be permitted to be introduced and carried on, and generally to inquire into and report to us upon the several methods or means proposed or that may be proposed to the Governments of our several Colonies concerned for the purpose of checking or suppressing the Rabbit pest in the said Colonies, and which may be referred to our said Commission by us for the purpose of inquiry and report: And whereas the Government of our Colony of Queensland has represented the advisability of appointing an additional member of such Commission: Now, therefore, know you, that we, of our especial grace, have thought fit to appoint, and do hereby appoint you to be such additional Commissioner accordingly.

In testimony whereof, we have caused these our Letters to be made Patent, and the Great Seal of our Colony to be hereunto affixed.

Witness our right trusty and well-beloved Councillor, CHARLES ROBERT BARON CARRINGTON, Knight Grand Cross of our Most Distinguished Order of Saint Michael and Saint George, our Governor and Commander-in-Chief of our Colony of New South Wales and its Dependencies, at Government House, Sydney, in New South Wales aforesaid, this twenty-fourth day of August, in the fifty-second year of our Reign, and in the year of our Lord one thousand eight hundred and eighty-eight.

(L.S.)

CARRINGTON.

By His Excellency's Command,

HENRY PARKES.

Entered on record by me, in Register of Patents, No. 13, pages 5,239-240, this twenty-fifth day of August, one thousand eight hundred and eighty-eight.

For the Colonial Secretary and Registrar of Records,

CRITCHETT WALKER,

Principal Under Secretary.

PROCLAMATION BY THE GOVERNMENT OF NEW SOUTH WALES.

EXTERMINATION OF RABBITS.

Department of Mines, Sydney, 31st August, 1887.

It is hereby notified that the Government of New South Wales will pay the sum of £25,000 to any person or persons who will make known and demonstrate at his or their own expense any method or process not previously known in the Colony for the effectual extermination of rabbits, subject to the following conditions, viz. :—

1. That such method or process shall, after experiment for a period of twelve months, receive the approval of a Board appointed for that purpose by the Governor with the advice of the Executive Council.
2. That such method or process shall, in the opinion of the said Board, not be injurious, and shall not involve the use of any matter, animal or thing, which may be noxious to horses, cattle, sheep, camels, goats, swine, or dogs.
3. The Board shall be bound not to disclose the particulars of any method or process, unless such Board shall decide to give such method or process a trial.

FRANCIS ABIGAIL.



## INDEX TO SECTIONS OF REPORT.

	PAGES.
Section I.—Report of Proceedings of Commission ... ..	1 to 36
Section II.—Minutes of Evidence given before the Commission ... ..	37 to 107
Section III.—Evidence given before the Executive Committee, at Tintinallogy and elsewhere	107 to 114
Section IV.—Evidence concerning Rabbit Mortality in New Zealand, by Mr. Coleman Phillips ... ..	115 to 123
Section V.—Statement made in lieu of evidence by Mr. E. H. Lascelles, a Member of the Commission ... ..	123 to 125
Section VI.—Minutes of Proceedings of the Experiment Committee ... ..	125 to 133
Section VII.—Report of the Experiment Committee ... ..	133 to 136
Section VIII.—Description of the Laboratory Buildings at Rodd Island ... ..	136 to 137
Section IX.—Report on Rabbit with bladder-worm disease ... ..	137
Section X.—Report on the Experiments carried out by M. Pasteur's representatives ...	138 to 143
Section XI.—Experiments with Microbes of Chicken-cholera conducted by Dr. Katz, chief expert to the Commission ... ..	143 to 182
Section XII.—Investigation into fowl diseases, with a view to ascertain whether Fowl-cholera exists in the Australasian Colonies or not ... ..	182 to 188
Section XIII.—Description of the symptoms and <i>post-mortem</i> appearances in Fowl-cholera	188 to 189

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## INDEX TO APPENDICES TO REPORT.

	PAGES.
1. Schemes for the extermination of Rabbits by disease, as classified and reported on by the Correspondence Committee* ... ..	190
2. Expenditure by the Governments of the several Colonies in connection with Rabbit Destruction ... ..	190 to 192
3. Letters from M. Pasteur, extracted from papers on Rabbit Destruction, submitted to the Legislative Assembly of New South Wales, and ordered to be printed (March, 1888)	192 to 198
4. M. Pasteur's Letter to the Chief Inspector of Stock ... ..	198
5. Report by Dr. Bancroft of the visit of the Commission to Dr. Ellis' house, and of examination of diseased Rabbits from Tintinallogy ... ..	198 to 199
6. Abstract of Life History of <i>Coccidium oviforme</i> , by Professor Allen ... ..	199 to 200
7. Reports by Dr. Bancroft and Dr. Wilkinson concerning their visits to Tintinallogy ...	200 to 202
8. Professor Thomas' Report on diseases affecting Rabbits in the Wairarapa District, New Zealand... ..	202 to 214
9. Letter from Mr. Hawkins, of North Wairarapa (N.Z.), concerning bladder-worm disease	214
10. Nasal catarrh in Rabbits ... ..	215
11. Communications from Witnesses relative to Statements made in Evidence ... ..	215 to 216

\* Omitted by direction of the Honorable the Colonial Secretary.



## PROGRESS REPORT.

To His Excellency the Right Honorable CHARLES ROBERT, BARON CARRINGTON, Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George, a Member of Her Majesty's Most Honorable Privy Council, Governor and Commander-in-Chief of the Colony of New South Wales and its Dependencies.

MAY IT PLEASE YOUR EXCELLENCY,—

We, the undersigned Members of the Royal Commission appointed "To make a full and diligent inquiry as to whether or not the introduction of Contagious Diseases amongst Rabbits, by inoculation or otherwise, or the propagation of Diseases natural to Rabbits, for the purpose of destroying them, or promoting their destruction, will be accompanied or followed by danger to human health or life, or to animal life other than Rabbits, or to interfere injuriously with the profitable carrying on of the agricultural or pastoral pursuits followed by the tillers or occupants of public or private lands in our Australian Colonies; if either or any of the above means are dangerous, to what extent? if not so dangerous as to justify absolute prohibition, under what conditions and restrictions should such inoculation or propagation be permitted to be introduced and carried on, and generally to inquire into and report to us upon the several methods or means proposed or that may be proposed to the Governments of our several Colonies concerned for the purpose of checking or suppressing the Rabbit Pest in the said Colonies, and which may be referred to you by us for the purpose of inquiring into and reporting upon by you," beg to submit the following Progress Report:—

### PRELIMINARY WORK.

The Commission assembled for the first time on the 16th day of April, 1888, at Sydney, representatives of the Colonies of New South Wales, Victoria, South Australia, Queensland, and Tasmania being present. Dr. MacLaurin, one of the representatives of the Colony of New South Wales, was unanimously elected President of the Commission. A general discussion ensued in which all the members took part. The Commission then met daily, with the exception of one short adjournment, until the preliminary business was completed. At the fourth meeting the representative of the Colony of New Zealand associated himself with the Commission. At the request of the Commission the representatives of M. Pasteur received permission to introduce into the Colony of New South Wales cultivations of the microbes of chicken-cholera, on condition that they would undertake to conduct no experiments therewith without the sanction of the Commission. In order to test fully and safely the various schemes proposed for the destruction of rabbits by disease, the Commission immediately took steps to obtain a suitable laboratory in which small experiments might be conducted; and also an island infested with rabbits, and an inland area similarly infested and surrounded by rabbit-proof fencing, in which experiments could be conducted on a larger scale and under normal conditions. The evidence of Henry Augustus Ellis, Esquire, M.B., was taken concerning the great mortality which had prevailed among rabbits on Tintinallogy Station, bordering on the Darling River in New South Wales, and concerning the experiments which had been conducted by Herbert Pickering Butcher, Esquire, M.R.C.S., Eng., and himself in connection with the so-called Tintinallogy disease. The Commission then proceeded to the residence of Dr. Ellis, and examined certain rabbits suffering from the so-called disease.

At the request of Drs. Butcher and Ellis it was resolved that all particulars submitted by them concerning this disease would be considered confidential.

In consequence of a letter from M. Pasteur's representatives, it was resolved that in accordance with the terms of the Proclamation of the Government of New South Wales, the Commission would treat as confidential the details of any method that might be examined, but not adopted for trial by the Government.

The representatives of M. Pasteur were subsequently examined concerning the condition of the cultures of the microbes of chicken-cholera, which they were about to introduce into New South Wales, and the method which they proposed to pursue in order to exterminate rabbits. They were requested to prepare a written statement in connection with the scheme of M. Pasteur, and it was arranged that facilities be granted to them for the conduct of preliminary experiments at the laboratory of the Board of Health under such precautions as Dr. MacLaurin, the President of the Commission and of the Board of Health, might prescribe. It was ordered that a supply of rabbits be obtained for purposes of experiment. A schedule of experiments was adopted by which to test the utility of chicken-cholera and of the so-called Tintinology disease for the destruction of rabbits. Dr. Katz, Ph.D., was appointed chief expert officer for the conduct of experiments under the direction of the Commission, and a Committee, hereinafter called the Experiment Committee, was appointed to watch the experiments on behalf of the Commission. The representatives of M. Pasteur, on April 24th, submitted their written statement, including a list of the experiments of demonstration which they proposed to make. They were then examined concerning the existing evidence in favour of M. Pasteur's scheme. On April 25th a second general discussion was held, at the close of which the order of experiments was defined, and it was resolved that the Experiment Committee should have full discretion in all matters concerning the conduct of experiments within the terms of the Commission, and in all matters regarding the progress of the inquiry, subject to the limitations already determined by the Commission. Statistics concerning the cost of rabbit destruction in New South Wales and Victoria were received, and steps were taken to obtain like information from other Colonies. On April 26th the last meeting of the first session of the Commission was held, when a memorandum was received from the Rabbit Branch of the Lands Department of New South Wales, and a minute from the Under Secretary for Lands, forwarding for consideration by the Commission all the mechanical devices, &c., which had been submitted to the Government of New South Wales in connection with rabbit destruction. It was resolved that these appliances should be placed in some suitable store where they might be inspected by members, and the further consideration of their merits was postponed. The Experiment Committee was requested to scrutinize the correspondence concerning these appliances which was then in the possession of the Hon. the Minister of Mines. It was resolved that two members of the Committee should form a quorum and the Committee was requested to elect a chairman, who should have general control over the experiments about to be adopted. The Hon. the Secretary for Lands invited the Commission to take into consideration the question of the proper width and mesh of rabbit-proof netting fencing. It was accordingly resolved that a Committee, consisting of the members representing the Colony of Victoria, with such other members as were able to attend, should take evidence in Victoria from witnesses who had practical experience in the use of rabbit-proof fencing; and this Committee was authorised to make public advertisement inviting such evidence. The Commission advised that licenses to prosecute their experiments with the so-called Tintinology disease might be granted to Doctors Butcher and Ellis with safety to the public health. It was then resolved that on or about May 23rd the Commission should meet in Adelaide, and investigate the action of the disease known as rabbit scab, and subsequently proceed to Silverton, and if necessary to Tintinology or elsewhere, to take evidence concerning the so-called Tintinology disease. Steps were taken to secure the presence at Silverton of Dr. Butcher, and of rabbit inspectors and others who could give evidence concerning the mortality among rabbits

rabbits at Tintinallongy, and the Government of South Australia was invited to provide facilities for the work of the Commission in South Australia. The first session of the Commission then closed.

#### APPOINTMENT OF EXPERIMENT COMMITTEE AND EQUIPMENT OF LABORATORY.

On the following day, April 27th, the first meeting of the Experiment Committee was held, and Dr. W. Camac Wilkinson was elected chairman. The minutes of the proceedings of this Committee are set forth in Section VI of the detailed report. At the outset great difficulty was experienced in obtaining a suitable site for a laboratory, in which the schedule of experiments adopted by the Commission could be executed. Many places were visited, which were in some respects capable of adaptation to the purpose, but some serious difficulty presented itself in every instance. It became evident that no suitable building could be obtained in any inhabited neighbourhood, without risking interruption of the experiments, on the ground of danger to the public health. Ultimately, on May 4th, after communication with the Hon. the Secretary for Lands, Rodd Island was set apart for the use of the Committee as an experimental station. The necessary plans were speedily prepared, and the works were executed with admirable expedition by the Department of the Colonial Architect of New South Wales. Mr. A. N. Pearson, one of the representatives of the Colony of Victoria, rendered most important service in connection with the designing of the station, and with the supervision of all the work. A description of the station is given in Section VIII of the detailed report, so that here it need only be said that the island is surrounded by a broad belt of water; that the general enclosure, in which animals are kept, measures nearly a quarter of an acre, with stalls and pens, an aviary, artificial burrows, &c., the whole enclosure, with every outlet from it, being protected by fly-proof gauze, the drainage being conducted into disinfecting tanks, and a furnace being provided in which dead carcasses and all infected matters may be burnt. A well-equipped laboratory is provided, with quarters for the experts and servants. All these works were completed in less than two months, and thus, at a comparatively small cost, provision was made for the experiments to be performed under the direction of the Commission; and when its work is ended, a permanent bacteriological station will remain, in which, from time to time, the communicable diseases of animals can be studied with facility.

#### DIFFICULTIES WITH M. PASTEUR'S REPRESENTATIVES.

Meanwhile, on May 8th, the Committee received a letter from Dr. Hinds, one of the representatives of M. Pasteur, stating that their preliminary experiments were completed. The list of experiments with microbes of chicken-cholera, which had been adopted by the Commission, was sent to Dr. Hinds, and he was asked to suggest any other experiments. At the meeting of the Committee on May 14th, a letter dated May 10th was read, signed by Dr. Hinds, Dr. Germont, and M. Loir, in which they stated that they were unable to accept any participation in these experiments. This letter and the correspondence which ensued will be found in the Report of the Experiment Committee forming Section VII of the detailed report. As considerable delay in the progress of experimental work was caused by this correspondence, it is necessary to show clearly the positions taken by the Commission and its Experiment Committee on the one hand, and by M. Pasteur's representatives on the other.

The Commission, at its meeting on April 24th, had adopted a definite schedule of experiments concerning chicken-cholera, which would test— (1) whether chicken-cholera would spread from infected rabbits to healthy rabbits in hutches, cages, and artificial burrows; (2) whether domestic animals could be injured by the microbes of chicken-cholera; (3) what birds are liable to chicken-cholera; (4) whether the virulence of chicken-cholera is altered when it is repeatedly communicated from rabbit to rabbit. Incidentally, it was to be tested whether birds at liberty in a large enclosure would contract chicken-cholera when rabbits were dying from that disease in the enclosure. At the same meeting, at which this schedule was adopted, the representatives  
of

of M. Pasteur proposed to make experiments as follows:—(1) to show in the laboratory that they could kill rabbits by adding microbes to their food; (2) to show similarly that domestic animals are not affected by the addition of microbes to their food; (3) to make an experiment on an inland area of (say) 500 acres, enclosed with rabbit-proof fencing, but otherwise under natural conditions. In this experiment food containing microbes would from day to day be placed in different parts of the area. On behalf of the Commission it was explained that a laboratory would soon be ready, and that any experiments which M. Pasteur's representatives might desire would certainly be done; and it was proposed that they should associate themselves with Dr. Katz, the Chief Expert Officer of the Commission, in the conduct of their own experiments. The experiments proposed by the Commission were carefully explained, and M. Pasteur's representatives were informed that if they desired any modification of these experiments, their wishes would receive careful consideration, and also that Dr. Katz had been instructed that all work concerning chicken-cholera was to be performed in association with them. Dr. Hinds, on behalf of M. Pasteur's representatives, at once assented to these proposals. The Chairman asked if M. Pasteur's representatives would not take time to consult. They conversed shortly among themselves, and Dr. Hinds said, "We accept your proposals at once." In the course of their examination which followed, great stress was laid by members of the Commission on the necessity for proving, not merely that rabbits could be killed by administering infected food, but also that chicken-cholera would spread from infected rabbits to healthy rabbits independently of the administration of infected food.

When the Commission closed its first session, on April 26th, it was apparently understood by all parties that the laboratory experiments with chicken-cholera, including those proscribed by M. Pasteur and those directed by the Commission, would be performed as soon as the laboratory was completed. But the subsequent refusal of M. Pasteur's representatives to take any part in the tests proscribed by the Commission necessitated a tedious and disappointing correspondence. This refusal was considered by the Experiment Committee, as before stated, on May 14th.

#### VISIT OF COMMISSION TO MELBOURNE, ADELAIDE, SILVERTON, AND TINTINALLOGY.

Four days later the Commission met informally, in Melbourne, to hear the statements of Dr. R. F. Hudson and Mr. A. L. Gilbert, concerning their observations during a recent visit to Tintinallogy. As it proved possible to obtain a full attendance of the Commission in Melbourne, the intended committee meeting was replaced by a one day's Session of Commission, which was held on May 21st. Ten witnesses, who held land in various parts of Victoria and New South Wales, were then examined, chiefly concerning the proper height and mesh of rabbit-proof fencing. Two of the rabbit inspectors of Victoria were also examined.

The Commission then passed into South Australia, and on May 23rd, at Adelaide, the evidence was taken of seven witnesses, including owners, lessees, and managers of large station properties, and Professor Watson, who introduced the *Sarcoptes cuniculi*, or rabbit scab. Rabbits and sheep, which had been made the subjects of experiments with this disease, were examined by the Commission. It was then resolved that with a view to economise the time of the Commission, an Executive Committee, consisting of Dr. Bancroft, Dr. Wilkinson, Mr. Dillon Bell, and Mr. Tabart, should proceed forthwith to Tintinallogy, make investigations there, and submit a written report to the Commission.

On May 26th and 28th the Commission met at Silverton and examined Dr. Butcher, of Tintinallogy, and Mr. C. W. Reid, who assisted him in his experiments; also the managers of several large station properties in the Western District of New South Wales; Mr. H. E. Vindin, the Superintending Inspector of the Rabbit Branch of the Lands Department of New South Wales, and several of his staff, and Mr. M. J. C. Tully, the Inspector of Stock for the Sheep District of Wilcannia.

During

During the return journey the Commission examined, at Adelaide, on May 29, Mr. C. J. Valentine, Chief Inspector of Stock, and Mr. S. G. Hübbe, the Chief Inspector under the Vermin Destruction Acts of South Australia; and also one of the members of the Pastoral Board of that Colony. At Melbourne, on June 6th, the evidence was taken of Mr. E. M. Curr, Chief Inspector of Stock for the Colony of Victoria.

Meantime the Executive Committee had visited Tintinallogy, had personally examined the infested country on that and neighbouring runs, and had taken evidence there, and at Albemarle Station and at Adelaide.

#### FURTHER NEGOTIATIONS WITH M. PASTEUR'S REPRESENTATIVES.

On June 11th the Experiment Committee again assembled at Sydney, and gave orders for the completion of the necessary works at Rodd Island. Negotiations with the representatives of M. Pasteur were actively resumed. Finally, these representatives definitely declined to conduct any experiments to test the communicability of chicken-cholera from rabbit to rabbit, or to supply microbes of the disease for experiments under the direction of the Committee, until all the experiments of demonstration prescribed by M. Pasteur had been completed, including an experiment on a large scale on some inland area, protected only by a rabbit-proof fence. At last a cablegram was despatched to M. Pasteur, asking him (1) to consent to an experiment testing the contagiousness of chicken-cholera from rabbit to rabbit; (2) to permit infected rabbits to be given to the Commission for special experiments. M. Pasteur consented to an experiment, but directed that five infected rabbits should be kept for six days with twenty healthy rabbits in an enclosure of one square metre (*i.e.*, less than  $1\frac{1}{4}$  square yards), and that his representatives should wait before giving microbes of dead rabbits.

On June 16th M. Pasteur's representatives were asked whether, if this experiment was successful, they would permit further experiments under less favourable conditions, say in artificial burrows, or in a larger space, or with fewer rabbits. They said they could not. They were asked again whether they would make the experiment several times over, placing two infected rabbits with five healthy rabbits in each of six enclosures of two square metres each. They refused.

The Commission was therefore called together, and met on June 19th, 21st, and 22nd. A report was submitted by the Experiment Committee, and the correspondence and minutes of the Committee were read. It was thereupon unanimously resolved:—

“That the representatives of M. Pasteur be informed that the experiment which they propose to perform is not satisfactory to the Commission—that even if it be attended with positive results the Commission will not be able to infer that the disease will spread from rabbit to rabbit under natural conditions; that the Commission refuse to permit any broadcast dissemination of chicken-cholera microbes on any inland area until satisfactory proof shall have been given by experiments approved by the Commission—(1) that the disease is capable of spreading freely from rabbit to rabbit; (2) that the disease is innocuous to domestic animals; and that the Commission express its surprise that as M. Pasteur is seeking to obtain a reward of £25,000 for his scheme, his representatives should have absolutely declined to permit the fullest testing of its merits. The Commission will not object to the conduct of an experiment on the lines laid down by M. Pasteur, but it requests a final answer without delay—whether M. Pasteur's representatives will allow the experiments prescribed by the Commission to be conducted, and whether they will furnish rabbits suffering from chicken-cholera for the purpose of experiments under the direction of the Commission. If M. Pasteur's representatives do not assent to these conditions the Commission will report accordingly to the Government of New South Wales, and will recommend—(1) that correspondence with M. Pasteur and his representatives be suspended; (2) that the permission granted to M. Pasteur's representatives to introduce into

New South Wales and keep in New South Wales the microbes of chicken-cholera, and to perform experiments on rabbits with a view to maintain a supply of the microbes in active state, be withdrawn; (3) that steps be taken to obtain the microbes of chicken-cholera from other sources, so that the utility of this disease for the extermination of rabbits may be tested in a satisfactory manner."

A copy of this ultimatum was sent to the representatives of M. Pasteur.

#### OTHER SCHEMES FOR THE DESTRUCTION OF RABBITS.

Papers by Mr. Coleman Phillips, concerning the bladder-worm in the Wairarapa district of New Zealand, were received from the Government of South Australia. This subject was afterwards made the subject of close study, as will be shown in another part of this Report.

As fears were expressed that Drs. Butcher and Ellis would lose control of the so-called Tintinallogy disease, the Commission advised that they be granted permission to employ the so-called disease among rabbits in such districts as they may desire, provided that the places in which the disease is being employed be notified to the Commission. Dr. Ellis was requested to forward to Dr. Katz, as soon as possible, fifty rabbits suffering from the so-called disease, or any less number which might be available.

A Committee appointed to examine the correspondence relating to the introduction of disease for the extermination of rabbits presented its report, which was adopted. In conformity with a recommendation in that report, it was resolved that letters be addressed to Mr. F. A. Bishop, of Sydney; M. Lanféron, of Nevers, France; M. A. Laplanche, of Fismes, France; Mr. E. D. Graham, of Cairns, North Queensland; and Mr. J. H. Richardson, of Colorado, asking for additional particulars in support of their statements. At an earlier stage the Committee had caused a message to be sent by cable to Messrs. West and Raphael, of London, through the Agent-General of New South Wales, requesting them to forward the microbe cultures which were mentioned in their letter. (*See Appendix I.*) Letters were also addressed to Professor Ribbert, of Bonn, and to Professor Loeffler, of Greifswald, asking for information concerning the diseases of rabbits recently discovered by them.

It was further resolved,—

- (1.) That the Commission recommend the Governments of the respective Colonies to issue licenses to responsible persons who may desire to keep rabbits in confinement for the purpose of poison experiments.
- (2.) That the Commission recommend that licenses to keep rabbits in confinement be granted by the Governments of each Colony to any competent persons who may desire to conduct pathological inquiries concerning the destruction of rabbits.
- (3.) That these resolutions be transmitted to the Honorable the Secretary for Lands, and that he be requested to forward copies of them to the Governments of the other Colonies.

The Experiment Committee was authorised to subject to experiment, on the general experimental lines already laid down, any disease that might be submitted to them for examination, and that might seem worthy of investigation.

#### SUMMARY OF EVIDENCE.

The chief diseases which were submitted for consideration by the Commission were—

- (1.) Chicken-cholera.
- (2.) The so-called Tintinallogy disease.
- (3.) Bladder-worm (*cœnurus*).
- (4.) *Sarcoptes cuniculi* or Rabbit Scab.

The evidence concerning the usefulness of these diseases for the destruction of rabbits will now be stated as briefly as possible.

EVIDENCE

## EVIDENCE CONCERNING CHICKEN CHOLERA.

The case in favour of the employment of the microbes of chicken-cholera as submitted by M. Pasteur and his representatives was very imperfect. It will be found stated in Appendix III, and in Section II of the detailed report, pp. 43-49. It may be summarized shortly as follows:—

M. Pasteur states that, though he had made no special study of rodents, he had often seen rabbits die in cages which had not been disinfected after fowls had succumbed to chicken-cholera in them; that he soon convinced himself that the least meal given to rabbits, after the food has been tainted with the microbes of chicken-cholera, will speedily entail the death of the rodents. At his instigation M. Loir put five rabbits in a box and fed them with infected food, and six hours later introduced three healthy rabbits into the same box. The five rabbits fed with infected food died, and also one of the three rabbits placed with them. On another occasion four rabbits were fed with infected food, and four healthy rabbits were placed with them. Within twenty-four hours the four infected rabbits were dead. Their carcasses were left in the box with the healthy rabbits. Of the healthy rabbits one was found dead on the third day, one on the fourth, one on the fifth, and one on the seventh. Tame rabbits were used in both these experiments. In all these instances it was verified, according to M. Pasteur, that death was due to the microbes of chicken-cholera. Swine, dogs, goats, sheep, rats, horses, and donkeys were fed with infected food, and not one of them became indisposed. The microbes can be grown easily in broth made of flesh, *e.g.*, the flesh of rabbits. They lose their virulence and perish at 51° Centigrade (124° Fah.); but when not exposed to the atmosphere they may be kept for years. In addition, M. Pasteur gave a short sketch of the experiment on the Pommery Estate. Here a large number of rabbits, penned up for purposes of sport in an enclosure measuring eight hectares\*, were absolutely dependent for food on eight large trusses of hay† that were daily scattered about their burrows. On one day (Friday) this food was sprinkled with a fresh growth of the microbes of chicken-cholera. The food was consumed in a few minutes. On the day following the exposure of the infected food (Saturday), nineteen dead rabbits were seen outside the burrows. On Sunday no one visited the paddock. On Monday thirteen other dead rabbits were counted. The rest died in the burrows. Not a single live rabbit was seen after the day on which the fatal meal was given.

This was the sum of the evidence available prior to the arrival of M. Pasteur's representatives. These gentlemen stated before the Commission (1) that the virus was not weakened by transmission from one rabbit to another; (2) that there was no instance on record in France, within their knowledge, in which a natural epidemic of the disease among fowls had spread to rabbits; (3) that they had never heard of the epidemics among domestic fowls spreading to wild fowls; (4) that several diseases may kill rabbits, with very similar symptoms and *post-mortem* appearances; (5) that it was doubtful whether all the rabbits at Mme Pommery's Estate partook of the poisoned food, but that it was thought that the quantity exposed was not sufficient for all of them, and that therefore some must have communicated the disease to others.

The plan of spreading the disease, as proposed by the representatives of M. Pasteur, will be found on pages 45 and 46 of the detailed report.

## M. PASTEUR'S EXPERIMENTS OF DEMONSTRATION.

The experimental station at Rodd Island being in readiness, and the negotiations with the representatives of M. Pasteur having advanced a stage, the experiments of demonstration prescribed by M. Pasteur were performed by M. Loir, Dr. Germont, and Dr. Hinds, between July 7th and August 4th, under the supervision of the Experiment Committee, and of Dr. Katz, the Chief Expert Officer of the Commission. It was shown that, as a rule, rabbits died speedily after eating food to which the broth-cultures of the microbes of chicken-cholera had

\* A hectare is equivalent to 2 acres 1 rood 35 perches.

† See Appendix No. III.

had been added, or after inoculation with such cultures; when several rabbits were fed, in some instances all died, in others some survived; but the survivors invariably succumbed after a second or third feeding. The proof that the rabbits died from chicken-cholera was not as complete as was desirable, but a strong presumptive case was established. The next experiment was that dealing with the contagiousness of the disease. Five rabbits were inoculated with about two drops each of a broth-culture of the microbe, and thereafter placed with twenty healthy rabbits in an enclosure of one square metre area (*i.e.*, 3 feet 3 inches square). They were kept under observation for a period of seven days. The five inoculated rabbits died within fourteen and a half hours; of the twenty not inoculated five died within seventy-one hours, and from that time until the conclusion of the experiment no more died. The dead rabbits were left in the little enclosure to the end, but none of them were examined so as to obtain certainty as to the cause of death. The rabbits which survived ate food from off the bodies of the dead. Of twenty-five healthy rabbits kept in a similar enclosure for the same time three died without any introduction of infection.

Subsequently, the experiment was repeated with slight variation in another enclosure of the same size. Five rabbits fed on infected food were placed among twenty healthy rabbits. One of the five, through inadvertence, was not specially marked. The rabbits were kept under observation for ten days. Within this period eleven died. Among them were three of the five to which infected food had been given. One of the five survived. The fate of the fifth could not be decided owing to the omission to mark it. So that either seven or eight of the twenty healthy rabbits died. Blood from three of the eight unmarked rabbits which died was examined microscopically, and organisms agreeing in form with those of chicken-cholera were found. In two cases out of the three so examined, blood from the dead rabbits was inoculated into living rabbits; death followed, and similar organisms were found in the blood. A control experiment on twenty-five healthy rabbits was not made.

It was next shown that a horse, a cow, a sheep, a goat, a pig, and a dog did not suffer after many meals containing large doses of broth-cultures of the microbes of chicken-cholera.

When these experiments prescribed by M. Pasteur ended on August 4th, Dr. Katz, with the permission of M. Loir, took some blood from the heart of one of the rabbits which had died after eating infected food, and from this blood successive cultures of microbes were grown, which were used in the experiments conducted on behalf of the Commission. The experiments of demonstration, carried out according to the instructions of M. Pasteur, were regarded by the Commission as unsatisfactory. But it was now possible to institute a new series of tests which would fully try the real issue.

#### EXPERIMENTS WITH CHICKEN-CHOLERA MICROBES, CONDUCTED BY DR. KATZ, ON BEHALF OF THE COMMISSION.

These experiments are fully described in Section XI of the detailed report, so that only a brief summary need be given in this place. They were carried out chiefly in order to ascertain whether chicken-cholera will spread freely from infected to healthy rabbits. In some of the experiments, infected rabbits were allowed to be with healthy rabbits in artificial burrows, or in hutches, either with wooden bottoms or wire-netting bottoms; in other experiments healthy rabbits were put in hutches or boxes in which other rabbits had died of chicken-cholera. The artificial burrows varied from 16 to 70 feet in total length of the branching passages, and were so made that they could be easily opened. According to the size of the burrows, infected and healthy rabbits were let go into them in the respective numbers of one to two, two to four, three to six. In all, eight infected rabbits were placed with sixteen healthy ones. Within twenty-five minutes all the rabbits had found their way inside the burrows. A transmission of the disease from the sick to the healthy did not occur in any instance. Of the eight infected rabbits six died outside the burrows, and two inside. In the hutch experiments, ten infected rabbits were placed with twenty uninfected in eight wooden hutches, in six of

of which one infected rabbit was placed with two uninfected, while in two hutches two infected rabbits were associated with four uninfected. Four of the twenty uninfected rabbits contracted chicken-cholera in the hutches, and died in consequence. In five separate experiments single rabbits were placed in hutches or boxes in which other rabbits had died of chicken-cholera; all of these hutches or boxes contained droppings of infected animals, but the rabbits placed in them did not in any instance contract the disease. In the course of these experiments several facts were established:—

- (1.) Australian rabbits are killed in a very short time by the addition of small quantities of the microbes of chicken-cholera to their food, most of them dying in between twenty and twenty-four hours. Inoculation of cultures causes death in from seven and three-quarters to about fifteen hours. But on the other hand Dr. Katz stated in a summary report, dated November 21st, that "food material polluted with small portions of the contents of the rectum or cæcum of rabbits which succumbed to chicken-cholera (feeding) did not prove dangerous to healthy rabbits which ate it."
- (2.) The stage of incubation, or latency, occupies most of the time before death, the symptoms lasting but a short time.
- (3.) While chicken-cholera in fowls is a form of blood-poisoning attended with severe diarrhœa, the excreta being virulently infective, in rabbits the disease presents the characters of pure blood-poisoning, without diarrhœa or intestinal hæmorrhage. With few exceptions, the rectum or lowest portion of the bowel of rabbits dead from chicken-cholera contained ordinary faecal balls. In one rabbit, however, the contents of the rectum were soft; a rabbit, inoculated with a small quantity of this soft matter, died from chicken-cholera; but another rabbit, fed with a larger quantity, survived. In another series of experiments, two rabbits were fed with cabbage leaves, to which had been added part of the contents of the cæcum (or the first portion of the large intestine) of a rabbit dead from chicken-cholera; in neither case was chicken-cholera developed.
- (4.) So far as may be judged from one experiment, the urine of rabbits suffering from chicken-cholera is not infective.
- (5.) Dr. Katz frequently observed that blood-stained liquid exuded from the nostrils of rabbits which had been lying dead for some days from chicken-cholera.
- (6.) The virus of chicken-cholera preserves its infecting power for some time in putrid or putrefying matter; thus blood taken from a rabbit dead from this disease, kept for nineteen days and allowed to putrefy, caused a vigorous rabbit to die from chicken-cholera in less than seventeen hours; but after being kept for twenty-three days it failed to cause death when inoculated.
- (7.) In the course of putrefaction, moisture is necessarily present. But a series of experiments were performed to ascertain whether the process of drying at ordinary temperatures would prove fatal to the microbes. Sterilized silk threads were steeped in the blood of rabbits dead from chicken-cholera or in broth-cultures of the microbes of this disease. They were then dried in a desiccator at temperatures between 64.4° and 71.15° Fahr. From time to time these threads were placed under the skins of rabbits. Those steeped in blood lost their power of inducing chicken-cholera within four days; those steeped in broth-cultures even earlier. Similar threads were placed on sandy soil in baskets protected from rain and sun, and were successively inoculated into rabbits; the thermometer ranged from 68.9° to 84.65° Fahr.; threads soaked in blood lost their virulence in twenty-four hours; those steeped in broth-cultures in less than eight hours. In a subsequent series of experiments the basket and its contents were exposed to direct sunlight on a warm December day with southerly breeze; the threads steeped in broth-cultures failed to cause chicken-cholera after two hours exposure; but those soaked in blood retained their virulence longer, one of them inducing the disease after eight hours exposure. The general conclusion is that the process of drying even at comparatively low temperatures soon destroys the virulence of the microbes.

(8.)

## XVIII

- (8.) The virulence of chicken-cholera did not vary in any important degree when the disease was transmitted from one rabbit to another, from this to yet another, and so onwards for twenty removes from the first rabbit.
- (9.) In rabbits newly dead from chicken-cholera, the blood in the heart contained comparatively few microbes, contrasting strongly in this respect with blood taken from rabbits which had been left untouched where they died for twelve, twenty-four, thirty-six or more hours. The relative abundance of the organisms some time after death impressed itself upon Dr. Katz in every instance in which a comparison was made.
- (10.) No wild rabbit has manifested immunity from the disease, but one of the tame rabbits experimented upon survived after repeated feedings and inoculations with virulent matter.
- (11.) The virus of chicken-cholera, administered through the digestive organs, proved fatal to two magpies, two butcher birds, and a blue jay (which are principally animal feeders), and to two wonga pigeons, one bronze wing pigeon, one rose breasted cockatoo, and two swamp quail (all of them vegetable feeders). One cockatoo, which resisted two feedings, died of chicken-cholera after inoculation. Of two laughing jackasses, one died after feeding with infected matter, but not from chicken-cholera; the other resisted two feedings, but died from the disease after inoculation. Two Maori hens (wekas) remained alive after one had been twice fed and once inoculated, and the other once fed and twice inoculated. Of six crows variously inoculated and fed with infected matter, three died of chicken-cholera and three survived. Five infected rabbits were allowed to die in an aviary containing nine fowls and twelve pigeons; their bodies remained there for periods varying from two to five weeks, and were much pecked, those which lay longest being torn into fragments, while the others were pecked open and largely devoured. One of the pigeons died of chicken-cholera within the five weeks occupied by the experiment and one fowl died of that disease shortly after the experiment terminated. Apparently the tendency of birds to contract chicken-cholera in this way is not great.
- (12.) Hares are very liable to take chicken-cholera, after feeding or inoculation.
- (13.) Ferrets are not liable to the disease, after either feeding or inoculation.

In the various experiments so conducted concerning chicken-cholera, it is all important to establish the fact that the microbes used were in reality those of chicken-cholera. It may, therefore, be stated (1) that the cultures were developed from the blood of a rabbit which died of chicken-cholera in the course of the experiments conducted by M. Pasteur's representatives; (2) that the course, symptoms and post-mortem appearances of the disease produced by the microbes agreed with those which characterize chicken-cholera; (3) that the blood of animals experimented upon contained microbes of characteristic form and reactions; (4) that cultures of these microbes presented typical appearances; and (5) that introduction of these cultures or of the blood of infected animals into healthy rabbits succeeded invariably in reproducing the disease.

## DOES CHICKEN-CHOLERA EXIST IN AUSTRALASIA?

Section XII of the detailed report contains the results of inquiries made into the question, whether chicken-cholera exists in the Australasian colonies or not. A large number of suspicious outbreaks were reported to the Commission from New South Wales, Victoria, and New Zealand. When possible, specimens of the affected fowls were obtained. Dr. Katz was able to make an examination in nine cases; in none of these could the disease be identified as fowl-cholera. So far, therefore, there is no proof that the disease exists in these colonies.

## XIX

colonies, but more extended observations and experiments are necessary to determine this question. Dr. Gamaleïa, of Odessa, recently stated that he had obtained bacteria of chicken-cholera from the intestines of normal pigeons; that these bacteria had only slight virulent power, but that they acquired virulent power as against pigeons and fowls after being transmitted through susceptible animals, such as rabbits and other rodents. Several experiments made by Dr. Katz lent no confirmation to these statements.

## LARGE EXPERIMENT WITH CHICKEN-CHOLERA.

At this stage the Commission resolved that a larger experiment should be performed, so as to test fully, under conditions as natural as possible, whether chicken-cholera would spread from infected to healthy rabbits to such a degree as to warrant the dissemination of a disease which does spread naturally among domestic fowls, which has not been known to spread naturally among rabbits, and which has not been proved to exist among domestic fowls in these colonies.

The details of this large experiment are given in the progress report (No. III) furnished by Dr. Katz, which will be found in section XI of the detailed report, pp. 168-171. Shortly stated, the experiment was as follow:—On November 7th, a hundred rabbits were turned loose in an enclosure measuring 100 feet by 80 feet, and containing artificial burrows in all 185 feet long. These rabbits were in very poor condition. They had been caught in the dry country around Hay, N.S.W., and had suffered from partial starvation. Other rabbits from the same source were fed with cultures of the microbes of chicken-cholera and placed in the same enclosure, as follow:—Ten on November 7th, six on November 14th, and six on November 22nd. Of the twenty-two rabbits so introduced, twenty-one died before the 29th November, when the experiment terminated. Three of the twenty-one were removed after death; of these, one died from chicken-cholera, whilst two died from other causes. The remaining eighteen rabbits, according to Dr. Katz, died of chicken-cholera, and their bodies were left in the enclosure until the completion of the experiment. Of the hundred rabbits not specially fed, five died very quickly, and five other rabbits were put in their places. Between November 8th and 14th, fifty-two died; between November 15th and 22nd, seventeen died; and between November 23rd and 29th, ten died. Of the seventy-nine rabbits which so died, not one perished from chicken-cholera. All died, apparently, in consequence of the primary starvation.

The result of this experiment was unsatisfactory, owing to the great mortality which occurred among the rabbits from causes independent of chicken-cholera. The Commission therefore ordered that another experiment on a large scale should be conducted so soon as a sufficient number of strong healthy rabbits had been obtained, the experiment to be conducted strictly on the lines laid down by the Commission on October 15th.

This order was made on December 19th, 1888. Delay followed, owing to the difficulty experienced in obtaining a sufficient stock of healthy rabbits. Subsequently on January 2nd, a fire broke out at the experimental station on Rodd Island, the kitchen being destroyed, the shed and passages and main enclosure being damaged. The injury to the enclosure was not repaired till February 4th, and the kitchen was not rebuilt till an even later date. Meantime, between January 7th and 30th, one hundred and sixty-one live rabbits had been sent to the station in different consignments; but, in spite of attention to feeding and accommodation, large numbers died, only eighty-six surviving on February 4th. The second large experiment was commenced on February 12th, though the full number of rabbits required was not available till the 14th.

## SECOND LARGE EXPERIMENT.

The main enclosure on the island was divided into two nearly equal divisions, separated from each other by a double fence of rabbit-netting, the space between the two fences being one yard wide. In each division there were  
artificial

artificial burrows and special feeding places (see diagram 9). One division, called the disease division, was stocked on February 12th with fifty rabbits, most of which looked healthy; among these five well-conditioned rabbits were at once introduced, which had been fed on cabbage leaves, sprinkled for each rabbit with two cubic centimetres of a virulent broth-culture of the microbes of chicken-cholera. At the end of a week other five rabbits, infected in the same manner, were turned loose in the enclosure, and at the end of the second week five others, similarly fed. At the end of the third week, on March 5th, the experiment terminated. All the infected rabbits died speedily. Their bodies were allowed to remain in the enclosure, with one exception. In that instance, the rabbit had been much bruised, but the microbes of chicken-cholera were found in its blood. A control rabbit which died of chicken-cholera was put in its place in the enclosure. It may be inferred with confidence that the fourteen other infected rabbits died of chicken-cholera, because other rabbits fed at the same times, in the same manner, were proved to have died of this disease, and because many of the fourteen died with characteristic symptoms, and their bodies after death showed distinctive characters. Dr. Katz has now acquired such experience that he is able to recognize the symptoms during life, and the appearance of the carcass soon after death with some degree of certainty. Though the fifteen infected rabbits so introduced died of chicken-cholera, and though their bodies were allowed to remain to the close of the experiment, only four of the fifty rabbits originally placed in the disease division died of chicken-cholera. But no less than thirty-two rabbits died during the experiment from causes independent of chicken-cholera.

At the outset of the experiment, on February 12th, thirty-eight rabbits, mostly full-grown, were placed in the other half of the enclosure, called the control division. The majority of these rabbits were not in such good condition as those in the disease division. Two died almost immediately; and, when a fresh supply of rabbits arrived two days later, the number in the control enclosure was raised to fifty. No infected rabbits were introduced. Of the fifty, twenty-nine died during the course of the experiment. Dr. Katz satisfied himself in every case that death was not due to chicken-cholera.

The great mortality among the rabbits in both enclosures from causes other than chicken-cholera is attributed by Dr. Katz, in part at least, to the oppressive state of the atmosphere and the excessive heat prevailing at intervals during the course of the experiment. Injuries sustained by the rabbits in capture and during transit from the interior must also be taken into consideration. In examining the bodies of rabbits which died during this experiment from causes other than chicken-cholera, Dr. Katz found in quite a number of cases an appearance of the entrails resembling that found by Dr. Wilkinson in rabbits examined at Albemarle (*see* Appendix VII). Such rabbits, therefore, were in anything but a healthy state. In other rabbits the lungs were distinctly pneumonic. Before the experiment was commenced on February 12th ninety-one rabbits had died out of one hundred and ninety-one sent to the station. Even in the contagion experiments conducted by the representatives of M. Pasteur, which lasted only one week, and in which comparatively few rabbits were used, several deaths occurred from causes independent of chicken-cholera.

The details of this large experiment will be found in the Progress Report (No. V), submitted by Dr. Katz.

#### GENERAL CONCLUSION CONCERNING THE UTILITY OF CHICKEN-CHOLERA FOR THE DESTRUCTION OF RABBITS.

The Commission therefore finds that while rabbits are easily killed by the addition of the microbes of chicken-cholera to their food, the disease does not spread freely from infected to healthy rabbits. The disease in rabbits differs widely in this respect from chicken-cholera as seen among fowls. In poultry-yards it is virulently infective. The inquiries conducted on behalf of the Commission furnish a satisfactory explanation of the difference. Fowls infected with chicken-cholera suffer not only from blood poisoning but also from severe diarrhoea, and the droppings have power to spread the disease. On the contrary, infected rabbits, with

with few exceptions, remain free from diarrhoea, and die of pure blood poisoning. The microbes are chiefly in their blood. If these microbes are to infect other rabbits in any number the bodies of rabbits dead from the disease must be broken up by decomposition, or by the agency of carrion birds, &c., and the microbes so set free must contaminate the food of other rabbits. If the dead bodies lie in the burrows it will be remembered that rabbits do not feed there. If they lie in the open and the microbes are set free, a temperature of 124° Fah., or the mere process of drying at a much lower temperature, will suffice to destroy their virulence. Moreover, the experiments of Dr. Katz indicated that while the microbes retain their virulence for a time when mixed with putrefying matter, there is a limit to their power of survival. Generally, therefore, it appears that the destruction of rabbits on a large scale by chicken-cholera can be obtained only by feeding the rabbits with the microbes of the disease; and, as other poisons, such as arsenic and phosphorus, to the use of which no objection can be taken, will kill rabbits to which they are administered, the Commission cannot recommend that permission be given to disseminate broadcast through Australasia a disease which has not been shown to exist in these Colonies, which in other countries prevails in disastrous epidemics among fowls, but which has never been known to prevail naturally among rabbits.

#### EXPERIMENT WITH CHICKEN-CHOLERA UNDER NATURAL CONDITIONS.

It has already been made manifest that the Commission has arrived at an unfavourable conclusion concerning the practical utility of chicken-cholera for the destruction of rabbits. The Commission, in fact, does not feel justified in recommending any further expenditure by Government in testing the efficacy of this disease; but as M. Pasteur and his representatives desire that the microbes should be tried in an infested country under natural conditions, the question arises whether such experiments should be permitted. The investigations and experiments conducted by the Commission tend to prove that exaggerated notions have prevailed concerning both the probable spread of the disease from rabbit to rabbit and the contingent danger of spread from infected rabbits to birds. It has been made certain that chicken-cholera will not affect domestic animals other than birds. Even with the most susceptible animals the spread of the disease will be far less free in open country than among fowls in poultry yards. Certain wild birds, such as jackasses, crows, and cockatoos, are not so susceptible to infection as fowls or rabbits. Birds kept in an enclosure in which rabbits are dying or lying dead from chicken-cholera do not contract the disease in great numbers, though they peck freely at the carcasses. It may be urged that the experiments conducted at the station at Rodd Island, though very severe as regards the number of infected rabbits turned loose among healthy rabbits, and as regards the limited space within which diseased and healthy rabbits were penned together, do not furnish an absolute test of what would be the degree of contagion in an experiment conducted under natural conditions with natural food. The Commission, therefore, is not prepared to advise the Government of New South Wales to forbid the performance by M. Pasteur's representatives of an experiment in infested country under natural conditions, provided that such experiment be conducted on certain lines and subject to adequate precautions.

M. Pasteur's representatives, at their interview with the Commission on April 24th, 1888, spoke as follows: "We propose . . . to make an experiment on a larger scale in a space in the country, enclosed with rabbit-proof fencing, but otherwise under natural conditions. For this purpose we would go to a station, prepare there the broth, and make a cultivation; and this we would spread on food (natural, if available; if not, an artificial food—the cheapest to be procured in the neighbourhood) where the rabbits are thickest. From day to day we would go to the different parts of the area to spread the disease. We ask for this purpose an area of not greater extent than about 500 acres, for if we are able to prove that rabbits can be poisoned under natural conditions, the only question for future consideration will be the distribution of the poison. We consider that if we practically clear the area given to us for experiments it will be a fair and good test of the efficacy and practicability of the method advocated by M. Pasteur." Such

Such an experiment would, in the opinion of the Commission, be utterly unsatisfactory, whatever might be its result.

It has already been demonstrated that the microbes of chicken-cholera are deadly to rabbits, but do not injure domestic animals, excluding birds.

If M. Pasteur is to claim a reward of £25,000 simply on killing the rabbits in an area of 500 acres, his task is an easy one. No one doubts that such an area could be cleared with ease by means of chicken-cholera. But in such a case most, if not all, of the rabbits would be poisoned with infected food. No experiment can possess any value unless it is performed under such conditions that the main agent in the destruction of the rabbits shall be the spread of infection from diseased to healthy rabbits. One or other or both of the following experiments would be satisfactory:—(1) On an area of 500 acres of infested land, enclosed by netting-fencing, to catch from time to time a number of rabbits, infect them with chicken-cholera and turn them loose in their old haunts; (2) On a generally infested area of not less than 25,000 acres similarly enclosed, to lay food infected with microbe cultures at the discretion of the experimenters. In the former case all consequent mortality would be due to contagion; and in the latter case any approach to extermination would imply either a very extensive operation of contagion, or the use of such large quantities of infected food as to reduce the entire experiment to a mere competition between the present methods of poisoning, on the one hand, and the use of infected food (considered as a direct poison), on the other. In either experiment the enclosures should contain sufficient natural food to eliminate any possibility of death from starvation. There is obvious necessity for supervision by competent inspectors, and for the observance of all possible precautions.

The Commission, however, considers that the possibility of any useful results from such experiments is so remote, that its definite judgment on M. Pasteur's scheme, as above recorded, need not longer be withheld.

#### M. PASTEUR'S LETTER TO THE CHIEF INSPECTOR OF STOCK.

On the 1st October, 1888, M. Pasteur addressed a letter to Mr. Bruce, the Chief-Inspector of Stock in New South Wales. A free translation was published in the *Sydney Morning Herald*, and a copy of the published translation was forwarded to the Commission by the Under Secretary for Lands. Certain inaccuracies in the translation were calculated to cause misconception of M. Pasteur's position. The part of M. Pasteur's letter on which the Commission desires to comment, when literally translated, reads as follows\* :—

"With regard to the rabbit plague, I have not confided further to any one the secret of the use on large scale of the means which I have proposed for the partial or total extermination of these rodents by the adoption of chicken cholera. It is to the Government of Sydney that I will make it known, if there be occasion. My representatives have only one thing to do, and I have sent them to do it, at the request of that Government: they have to show that I have proposed a means harmless to domestic animals, a means which kills the rabbits in twenty-four hours, after a single meal sprinkled with the microbes, and that this means is contagious, that is to say, that the rabbits which have taken the fatal meal communicate the disease and death in a notable manner to healthy rabbits, with which they are mixed, as they are in the burrows.

"How to arrange for the manufacture of the fatal ingredient, how to mix and use at a distance this ingredient with all its properties, that is my secret, about which the Commission is to see and know nothing for the present, and which I will only make known if the prize proposed on the 31st August, 1887, is awarded to me."

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\* "Quant au fléau des lapins, je n'ai pas davantage confié à personne le secret de l'application en grand du moyen que j'ai proposé pour l'extermination partielle ou totale de ces rongeurs, par l'emploi du choléra des poules. C'est au Gouvernement de Sydney que je le ferai connaître, s'il y a lieu.

"Mes représentants n'ont qu'une chose à faire, et je les ai envoyés la faire, à la demande de ce Gouvernement: ils ont à démontrer que j'ai proposé un moyen inoffensif pour les animaux domestiques, moyen qui tue les lapins en vingt-quatre heures à la suite d'un seul repas souillé par le microbe, et que ce moyen est contagieux; c'est-à-dire, que les lapins qui ont pris le repas mortel, communiquent d'une manière notable la maladie et la mort à des lapins sains auxquels ils sont mêlés, comme ils le sont dans les terriers.

"Comment disposer une fabrique de l'ingrédient mortel, comment ingrédier et utiliser au loin cet ingrédient avec toutes ses propriétés, là est mon secret, sur lequel la Commission n'a rien à voir ni à savoir pour le moment, et que je ne ferai connaître que si le prix, proposé le 31 août 1887, m'est attribué."

## XXIII

The translation previously published implied that there was some essential secret concerning M. Pasteur's method kept back by him. From the original letter it is clear that M. Pasteur instructed his representatives to make, on a small scale, a demonstration of the efficacy and safety of his scheme; but that he retains the method of applying it on a large scale as his own secret, which he will make known only if the prize of £25,000 is awarded to him. M. Pasteur, however, seems not to understand the terms of the proclamation concerning the reward, which was offered to "any person or persons who *will make known and demonstrate* at his, or their own expense, any method or process, not previously known in the Colony, for the effectual extermination of rabbits."

According to M. Pasteur's letter, he sent his representatives to show, *inter alia*, that chicken-cholera was contagious; whereas, in point of fact, the Commission had the utmost difficulty in inducing his representatives to perform any experiment testing the contagiousness of the disease among rabbits. M. Pasteur's letter implies that he expects the reward to be adjudged him for his scheme on such proofs of its efficacy as he may determine, and before the mode of carrying it out on a large scale shall have been revealed.

## MORTALITY AMONG RABBITS IN CERTAIN DISTRICTS.

From time to time great mortality has prevailed among rabbits in different parts of the Australasian Colonies. Thus, on the Ellenthorp property in Tasmania, about five years ago, a disease prevailed among rabbits, but not to such a degree as to exterminate them. On two other occasions disease appeared among the rabbits on two other estates in that Colony, 60 miles distant from each other, and destroyed all the rabbits. Two very recent instances of great mortality among rabbits have engaged the close attention of the Commission—namely, the so-called outbreak of disease at Tintinallogy Station, on the Darling River (N.S.W.), and the disappearance of rabbits from the Wairarapa district, in the North Island of New Zealand. Much information concerning the former will be found in this report, but no absolute conclusions can be arrived at in the absence of further experimental tests. The Commission is able to reprint an exhaustive report by Professor Thomas, of Auckland, on the causes of the mortality in the Wairarapa district.

## THE SO-CALLED TINTINALLOGY DISEASE.

Tintinallogy is a station on the eastern bank of the Darling River, between Menindie and Wilcannia. It includes about 380 square miles of country appraised at one sheep to 7 acres, but more heavily stocked. Rabbits were present in 1884 when the present manager went to reside there; but they increased vastly in numbers in the following years. In 1885, 5,000 rabbits were killed on this station; in 1886, 32,000; in 1887, 291,000. The maximum was in the month of September, 1887, when twenty-two men killed 56,510 rabbits. Dr. Butcher, who was resident at the station, and Dr. Ellis, of Sydney, had discussed the probability of an outbreak of disease among the swarms of rabbits, and agreed to investigate any disease which might present itself. The so-called Tintinallogy disease appeared about  $1\frac{1}{2}$  mile above the home station, and Dr. Butcher obtained a rabbit suffering from it at the beginning of September, 1887. He at once commenced a series of experiments to test the contagiousness of the disease, and reported the matter to the Minister of Mines. In consequence, orders came to destroy his rabbits. Proceeding to Sydney, he obtained permission to fence off with rabbit-proof netting a bend of the Darling, including about 500 acres, and to continue his experiments in this enclosure. He claims to have spread the disease through the bend, and subsequently through the Tintinallogy station by turning loose rabbits which he had infected artificially. His first attempt to infect the bend, early in November, 1887, failed, in his opinion, because he used rabbits from the back country which would not mingle with the bend rabbits. He then caught rabbits in the bend, infected them, and turned them loose in their old haunts. From that time, he says, the rabbits died in the bend. From the original centre of the outbreak,  
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the disease spread in all directions, and with great fatality. Dr. Butcher turned loose infected rabbits in various parts of the run, especially in places where the natural spread seemed to be checked. In five or six months from the first appearance of the mortality among the rabbits, Tintinallogy, which was so heavily infested before, became a thinly infested country. Mr. Tully, Inspector of Stock for the sheep district of Wilcaunia, was sent to Tintinallogy to report on the experiments made by Dr. Butcher concerning the transmission of the disease to stock. At his first visit early in January 1888, he saw little evidence of general mortality among the rabbits in the country which he passed through on his way to Tintinallogy. He saw no evidence of disease till his arrival within two or three miles of the home station; within this limit the rabbits were in very low condition, and he noticed carcasses lying about. In the bend he saw evidence of general mortality. At his second visit, early in February, he noticed a falling off in condition of the rabbits, which were apparently ill from some cause a much greater distance up the river, more than 9 miles from the station. There did not seem to be anything like the same number of live rabbits in the bend. Carcasses were lying about. There was still green feed along the river frontage. On his third visit, in the middle of March, there were very few rabbits left in the bend. Many dead rabbits were lying about, and the live rabbits were very weak. The river frontage was still in good condition, though dry and a little bare. The rabbits along the frontage outside the bend enclosure appeared more or less sickly, and their number had decreased amazingly. The rabbits were sickly for 20 miles up the river. He was quite satisfied that at the time of his first and second visits, the mortality could not have been due to starvation; and even at his third visit, the condition of the feed was not such that he could conclude that the mortality was due to starvation. Mr. Clarke, the Rabbit Inspector of the district, which includes Tintinallogy, Murtie, Billilla, Teraweynia and adjoining stations, stated that Tintinallogy was very heavily infested with rabbits; that the rabbits began to die in large numbers in November, 1887; that the feed was then good, and the condition of the stock good; that he had reported the decrease in the number of rabbits as 95 per cent. At Billilla and Teraweynia, on the Tintinallogy boundary, the mortality was also great. On Murtie, nearly 60 miles from Tintinallogy, the mortality was startling in its intensity and suddenness, as great an effect being produced in one month as in six months at Tintinallogy. The manager of Murtie is reported to have said that in one month (February) 80 per cent. of the rabbits died.

According to Dr. Butcher, the course of the disease is as follows:—The fur on the head stands up, the eyes are prominent, and there is a very slight discharge from the eyes and nose, lasting only three or four days. By the end of a week, emaciation is perceptible, the fur stands up all over the body, power is lost in the hind legs, so that when the rabbit tries to sit up, it falls over. Weakness and emaciation become more and more marked, and the animal dies in a kind of convulsion in about twenty or twenty-one days.

In the course of a large number of post-mortem examinations, Dr. Butcher found slight increase of serous fluid in the abdominal cavity; the liver blackish and friable, but not increased in size; the mesenteric glands swollen, and infiltrated with jelly-like fluid; and the glands above the kidneys (supra-renal glands) enlarged and altered in colour from dull white, the natural colour, to blood-red or black. He had found little nodules containing pulp in the liver in many cases, but these were absent in a large number of affected rabbits.

Dr. Ellis, in his evidence given at Sydney, said he had not noticed enlargement of the mesenteric glands, that the supra-renal bodies were red instead of white, and that points like tubercular abscesses were scattered over the surface and in the substance of the liver.

In examining diseased rabbits at Dr. Ellis' residence, the Commission noted chiefly the great emaciation, and the presence in the liver of lines and nodules of yellow pulpy matter, due to the growth in the bile ducts of a gregarinoid animal parasite, called *coccidium oviforme*.

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During their visit to Tintinallogy, Dr. Bancroft and Dr. Wilkinson made examinations (post-mortem) of several rabbits suffering from the disease. The chief appearances were general emaciation of the body and darkening in colour of the liver. Dr. Wilkinson examined a number of rabbits suffering from the same disease at Albemarle station. He found emaciation, excess of fluid in the abdominal cavity, the liver dark-blue or black, and very friable, the supra-renal capsules, spleen and kidneys healthy; but there was invariable evidence of catarrhal inflammation of the stomach, with small patches of hæmorrhage in the lining membrane, and in many cases erosions, or even ulcerations of the surface. Signs of chronic inflammation were present in other parts of the alimentary canal.

Dr. Butcher found a scabby skin disease prevalent among the rabbits, and also, in constant association with this skin disease, cheesy deposits in the muscles. But in the great majority of the rabbits suffering from the so-called Tintinallogy disease the skin was healthy. The skin disease had been known in the district for some considerable time.

Dr. Butcher's experiments concerning the transmission of the disease from affected rabbits to healthy rabbits are described with great fulness in the detailed report (pp. 73 to 79). Blood-clot, blood serum, and the substance of the liver or the supra-renal glands mashed up in water, were used to communicate the disease. The infective matter was introduced into other rabbits by injection beneath the skin with a hypodermic syringe, by inoculation into a vein, and by the passage of a seton steeped in infective matter beneath the skin. In all these ways the disease was reproduced. A few animals operated on died from septic poisoning in a few days, others from various accidents, but in the great majority of cases the disease was produced and ran its regular course, death ensuing usually on or about the 16th or 17th day. Control rabbits, kept under similar conditions, but not inoculated, did not die. The rabbits experimented on were well cared for in every way. Infected rabbits having been kept in a certain crate, other rabbits placed in the empty crate contracted the disease. A rabbit suffering from the natural disease was put with sixteen rabbits in a yard measuring 10 ft. x 12 ft.; all the rabbits died between the 18th and 23rd day. One inoculated rabbit was placed in a crate with six other rabbits; after 24 hours the inoculated rabbit was removed; the six rabbits died on the 19th and 20th days. A diseased rabbit caught in the bend was placed in a yard 20 ft. x 24 ft. with thirty-eight other rabbits; the bend rabbit died in 9 days, all the other rabbits died between the 19th and 24th days, the one remaining rabbit was lost sight of. In each case, some kind of control experiment was conducted. Thus, in the last instance, ten rabbits were kept in a similar yard under similar conditions, and these all remained alive. Diseased rabbits caught in the bend were nursed and fed; but they died in the usual way. A number of sheep, a horse and a calf, variously inoculated, remained healthy. The carcasses of rabbits lying dead from the disease in various parts of the run were eaten by dogs, cats, pigs, fowls, crows and hawks. None of these animals died except cats. The cats died in great numbers. When the Executive Committee visited Tintinallogy, the bodies of eighteen cats were seen on the bank of the river. Two of these cats were examined by Dr. Bancroft and Dr. Wilkinson. They died fat; inflammation with exudation was present in part of the small intestine.

The witnesses examined before the Commission at Silverton, and by the Executive Committee, varied greatly in their views concerning the cause of the great mortality among the rabbits at Tintinallogy. Thus, Mr. Sadler, the general manager of the Albemarle station, on which, also, the disease made its appearance, believed that it was produced by the food. He remarked that "A very similar disease to the present one—in fact, identical, so far as I can observe—has displayed itself on this station during the summer in previous years; but as these seasons were unusually good, and the feed abundant, it did not last long, and the rabbits seemed to get quite healthy again. . . . At the present time, since the rain a fortnight ago, the rabbits are becoming quite active, and getting quite strong." Mr. Vindin, Superintending Inspector of the Rabbit Department of New South Wales, was at Tintinallogy from the 5th to the 9th March. He came to the

conclusion that the rabbits were dying of some disease, and that the disease was caused by the dryness and poverty of the feed. Over a large part of his district, since the beginning of March, there had been great mortality among the rabbits, which he ascribed to the condition of the feed. His general conclusion was, that the rabbits at Tintinallogy died through eating dry feed and astringent barks, and through want of nourishing food; and that, as the feed improved, the disease would disappear to a great extent, and the rabbits would recover. Mr. Brown, manager and part-owner of Kallara Station, visited Tintinallogy on behalf of the Wilcannia Pastoral Association. He held that the disease was Nature's remedy for the plethora of rabbits; but he thought that it was closely connected with the condition of the feed—"Where the rabbits are very thick, and feed very scarce, there this disease appears." The theory that the mortality was directly due to the rabbits eating bark, through want of other succulent food, was not supported by the general tenor of the evidence given before the Commission. It was stated, on the contrary, that the rabbits died in the open country as well as where scrub was abundant, and that the rabbits were not dying in some parts where the barking of the shrubs had been extreme.

Amidst these diversities of opinion, it was all-important that the experimental results should be placed beyond question. But the experiments conducted by Dr. Butcher cannot be regarded as conclusive. They were not watched by any competent independent observer. The rabbits used in them were obtained from the run, on which vast numbers of rabbits were dying naturally from the so-called disease. Hence, comparatively little weight can be attached to Dr. Butcher's results unless they be confirmed by a disinterested expert, working with rabbits obtained from a district where no unusual mortality prevails. Why, then, were such experiments not performed under the direction of the Commission? For the simple reason that Drs. Butcher and Ellis would not, or, at all events, did not, furnish diseased rabbits to the Commission, though repeatedly requested to supply them.

The history of the correspondence between the Commission and Drs. Butcher and Ellis may be shortly stated as follows:—The Commission, having heard the evidence of Dr. Ellis on April 17th, resolved on the 23rd that experiments be at once made on behalf of the Commission with the disease suggested by Drs. Butcher and Ellis. On April 24th, a schedule of experiments was adopted for the testing of the so-called Tintinallogy disease. On April 26th, the Commission advised that licenses to prosecute their experiments with the said disease might be granted to Drs. Butcher and Ellis, with safety to the public health. It was then clearly understood that Dr. Ellis would forward to the Commission rabbits suffering from the so-called disease. On May 28th, the evidence of Dr. Butcher was taken at Silvertown. On June 21st, as fears were expressed that the control of the disease would be lost, owing to the limited number of rabbits obtainable at Tintinallogy, the Commission advised that Drs. Butcher and Ellis be granted permission to employ the so-called Tintinallogy disease among rabbits in such districts as they may desire, provided that the places in which the disease is being employed be notified to the Commission. It was further resolved, that Dr. Ellis be requested to forward to Dr. Katz as soon as possible fifty rabbits suffering from the so-called disease; or if fifty were not quickly available, to send, in the first instance, such number as might be forthcoming. On August 18th, the Chairman of the Experiment Committee reported that no further communication had been received from Drs. Butcher and Ellis; that no experiments with the Tintinallogy disease had been conducted, owing to rabbits not having been supplied; and that he was unable to say when rabbits affected with the disease would be forthcoming. It was resolved that a communication be addressed both to Dr. Butcher and to Dr. Ellis, asking whether their experiments were being conducted in new country in accordance with the permission granted on 21st June, and enquiring when they would be able to provide twenty rabbits, suffering from the said disease, for the purpose of experiments under the direction of the Commission; that Messrs. Butcher and Ellis be also reminded that the permission granted to them to establish this so-called disease in fresh country was merely intended to prevent the disease from being lost, and did

did not involve approval of their scheme by the Commission. On October 13th, a letter from Dr. Butcher was read, complaining that his account for expenses for his attendance at Silverton had not been attended to, and intimating that no infected rabbits would be forwarded until such account was paid, and a guarantee given to refund the cost of the carriage of such rabbits to Sydney. A scale of payment for the expenses of witnesses was adopted; provision was made for the payment of Dr. Butcher's expenses according to this scale; and it was resolved that Drs. Butcher and Ellis be again requested as speedily as possible to forward to Sydney fifty rabbits suffering from the so-called Tintinallogy disease, or such less number as may be forthcoming—the Commission undertaking to defray the expenses of conveying such rabbits to Sydney. Dr. Butcher intimated that, being at considerable expense through his experiments, he had closed his camp at the bend and could not provide rabbits, but that, on receipt of his expenses as already applied for, he would re-open the camp. The Commission regards the neglect by Drs. Butcher and Ellis to supply rabbits suffering from the disease as highly unsatisfactory. The failure to supply such rabbits was of long standing, before any difficulty arose concerning expenses.

The Commission finds it hard to believe that the abandonment of this scheme by its promoters was due to the alleged illiberality of the official scale of expenses. The Commission is not in a position to state whether, independently of conditions arising directly from starvation, any disease, and especially any communicable disease, existed at Tintinallogy. The balance of the very imperfect evidence at present available appears to incline to the negative.

#### BLADDER WORM AND COCCIDIAL DISEASES IN NEW ZEALAND.

Section IV of the detailed report, pages 115 to 123, consists of the evidence of Mr. Coleman Phillips, concerning the disappearance of rabbits from the South Wairarapa district of the North Island of New Zealand. This district contains over a million acres, and the rabbits, which a few years ago were swarming in the country, have almost entirely disappeared. According to Mr. Phillips, the poisoning operations conducted in 1883-4 were not successful; and in the South Island, where millions of rabbits have been destroyed by poison, the plague is as severe as ever. He attributes the success in the Wairarapa district to the ravages of the bladder worm, which is an encysted parasite, forming a bladder-like tumour in the muscles of rabbits. The mature form of the parasite is a tape worm, found in the intestines of dogs. Segments of these tape worms, or the eggs thereof, pass from the intestines of the dogs, and, when eaten by rabbits with their food, produce the bladder worm; just as the little echinococcus tape worm in the dog leads to the hydatid cyst in man. In this bladder worm, heads of new worms develop in large numbers. Dogs in turn feed on the flesh of rabbits containing bladders, and the heads thus swallowed form new tape worms in the intestines of the dogs. This cycle is constantly being repeated. Mr. Coleman Phillips therefore recommends that all dogs at stations where rabbits abound be fed on rabbit flesh till they get thoroughly infested with these worms, so as to become thin and mangy in appearance; that they then receive doses of areca nut, so that the worms may be expelled. The segments with their myriads of contained eggs will then infect the grass. Rabbits will eat the grass and develop the bladder worm. Mr. Phillips thinks that other natural enemies of rabbits, such as ferrets, stoats, weasels, cats, and hawks may also harbour the parasite in its tape worm stage, and thus assist in propagating the bladder worm among rabbits. He maintains that these natural enemies of rabbits slay by the parasites contained in their excreta, and not by directly killing the rabbits; that the process is slow, but effectual.

Professor Thomas, of University College, Auckland, made an inquiry into the causation of the disappearance of rabbits from the Wairarapa district, and his Report to the Honorable the Minister of Lands of New Zealand will be found reprinted in full in Appendix VIII. The Commission regards this Report by Professor Thomas as most valuable. He concludes that the decrease  
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of rabbits in the Wairarapa has, in the first place, been due to the measures adopted by man, especially the winter poisoning; but that certain parasitic diseases have appeared in the district, have been widely but unequally prevalent, and have assisted, to a small extent, in keeping down the rabbits. These parasitic diseases include—(1) the bladder worm (*cœnurus*) of which Professor Thomas gives an excellent history, and the smaller bladder worm (*Cysticercus pisiformis*); (2) the *coccidia*\* or gregarinoid animals which have already been referred to in connection with the so-called Tintinallody disease; (3) the rabbit mange, itch, or scab; and (4) the rabbit louse. The little mite which causes the scab disease is distinct from the *Sarcoptes cuniculi* experimented upon by Professor Watson; it lives on the surface of the skin and is comparatively harmless. In the opinion of Professor Thomas, the effects of this mite, and of the larger louse, are seldom so serious as to lead to the death of a rabbit infested with them. Professor Thomas found comparatively few rabbits affected with the bladder worm, but rabbiters told him that 20 per cent. were not uncommonly infested. Infested rabbits usually contained only one bladder, some had two, and in one instance of the natural disease Professor Thomas found three bladders. The bladder-like cyst is usually situated among the muscles in one of the limbs, the trunk, or the head, but may be in the internal parts of the body. It may reach the size of an orange, and consists of a gelatinous membranous sac full of clear fluid, and supported externally by the thickened tissues of the part in which it lies. The inner surface is dotted with minute heads of future worms.

“Avoiding unnecessary details,” (writes Professor Thomas) “we may say that the effect of a single bladder-worm will, as a rule, hardly be shown during the first three or four months, but that afterwards, as it continues to increase in size, it may be a source of weakness to the rabbit; but I have not been able to find any evidence that a rabbit affected with a single bladder-worm only might not live till death came to it from some other natural cause. But with the increase of the number of parasites the tax on the strength of the rabbit becomes greater than it can bear, and it succumbs to the burden, sometimes directly, sometimes indirectly, being brought into a low and weak condition, in which it readily falls a victim to other adverse influences, such as weather, scarcity of food, or enemies.”

The presence of one, or at most two, bladder-cysts indicates that as a rule the rabbit swallows isolated eggs of the tape-worm; but Professor Thomas' experiments showed that when whole segments were swallowed, little bladder-cysts grew in multitudes in the tissues, and death followed from the disturbance so caused. It is difficult to estimate how often such an event occurs in the natural process of infection.

The researches of Professor Thomas prove that the bladder worm of rabbits and the tape worm of the dog from which it is derived are perfectly distinct from the *cœnurus* which sometimes proves fatal to sheep. Stock of all kinds that fed on the same ground with the diseased rabbits remained in good condition. A few experiments on ferrets and cats gave Professor Thomas no reason to think that any animals except dogs could be the bearers or hosts of the adult tape-worm.

The smaller bladder-worm of the rabbit (*Cysticercus pisiformis*) was found by Professor Thomas in only two of the rabbits from the Wairarapa district, but it was present almost constantly in rabbits caught in the Waikato, each rabbit usually containing one to ten specimens. This bladder-worm is round, about the size of a pea, and is found free in the abdominal cavity, or, at a later stage of development, adherent to the lining membrane, usually in that part forming the great omentum or that covering the rectum. “When present in small numbers it causes very little injury to the rabbit . . . . It must be seldom, however, that this parasite can, under conditions obtaining in nature, cause the death of a rabbit.”

Professor

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\* Further information concerning *coccidia*, with magnified representations of the lesions caused by them, will be found in Appendices V and VI.

Professor Thomas found *coccidia* in the liver more prevalent than the bladder worm, and apparently productive of more serious mischief. *Coccidia* spread from infested rabbits to healthy rabbits through the droppings of the former falling on to the food which is eaten, or being carried into water which is drunk by the latter.

Immediately before summarizing his general results, Professor Thomas writes as follows on parasitic diseases generally:—

“One of the most prominent characteristics of parasitic diseases is their unequal development in different localities and in different seasons. So, with reference to the diseases due to the bladder-worm and liver coccidia, we may expect in some localities a more extensive development and useful results, whilst in other localities the diseases may not meet with the necessary conditions, and little or no good may result. Further, we have seen that moisture is favourable to the spread of these diseases; we may expect them therefore to be more prevalent in moist or ill-drained localities, and to be more useful in wet seasons and climates than in dry ones. Hence, over a great part of Australia the diseases would be less effective than in New Zealand.

“When animals of the same kind are densely crowded together on the same ground, as is the case with the rabbits in the infected districts, one of the conditions for the spread of a parasitic or infectious disease is best fulfilled. When the number of animals is reduced, the danger of infection will diminish.”

Professor Thomas summarizes his conclusions as follows:—

- “1. The reduction of rabbits in the Wairarapa has been chiefly due to measures adopted by man. The most valuable of these measures has been the winter poisoning, which has been followed up during the rest of the year by trapping, &c. Cats and ferrets, too, seem to have done good work.
- “2. Certain parasitic diseases have appeared in the district, and have been widely, though unequally, prevalent.
- “3. Of these parasitic diseases two only—those due to bladder-worm and liver coccidia—deserve special notice as being capable of destroying rabbits. There is reason to believe that these have assisted to a small extent in destroying rabbits in the district.
- “4. The employment of the liver coccidia for the destruction of rabbits cannot be advocated, as in rare instances the parasites have been known to attack man. They are, however, present in the district, and it would probably be impossible to suppress them. Fortunately the danger to human beings is very small indeed, and the disease may prove of further use in killing rabbits.
- “5. The bladder-worm may be usefully employed against the rabbit pest; but it must not be expected that it will destroy more than a small percentage of the rabbits in the district. Like all parasitic diseases, it is variable and apparently capricious in its distribution, and its propagation is limited by conditions which will vary with the locality and season. It would be more useful in a moist climate than in one which is hot and dry. It assuredly cannot be regarded as furnishing alone a sufficient means of dealing with the rabbit pest, nor will it render unnecessary the ordinary methods of the destruction of rabbits, but must be looked upon as simply a minor and auxiliary means of destruction.”

A rabbit suffering from bladder worm was brought from New Zealand by Sir James Hector, for examination by the Commission. It was received at the station on June 16th. Since then the bladder has increased in size, but otherwise the rabbit seems in a normal state.

Mr. Hawkins, of North Wairarapa, in a letter recently addressed to the Commission, states that, during the past seven years, rabbits have not decreased in numbers in his district, though the bladder worm has been prevalent. He states that ferrets thrive exceedingly well in South Wairarapa, but did not multiply freely in the North. He holds that the great diminution of the rabbit pest

pest in South Wairarapa has been due, not to the bladder worm disease, but to the great multiplication of ferrets. His letter will be found in Appendix IX.

In the opinion of the Commission, the receipt of Professor Thomas' full report renders it unnecessary that the Commission should make any further inquiry concerning the bladder worm disease.

#### SARCOPTES CUNICULI OR RABBIT SCAB.

In March 1887, Professor Watson, of the University of Adelaide, succeeded in importing from Germany six rabbits suffering from the *Sarcoptes cuniculi* or rabbit scab. He placed them in an enclosure about 50 feet square with a number of Australian wild rabbits. The latter contracted the same disease and died, some in two, some in three, and some in six months. The *Sarcoptes cuniculi* is the itch-mite of the rabbit, an animal parasite which lives in the fur, the female burrowing and depositing eggs in the skin. The insect is only a quarter of the size of the scab insect in sheep. It causes great irritation of the skin, and enlargement of the lymphatic or absorbent glands. The affected animals die of wasting and exhaustion. In Germany, where the *sarcoptes* has been chiefly studied, septic poisoning usually occurs, with suppuration in the absorbent glands; but this complication was absent in the rabbits subjected to experiment in Adelaide. The fur of rabbits infested with the *sarcoptes* was repeatedly inserted in the wool of sheep without any ill effect. Attempts to communicate the rabbit scab to man, and to a dog and cat, failed. It thus appeared probable that the *sarcoptes* could be utilised for the wholesale destruction of rabbits. But the spread of the parasite from infested rabbits to healthy rabbits, and the fatal development of the disease, occurred in the wet season. As soon as the dry season set in, the infested rabbits, which had been suffering severely, proceeded to recover in the most thorough manner. Professor Watson satisfied himself that the *sarcoptes* would not be of any practical utility for the destruction of rabbits in the dry parts of Australia, but he is not satisfied whether it might not be of service in districts which possess a moist climate. While the results were still favourable, Professor Watson sold all his stock of infested rabbits. The subsequent history of these rabbits, as described by several witnesses, did not encourage any hope that material assistance in dealing with the rabbit plague would be obtained by use of the *Sarcoptes cuniculi*, at all events in the dry districts of Australia.

#### OTHER SCHEMES FOR THE DESTRUCTION OF RABBITS BY DISEASE.

Suggestions for the destruction of rabbits by disease were submitted by one hundred and fifteen correspondents for consideration by the Commission. Of these, 26 were from New South Wales, 8 from Victoria, 3 from South Australia, 3 from Queensland, 6 from New Zealand, 2 from Tasmania, 1 from Fiji, 15 from England, 4 from Scotland, 1 from Ireland, 12 from France, 3 from Belgium, 2 from Germany, 2 from Switzerland, 2 from Spain, 1 from Italy, 1 from Austria, 1 from Roumania, 17 from the United States, 1 from Canada, 1 from India, 1 from Netherlands India, and 2 from South Africa. Most of these schemes were classified and reported upon by a special committee, and the results of the labours of that committee are recorded in Appendix 1, pages . . . . . The remaining schemes came under the notice of the Commission at a later date, and were classified by Mr. Pearson, whose report appears in the supplement to Appendix I, page . . . . . According to these reports, in which the Commission fully concurs, many of the schemes are vague, no specific disease being mentioned, or merely "a disease" said to be peculiar to rabbits. In many instances the use of diseases dangerous to man or to domestic animals is recommended, such as small-pox, syphilis, glanders, hydrophobia, tuberculosis, &c. Other correspondents suggest the employment of nasal catarrh, which is mentioned by Leuckart as peculiar and fatal to rabbits; of the liver-worm, which is said to have killed great numbers of rabbits in Colorado; of diseases which have decimated the wallabies and opossums in certain districts, &c. In all cases in which there seemed to be any possibility that the disease mentioned would prove useful, letters asking for further information were sent

sent to the correspondents concerned. Communications were also addressed to Professor Ribbert, of Bonn, and Professor Loeffler, of Greifswald, requesting fuller details concerning diseases recently described by them as peculiar to rabbits. In two instances replies were received stating that the original correspondents had disappeared. A letter from M. Laplanche, of Fismes, was unfortunately lost in transit, and a request for a copy of the same has been forwarded. One proposal was that as disease always breaks out when animals are crowded together, rabbits should be placed in an enclosure, fed well, and encouraged to breed freely, and that when any disease manifested itself among them attempts should be made to spread it widely.

The Commission has found no evidence to warrant the belief that any known disease can be so employed as to exterminate rabbits. Probably many diseases will be found useful auxiliaries in reducing the rabbit plague within manageable proportions. Further inquiry by competent observers into the epidemic and parasitic diseases of rabbits should be encouraged. But even when much fuller information concerning these diseases shall have been obtained, it will still be necessary, in the opinion of this Commission, to continue the methods of suppressing the pest which are now generally adopted, subject to such improvements in detail as may from time to time be discovered.

#### SCHEMES FOR THE DESTRUCTION OF RABBITS OTHERWISE THAN BY DISEASE.

About fourteen hundred schemes for the destruction of rabbits by means other than disease have been referred to this Commission. It was intended that the schemes should be classified and reported upon by a special committee prior to the publication of this Report, but the mass of the correspondence has rendered it impossible to complete this labour. The Commission trusts to be able, within the space of six weeks, to submit this classified list of schemes, with notes on the merits of the several proposals.

On certain points, however, the Commission has arrived at definite conclusions, the chief of which may be formulated as follow:—

- (1.) That the responsibility for the destruction of rabbits, whether on freehold or on leasehold land, must rest on the landholder. That, with respect to unoccupied Crown lands, the State must accept similar responsibility.
- (2.) That the rabbit pest has made the continuance of the system of annual leases of Crown lands impossible.
- (3.) That no finality in rabbit destruction will be obtained without making the erection of rabbit-proof fences compulsory.
- (4.) That there are very large areas of land so poor that the erection of rabbit-proof fences around individual holdings might cause financial failure. That the Department administering the Rabbit Destruction Acts should be empowered to permit the fencing of such poor holdings in groups. That in dealing with land of very poor carrying capacity the State should show special consideration to the lessees in respect of tenure.
- (5.) That in all infested country, but especially in such poor districts, simultaneous operations for the destruction of rabbits should be made compulsory.
- (6.) That netting fencing, 3 feet high, with a mesh of  $1\frac{1}{2}$  inch, forms a practically efficient barrier against the incursions of rabbits.
- (7.) That the system of compulsory trapping, with professional trappers and State bonuses, is radically bad.
- (8.) That legislative measures should be taken compelling land owners or lessees in districts infested by rabbits to join, subject to the above provisions, in payment of the cost of rabbit-proof netting fences or in the addition of such netting to existing fences.

In the opinion of the Commission these propositions require little explanation or argument in their favour. Responsibility for the destruction of rabbits must be placed somewhere. To whom can it be assigned but to the holder of the land, whether owner or lessee? Boundary fences would then be paid for jointly by neighbours. The State must take all the responsibilities of ownership with reference to unoccupied Crown lands, both as to destruction of rabbits and joint payment of the cost of boundary fences. In infested country the leasehold occupiers of Crown lands must have certainty that, if they expend the money necessary for the destruction of rabbits and for the protection of their lands, they will enjoy for a fair term the fruit of their labours. The contest with rabbits is most difficult in the huge resumed areas of poor land now held under ordinary squatting tenure. To break up these large holdings at once into small blocks is to postpone the adoption of effective measures for the destruction of rabbits. The first work in saving these lands must be done by large holders; and the necessary expenditure will not be incurred unless there is a reasonable security of return. In every large leasehold of this character it should be arranged that at intervals a certain fraction of the whole should be open for resumption. There would then be no sound reason for complaint either by the State, the lessee, or the selector. The necessity for rabbit-proof fencing scarcely needs demonstration. However stringent supervision may be, action on adjoining holdings will fail in certain cases to be simultaneous, and the holder who acts promptly will find in the absence of fencing that the respite from the plague is but temporary, while the holder whose lands abut on unoccupied hilly or scrubby country will see all his operations futile. When once rabbit-proof fences are erected the reduction of the pest within manageable proportions is a question simply of time and money. Yet, with large areas of land of very poor carrying capacity, the erection of rabbit-proof fencing around individual holdings may not be financially practicable. These areas must be fenced off from the better land around, and the *simultaneous* pursuance of the best known methods of rabbit destruction must be made compulsory. The Commission, realizing that the cost of netting fencing was a great difficulty, made careful inquiry concerning the minimum height and the maximum mesh which would prove effective. Abundant evidence will be found in the proceedings in favour of the decision of the Commission: that netting fencing 3 feet high, with 1½ inch mesh, is for all practical purposes an effective barrier. Such was the almost unvarying testimony of those witnesses who had practical experience with netting of this width and mesh. Rabbits die of starvation when their warrens are encircled with this netting; gardens protected by it are free from invasion, though the infested country around is dry and bare. Little weight can be attached to the opinions of witnesses who never used such netting, and still less to experiments in which rabbits are chased in small enclosures.

The system of compulsory trapping, with professional rabbiters and State bonuses, is radically bad. Rabbiting parties settle down in thickly-infested country and speedily kill multitudes of rabbits; as soon as the numbers are greatly thinned, a longer stay is unremunerative. No attempt at extermination is made. The party moves on to another place favourable for its operations, leaving the remaining rabbits to multiply ready for its next visit. Large sums are paid to such parties *per capita*. The station hands are demoralised. The State treasury is depleted of hundreds of thousands of pounds, and with what result? The rabbits are as numerous as ever; the operations of the trappers simply drive them more and more widely over the country; the landholders are disgusted at being forced to assist in a practice which they condemn; and no good whatever is done except to the rabbiters themselves, who fatten on a pernicious system. The Commission expresses its satisfaction that the Rabbit Department of New South Wales has resolutely turned its back upon this wasteful policy. It must not be inferred that the Commission objects to traps and trapping parties *per se*. Trapping is, without doubt, a useful method, but should be carried out by station hands, and with a view to the extermination of rabbits, not to profitable employment.\*

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\* This limited recommendation of trapping must be held to apply only to areas enclosed by wire-netting fences, and in which the propagation of natural enemies of rabbits is not being encouraged.

## XXXIII

It remains only to record that the first-appointed President of the Commission, Dr. MacLaurin, was able to attend but few of the meetings; that Professor Allen, as acting-Chairman, undertook the general direction of the business of the Commission; that on August 18 it was notified to the Commission that Dr. MacLaurin's resignation of membership had been received, and that at the repeated request of the Commission, Professor Allen finally accepted the office of President.

Certified under our hands and seals this third day of April, 1889,—

(L.S.)	H. B. ALLEN (PRESIDENT),
(L.S.)	W. CAMAC WILKINSON,
(L.S.)	EDWARD QUIN,
(L.S.)	E. H. LASCELLES, <i>per</i> H. MAHON,
(L.S.)	A. D. BELL,
(L.S.)	HENRY TRYON,
(L.S.)	THOMAS A. TABART, <i>per</i> H. MAHON,
(L.S.)	JOSEPH BANCROFT, <i>per</i> H. MAHON,
(L.S.)	ALEX. S. PATERSON, <i>per</i> H. MAHON.

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## DISSENT I.

In opposition to the majority of our colleagues we submit that M. Pasteur's representatives should not be permitted to make experiments with chicken-cholera microbes in infested inland country protected only by netting-fencing.

The experiments made under the direction of the Commission show that chicken-cholera has very little tendency to spread from infected to healthy rabbits. This result agrees with the fact that in France and elsewhere the disease has not been known to prevail among rabbits when it was devastating the poultry farms. Hence, if used for the destruction of rabbits, the microbes of chicken-cholera must owe almost all their value to their action as direct poisons to the rabbits which eat them. A certain quantity of a broth culture of these microbes will kill a rabbit, but so also will a certain dose of phosphorus, arsenic, or strychnine. For the preparation of cultures and their maintenance in full virulence the services of experts are necessary. The cultures lose their virulence on drying at ordinary temperatures or on short exposure to the sun's rays on a warm summer day. Hence as a direct poison the microbes must be more expensive, less stable, less manageable, than the poisons now in use. So far as this paragraph is concerned we believe that our statements have the concurrence of our colleagues.

In our opinion, a small experiment with chicken-cholera on an inland area is of no service, except as a preliminary to the wide dissemination of the microbes through the huge areas of infested country. Such dissemination would entail risk to wild birds, though the experiments of the Commission show that the risk is not so great as might have been anticipated. The chief risk is the remote one to domestic fowls. It has not been shown that chicken-cholera exists among fowls in Australasia. The introduction of any new disease should be forbidden unless some decided benefit is clearly to be secured; the wide dissemination of a new disease is specially objectionable. In face of the final conclusion of the Commission that chicken-cholera should not be disseminated broadcast in the infested parts of Australia, we regard any limited experiment in open country as useless and not devoid of danger.

(L.S.) H. B. ALLEN,

(L.S.) JOSEPH BANCROFT,  
*per* H. MAHON,

(L.S.) ALEX. S. PATERSON,  
*per* H. MAHON.

3 April, 1889.

## DISSENT II.

I dissent from the decision arrived at by the majority of my colleagues to withdraw opposition to the introduction of fowl-cholera microbes into the country; and the following are the reasons for my dissent:—

The action of the Commission as set forth in this resolution is opposed to their past action, as especially set forth in the proceedings, and report of the Experiment Committee, page 130 at the top, and page 135, 23rd line from the top.

The chain of reasoning by which my colleagues endeavour to link the present with the former action of the Commission may be briefly presented as follows:—

Although the experiments at Rodd Island have throughout indicated that chicken-cholera has so low a degree of contagion amongst rabbits that there is next to no probability of its possessing any special merits as a means of destroying these pests, yet, it is just possible that there may be in the open country some condition, not existing at Rodd Island, which would operate in favour of the contagiousness of the disease. And, because this is possible, it would be more conclusive to have the experiment tried under entirely natural conditions.

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The original objection to admitting the microbes into the interior for the purposes of experiment in the open was that there might perhaps be danger to the public health, to sheep, cattle, and other domesticated beasts, and that there certainly was danger to poultry, and perhaps to many useful wild birds. The experiments at Rodd Island are held to have shown that there is no danger to the public health, nor to domesticated beasts, and that the danger to birds is much less than was anticipated, that, in fact it is so small as to be practically out of the reckoning. Therefore these objections having been removed, there is no reason why an experiment in the interior should not be allowed.

To me, however, this chain of reasoning appears seriously imperfect. Leaving out of consideration the danger to man and to beast (which, for general reasons, may be regarded as *nil*) the true logical position is as follows:—

- (1.) The contagion amongst rabbits at Rodd Island was less than desired.
- (2.) The danger to birds at Rodd Island was less than anticipated.
- (3.) In the open country the contagion amongst rabbits may be greater than at Rodd Island.

Here the argument of my colleagues ends. But to complete the chain the following is necessary:—

- (4.) In the open country the danger to birds may be greater than at Rodd Island.

Whatever line of reasoning be applied to the question of contagion amongst rabbits must just as rigorously be applied to the question of danger to birds, and indeed also to the danger to stock and to the public health.

If, however, the position be abandoned, and it be admitted that no hope whatever can be entertained of there being greater contagion in the open country than there was at Rodd Island, then it must be asked, what is the object of introducing the disease at all? The only answer which can be given is that it is out of courtesy to M. Pasteur, and that his agents may be allowed to perform the experiments of demonstration, which they came to perform. But, as a matter of fact, the experiment which the majority of the Commissioners have decided not to oppose, is not the experiment which these gentlemen came to perform. It is in substance an experiment on a large scale, which the Commission have repeatedly requested to have performed, but which M. Pasteur's agents have strenuously declined to carry out. And even supposing that the experiment were precisely that which M. Pasteur has laid down, it seems to me entirely unjustifiable to permit, out of mere courtesy to anyone, and with no practical object, the introduction of a disease into the country, when that introduction, as shown by the Rodd Island experiments, will undoubtedly, in a degree, be dangerous to poultry, and to some other birds.

If it be said that the probabilities of any real danger to birds are so small as to be practically out of the reckoning, I cannot agree with the statement. By arguing from probabilities, it is easy to arrive at any conclusion which may be desired. The conclusion where possible should be based, not on probabilities, but on known facts. And what are the known facts? They are, on the one hand, that chicken-cholera has never been known to prevail, or even to occur, naturally amongst rabbits; and that in the experiments at Rodd Island, the contagion was so small as to be of no practical utility; and these experiments it is important to bear in mind were specially devised so as to be eminently favourable to contagion amongst rabbits; devised not only by the Commission but also by M. Pasteur himself. Then, on the other hand, the facts are, that chicken-cholera, according to M. Pasteur's own statements, has prevailed naturally as a virulent, devastating, and highly infectious disease in poultry-yards; and that, according to the experiments at Rodd Island, birds do contract the disease from rabbits. If then the disease be once admitted into the country, there is a risk that it may become established amongst birds, and by slow degrees be carried about both by birds and by insects, until at last it reaches the poultry-yards. To attempt to estimate the amount of this risk is useless, whether that attempt be in the direction of exaggerating it or of minimising it. But one thing is clear, while the disease is not in the country there is no risk; if it be introduced there will be risk.

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If, finally, it be said that fowl-cholera already exists in the colonies, then it is to be answered that the investigations of the Commission all go to show that the disease now in the colonies is not the same as M. Pasteur's *choléra des poules*; and it is undesirable to supplement one disease by the importation of another.

For these reasons, and as being officially interested in poultry farming, I am obliged to dissent from this resolution.

In all the rest of the report I concur.

3 April, 1889.

(L.S.)

A. N. PEARSON,  
*per* H. MAHON.

#### NOTE BY THE COMMISSION ON DISSENT II.

The Commission has decided to print Mr. Pearson's dissent with its Report, although such dissent did not reach the Commission till a few minutes before the hour appointed for the signing of the Report, Mr. Pearson having already left Sydney. It is absolutely necessary to state that the general opinions, arguments, and conclusions attributed by Mr. Pearson to the Commission have never been entertained for a moment, so far as the Commission is aware, by a single member; at any rate the Commission utterly repudiates them. The Commission has already given its final judgment against M. Pasteur's scheme. Its position with regard to an experiment with chicken-cholera in the open is simply that no sufficient reason exists why M. Pasteur's representatives should be forbidden to perform such an experiment if they so desire. In development of this position, the Commission has briefly indicated, for the guidance of the Government, if it should be decided to permit any such experiment, certain leading conditions, which would be indispensable if the experiment is to be worthy of the slightest attention. The Commission is of opinion that no advantage can be gained by such an experiment, other than that M. Pasteur's representatives would not be able to complain that any part of the demonstration which they were sent to perform had been prohibited by Government.

Inserted by order of the Commission,—

(L.S.)

H. B. ALLEN,  
President.

3 April, 1889.

#### DISSENT III.

In nearly every respect I agree with the conclusions embodied in the general report of the Commission; but I desire to record my separate opinion upon two points:—

I. Assuming that the experiments carried on by the Commission on Rodd Island have shown that the microbes of chicken-cholera are—

- (a) Innocuous to human beings and domestic animals;
- (b) To some extent dangerous to wild birds, but not so dangerous as was supposed;
- (c) Highly fatal to many kinds of domestic birds;

I should still not have hesitated, in face of the grave evils of the rabbit pest, to recommend that further trials in the open country should be permitted, if only it had been shown that there was a reasonable probability that the disease (which is admittedly very fatal to rabbits when the microbes are directly consumed) would freely spread amongst them by infection. The extensive experiments, however, which have been made on behalf of the Commission, though carried on under conditions far more favorable to the spread of the disease from rabbit to rabbit than those which exist in the open country, have not shown that this is likely to be the case. On the contrary, the experiments show that the disease will not freely spread. I am, therefore, of opinion that it is not advisable to give permission to spread broadcast a disease which

which, while it is assuredly fatal to many kinds of poultry, has not been shown to be at all likely to have the effect of aiding to any practicable extent in the work of rabbit extermination.

In this respect, therefore, I agree with the dissent of Professor Allen.

II. In regard to the conclusion of the Commission as to compulsory fencing: while I agree with the general opinion that some sort of subdivision of the land into suitable areas is an essential element in any scheme for the wholesale and complete extermination of rabbits, yet, in view of the heavy relative expenses of this operation, necessitated by the enormous areas of comparatively poor land that have to be dealt with in South Australia, I am unwilling to subscribe to a recommendation for compulsory legislation that might, by suddenly throwing heavy burdens upon the pastoral lessees, have the effect of bringing upon them disasters to a scarcely less extent than is now threatened by the rabbits themselves.

In all other respects I agree with the report of the Commission.

(L.S.) E. C. STIRLING.

NOTE ON NETTING-FENCING BY MR. BELL (NEW ZEALAND).

While (as a member of a mixed Australian and New Zealand Commission) I do not dissent from the emphatic declarations made in the Report with regard to the value of "rabbit-proof" fences as an aid to rabbit destruction, I desire to say that I do not consider this part of the Report to be entirely applicable to the circumstances of New Zealand. My Australian experiences in connection with the work of the Commission have satisfied me that wire-netting is an agent of considerable value in Australia, where there are no heavy snow-drifts, no mountain torrents, no great streams and rivers changing their course with every flood, no extensive landslips, glaciers, mountain crags thousands of feet high, and so on. In New Zealand, where all these special conditions prevail, its usefulness must, I think, be proportionately less. Moreover, there are few districts in New Zealand where the country is not considerably intersected by road lines, which introduce obvious difficulties into the wire-netting question. This is not the case in Australia, where vast tracts of infested country are traversed by at most two or three lines of road. I do not dwell upon the well-known danger of the wilful introduction of wild rabbits into netted areas by persons interested in the maintenance of the pest, because such a practice could scarcely be carried out on a scale of serious magnitude in the case of an already infested district subdivided into netted enclosures. Where, on the other hand, what is called a "barrier" is attempted, by the erection of a "rabbit-proof" fence between an infested district and a clean one, this practice of dropping rabbits over the fence from the infested side must certainly be taken into account in weighing the probabilities as to the efficacy of the plan.

(L.S.) A. D. BELL.

3 April, 1889.

NOTE BY DR. BANCROFT.

To me it appears important that the diseases so destructive to multitudes of rabbits, that arose in Tasmania, at Tintinallogy, and elsewhere in Australia, should be scientifically studied, in order that their value as exterminating agents may be understood, and, if possible, utilized. The great number of rabbits that can be driven into wire-net enclosures offers a means of communicating Coccidium disease.

The female rabbits being destroyed, the males could be fed with Coccidia, and afterwards set at liberty. I consider such trials worthy of consideration, as in all probability some of the outbreaks so destructive to rabbits were caused by the Coccidium parasite.

A convenient plan of communicating Coccidium disease on a large scale could be easily devised.

(L.S.) JOSEPH BANCROFT.



**ERRATA.**

In page 4, Report of Proceedings, the sentence beginning on the 7th line from the bottom should be—"If this were done we should have some useful information, gained under the conditions which have to be faced." The words "gained under the," in 5th line from the bottom, should be omitted.

Page 91, question 1098—The concluding sentence of answer to this question should be—"I have been told that occasionally odd rabbits get over it."



# REPORT OF PROCEEDINGS AND MINUTES OF EVIDENCE

OF THE

## ROYAL COMMISSION

OF INQUIRY INTO

### SCHEMES FOR THE EXTERMINATION OF RABBITS IN AUSTRALASIA.

#### SECTION I.

##### REPORT OF PROCEEDINGS.

MONDAY, 16 APRIL, 1888.

The Commission met at 10 a.m. at the Colonial Secretary's Office, Sydney.

The members of the Commission present were:—

*New South Wales*: HENRY NORMAN MACLAURIN, Esq., M.D.

WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.

EDWARD QUIN, Esq.

*Victoria*: HARRY BROOKES ALLEN, Esq., M.D.

ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., F.C.S., A.I.C.

*South Australia*: EDWARD CHARLES STIRLING, Esq., M.D.

ALEXANDER STUART PATERSON, Esq., M.D.

*Queensland*: JOSEPH BANCROFT, Esq., M.D.

*Tasmania*: THOMAS ALFRED TABART, Esq.

Dr. MACLAURIN stated that the usual practice hitherto had been that the President of any Royal Commission should be appointed by the Government; but in this case, owing to the presence on the Commission of representatives from other colonies, it was deemed desirable that the Commission should appoint its own President.

Professor ALLEN, on behalf of the Victorian representatives, moved that Dr. MacLaurin be elected President of the Commission.

Dr. PATERSON seconded the nomination. No other candidate having been proposed, Dr. MacLaurin was unanimously elected.

It was decided that the Press should not be admitted to the meetings of the Commission, but the President was authorized to convey such information to the Press representatives as he might deem desirable.

Dr. PATERSON presented a Commission from the Government of South Australia appointing him and Dr. Stirling representatives of that Colony on the Commission.

Mr. TABART stated that a Commission from the Government of Tasmania, appointing him as the representative of that Colony on the Commission, had been forwarded to the Colonial Secretary.

Dr. BANCROFT stated that a Commission appointing him as the representative of Queensland had also been forwarded to the Colonial Secretary.

Professor ALLEN stated that in reference to the appointment of Messrs. Lascelles, Pearson, and himself, as representatives of Victoria, he understood some less formal communication had taken place with the Government of New South Wales.

On the motion of Mr. TABART, it was decided that the Commission should meet at 10 o'clock each morning and at 2:30 each afternoon on sitting days.

Professor ALLEN said:—Mr. President,—When first I was invited by the Victorian Government to act as a representative of Victoria on this Commission, I was informed that the object of the Commission was to examine and report upon the proposals of M. Pasteur for the destruction of rabbits. I replied that, owing to the pressure of my University engagements, I could not undertake more than to discuss the evidence immediately obtainable, and to advise what steps should be taken thereupon. I accepted therefore only this limited responsibility. Subsequently, learning that the disease at Tintinallong was destroying great numbers of rabbits, I induced my Government to make provision for the conduct of my University work during my absence. But I must return to Melbourne on Wednesday for the first public session of the Royal Commission on the sanitary condition of Melbourne and its suburbs, which will be held on Thursday afternoon, as two very important witnesses, who are on the point of departure to England, will then be examined. It will, however, be possible for me to return on Friday, or if the Commission should determine to examine the Tintinallong outbreak, I can proceed thither directly from Melbourne.

1. The problem before us is far more urgent in New South Wales than in Victoria. The difficulties which beset it become great when enormous areas of poor thinly settled land are dealt with. In Victoria, even in the Mallee Country, in parts once given over to rabbits, my colleague, Mr. Lascelles, will be able

to tell you how the rabbit plague has been successfully combatted without resort to the introduction of disease. But I can readily understand that in the back blocks of New South Wales, and even in more settled parts adjoining infested hill country, it would be a great boon to landowners if some disease could be introduced which would propagate itself among rabbits without doing serious injury to other animals, and which could be maintained in active spread among rabbits with a minimum of trouble and expense. In estimating the probability that any disease will disseminate itself among rabbits so as substantially to thin their numbers, several distinct questions must be considered—firstly, the spread of disease in a large warren; secondly, its transmission from one warren to another; thirdly, the effect of disease upon the multitudes of rabbits, which, under favourable circumstances, are said not to warren at all, or at least not during a great part of the year. The problem also will vary according as the remedy is to be applied in the dry arid plains of the interior, or in parts where food and covert are abundant. Even the season of the year will be a factor of considerable importance.

2. After these preliminary remarks, I may be permitted shortly to discuss the use of chicken-cholera for the extirpation of rabbits, so that members of the Commission may be aware of the reasons for which, in my opinion, great caution should be exercised both in conducting experiments and in drawing inferences from them. M. Pasteur's proposals must be viewed from two distinct standpoints, firstly with regard to their effectiveness, and secondly with regard to their safety.

3. It may be admitted that the bacterial broth employed by M. Pasteur will destroy any rabbits to which it is administered. This has been established for many years, and has been demonstrated recently on a large scale by M. Loir in the destruction of rabbits on the Pommery estate. But this fact would not in the least degree justify us in propagating disease in these colonies, for the extent of action of such a disease, direct and indirect, is beyond our power of prediction, and other poisons, such as arsenic and phosphorus, whose action is known and measurable, will fulfil the same purpose. The introduction of any new disease is specially open to objection; but it is probable that chicken-cholera is no new thing among us. Many proprietors of poultry-yards appear to have suffered severely from outbreaks of rapidly fatal disease among their fowls, the symptoms being drowsiness, balling of the feathers, weakness and diarrhœa. Information on this point is very desirable, and should be obtained as soon as possible.

4. The next question, and a most important one, is—*Would the chicken-cholera spread freely from rabbit to rabbit?* On this point more evidence is necessary. The experiments of M. Pasteur already published tend to show that the disease may be communicated from infected rabbits to healthy rabbits kept in the same hutch; but of the degree of this tendency, I have not been able to obtain any sure knowledge. As regards the spread of the disease among fowls, we find that it has prevailed in devastating epidemics; but still it has not exterminated fowls in France or other countries most subject to chicken-cholera. On the other hand, it may be effectively replied that the result would be very different if constant attempts had been made to spread the disease and to maintain its virulence in the poultry-yards, instead of struggling to suppress it. It is certain that among fowls the disease is virulently infective, and that the chief vehicle of infection is furnished by the droppings of infected fowls. As to its power of spontaneous spread among rabbits, no evidence, so far as I am aware, is yet available. We cannot argue with safety from the analogy of fowls. It is not certain that the disease would effectually thin out the rabbits in a crowded warren. The opportunity which the Pommery estate afforded for a crucial experiment was thrown away. If a number of diseased rabbits had been introduced into the warrens on that estate, conclusive evidence might have been attained; but instead of proceeding thus, the rabbits, which were dependent wholly for their subsistence on food daily provided by Mme. Pommery, were apparently destroyed at one swoop by adding infected broth to their stated meal on one particular day. There is no evidence as to whether the disease would spread from warren to warren, or seriously affect the rabbits which do not warren.

5. The next question which arises concerns the perpetuity of the disease when once started. In the first place, chicken-cholera kills very rapidly—so rapidly that a diseased animal would not long be in contact with healthy animals. Thus Pasteur tells us that nothing can be more easy than to stop the progress of the disease in a poultry-yard. The fowls should be isolated for some days only; the yard freely washed with water, especially with water acidulated with a little sulphuric acid, which readily destroys the microbe. All the excrement should be removed from the yard, and then the animals which survive may be brought together again. (*Comptes Rendus*, vol. 90, Feb. 9, 1880, pp. 239 *et seq.*) It is generally stated that when disease becomes prevalent among rabbits in any district they move into adjacent districts. The diseased animals would remain behind, and thus the progress of the outbreak would be checked. Again, a moderate heat, below the heat in the sun on a hot Australian summer day, suffices to kill the microbes, so that another hindrance to the perpetuation or wide spread of the disease is thus afforded. Then, too, the microbe is not known to form spores, and, in the absence of these specially resistant forms of development, less persistence in the spread of the malady can be expected. It may therefore be questioned whether, without frequent reinforcement, the disease would prevail more than in circumscribed epidemics, such as those of measles and scarlatina among children; and, if continual sowing of the disease be necessary, the element of expense at once acquires importance. It seems to me that we might fairly ask M. Pasteur to make his case clear—to give it some of the fulness and certitude with which he presented the results of other inquiries which have made his name famous. However, he may well reply that, in sending his agents to experiment in the locality where the remedy is to operate, he is doing the best thing possible, so that the Governments of these colonies may determine the nature of the test which will be accepted as conclusive. If it be determined to conduct a series of experiments, the operations may be divided into three groups—laboratory experiments; experiments on an island, preferably already infested with rabbits; and experiments on a portion of the main land, under the natural conditions which will obtain in ordinary cases.

6. *Is it safe to use chicken-cholera for the extirpation of rabbits?* M. Pasteur seems confident that it would be safe. But it is well known that the disease may be transmitted to fowls, ducks, geese, turkeys, pheasants, pigeons, and other birds. Thus Professor Zürn has reported on the examination of the bodies of 365 dead birds, namely, 237 fowls, 56 pigeons, 14 ducks, 16 geese, 10 turkeys, and 32 cage birds. Fowl typhoid (chicken-cholera) was found to have caused death 122 times, namely, in 79 fowls, 1 tragopan (a kind of pheasant), 3 ordinary pheasants, 17 pigeons, 8 turkeys, 5 ducks and 9 geese (see notice in the "Jahresbericht über die Leistungen auf dem Gebiete der Veterinär-Medicin, 1885," from the "Dresdener Blättern für Geflügelzucht"). Moreover, the real nature and affinities of chicken-cholera do not seem to be thoroughly understood. The disease appears to be a hæmorrhagic form of septicæmia; and

and some doubt has been expressed whether this form of septicaemia affecting fowls and rabbits is distinct from forms affecting larger animals. Thus, in the *Comptes Rendus* of the French Academy of Sciences, for July 8th, 1878 (vol. 87, pp. 69 *et seq.*), Professor Toussaint, of the Veterinary School at Toulouse, reported that he had been able to produce a peculiar septicaemic disease in a rabbit, by inoculating its ear with blood with a horse, which died from symptoms of anthrax sixty hours before the operation. A second rabbit was inoculated from the first, and subsequently fifty rabbits were inoculated in different places with similar results. Toussaint found special organisms, quite unlike those of anthrax, swarming in the blood, the tissues, and the excreta of the inoculated animals. Three rabbits died eighteen to twenty-four hours after eating oats moistened with the blood of infected animals. The excrement of diseased rabbits, powdered and mixed with food, killed two rabbits out of six, after one feeding. Two vigorous rabbits, placed for one night with inoculated animals, died next day. Three adult rabbits, placed in cages near those in which animals under experiment were kept, died in the same way without any direct contact with inoculated animals. In the *Comptes Rendus* of August 2, 1880 (vol. 91, p. p. 301 *et seq.*), about six months after Pasteur described the microbe of fowl-cholera with accuracy, a note from Toussaint was presented containing the following statements:—"When one studies fowl-cholera and acute septicaemia, one is quickly struck by the analogy which exists between these two diseases; two animals of the same kind, inoculated with the blood of the one and the other disease, and in the same way, present identical symptoms, die in the same time, and show exactly similar lesions . . . . I can say after several series of experiments, including more than 250 cases, that in the disease which kills the rabbit in ten to twenty hours, and which is inoculated so readily into birds, a microbe exists of well-determined form, whose action is always identical, which is the same that M. Pasteur has so perfectly studied and whose existence I had already demonstrated in the disease called fowl-cholera . . . . The cholera of fowls is, therefore, nothing else than acute septicaemia, contracted spontaneously by these birds in the places which they inhabit, and it is necessary, for cholera to exist, that putrefying matters should have been within their reach." Toussaint produced his septicaemia in rabbits and fowls with the blood of a horse which died of septicaemia, with that of a horse which died of typhus (*typhose*), and with blood of a sheep which died of anthrax. In the *Comptes Rendus* of July 25, 1881 (vol. 93, page 219), he reiterated his previous statements, and notified two fresh series of experiments, in one of which blood from a case of anthrax was used, in the other blood from a tuberculous cow. He inoculated rabbits with the blood from the case of anthrax; they died in seven or eight hours of septicaemia, and their blood contained a microbe exactly similar to that of fowl-cholera. It could be inoculated into pigeons and fowls, and passed readily from one bird to another. He obtained from Pasteur cultures of the microbe of fowl-cholera, and made separate experiments with these and with his own cultures from various sources, using different places and different instruments for the two series of experiments. The most minute observation could not establish any difference in the symptoms, the lesions, or in the cultures of the microbes. If we accept these experiments of Toussaint, an observer to whose ability Pasteur has borne testimony, we must believe either that chicken-cholera is simply a form of septicaemia which may be produced by microbes obtained from various animals dying of diverse diseases, or that there are two diseases affecting rabbits and birds, one genuine fowl-cholera, the other an ordinary acute septicaemia, the symptoms, lesions and microbes being almost, if not quite, identical in the two diseases. Moreover, Böllinger, a distinguished German observer, announced in 1878 that a plague, which was then causing great devastation among cattle and wild animals, was distinct from anthrax, though closely resembling it. Kitte subsequently confirmed Böllinger's observations, and discovered what he thought to be a new bacterium, very similar to those of rabbit septicaemia, chicken-cholera, and of the swine plague prevailing on the Continent of Europe. Hüppe has recently conducted a series of observations from which he concludes that all these diseases are varying expressions of hæmorrhagic septicaemia; that the disease is transmissible to domestic animals, especially to oxen, horses and swine; that rabbits and mice are specially adapted for experiment with the disease; that sheep and guinea-pigs are less liable. He describes the microbe as a short rod with deeply stained poles and a clear centre, thus resembling that which Pasteur has shown to be the cause of chicken-cholera (Schmidt's *Jahrbucher* for 1887, vol. 213, page 231). The reviewer of Hüppe's observations very properly notes that it is difficult to believe that there is such unity in the causation of these various diseases. In the *Comptes Rendus* of November 26th, 1883 (vol. 97, page 1,163), Pasteur presented the report of an investigation into swine plague, conducted by himself and M. Thuillier. He discovered a micro-organism which he believed to be the cause of the disease; he says that it resembles the microbe of fowl-cholera; "the form is still that of a figure of 8, but more delicate and less visible." He writes as follows:—"The inoculation of pigeons and rabbits with swine plague yielded the following very curious result:—If an inoculation with the micro-organism of swine plague was made into the pectoral muscle of a pigeon, the bird, after showing the ordinary outward symptoms of fowl-cholera, died in six or eight days. When the blood of this first pigeon was used for inoculating a second, the blood of a second for inoculating a third, and so on in a series, the micro-organism became acclimatized in the pigeon. The drowsiness and the tendency to roll itself up into a ball, which are the customary symptoms of the disease, appeared after a much shorter interval than in the first pigeons of the series. Death also occurred more quickly, and the blood of the later pigeons in the series was much more virulent to the pig than even the most infective products from a pig which had died of the so-called spontaneous swine plague. If the micro-organism of swine plague is passed through a series of rabbits, the result is altogether different. Rabbits inoculated with the infective products of a pig which has died of swine plague, or with cultivations made from them, are always made ill, and in the majority of instances die. If the disease is inoculated from rabbit to rabbit, the micro-organism becomes acclimatized in the rabbit. All the animals die, death supervening in a few days. . . . If the blood of the last rabbit of the series . . . be used for inoculating pigs it is found that the virulence has been progressively diminishing from the first to the later rabbits of the series. Very soon pigs inoculated with the blood of the rabbits are not killed, although they are made ill by it. After recovery they are found to be vaccinated for the fatal form of swine plague." (*Microparasites in Disease, New Sydenham Society's publications* for 1886, pp. 624-5). Loeffler, of Berlin, states that, from his own observations, swine plague is due to a minute bacillus, astonishingly like the bacillus of Koch's mouse septicaemia, but in one case he found quite a different organism. Schütz also found a similar bacillus to be the cause of the disease, and he found this bacillus in M. Pasteur's vaccine for swine plague, along with the figure of eight organisms, which Schütz regards

\* For the references to Zürn's Statistics and to Schmidt's *Jahrbucher*, Professor Allen desires to express his indebtedness to Dr. James Jamieson.

regards as a mere contamination. Schottelius agrees with Schütz, and the general conclusion of Dr. Loeffler is, that under the name of swine plague several diseases etiologically distinct, though perhaps identical in symptoms, have been confused together. (*Microparasites in Disease*, page 627). Similarly, it appears, from the evidence already quoted, that the nature and affinities of chicken-cholera are not well understood.

7. It seems necessary, therefore, that further evidence be obtained, especially in the way of testing whether chicken cholera is communicable to horses, cattle, sheep, and native birds. It does not follow that native birds must be affected because domestic birds are prone to the disease. But the presumption is that all birds will be liable. A quotation from Pasteur's paper on the attenuation of anthrax virus (*Compte Rendus*, vol. 92, page 429, translated in *Microparasites in Disease*, pages 566-7) will furnish evidence on this point, and will also show how the microbe of a disease may gain in virulence in passing from one animal to another of different age or of different kind. Pasteur has shown how the germs of anthrax may be weakened by cultivation at high temperatures, until the virus once fatal to a sheep will not kill a guinea-pig. But though it will not kill an adult guinea-pig, it kills one a single day old. If now we pass from the first guinea-pig one day old to another, by the inoculation of the second with the blood of the first, and from the second to the third and so on in series, its habit of developing in the economy is strengthened progressively. In consequence, we can soon kill guinea-pigs three days, four days, one week, one month, several years old, and in the end even sheep. The bacterium has returned to its original virulence.

In the case of the microbe of fowl-cholera, when it has arrived at the point at which it has no action on fowls" (in accordance with Pasteur's special method of weakening the virus of this disease) "its virulence can be restored by operating with it on small birds, canaries, sparrows, &c; all these species it kills at once. By passing it thus through the bodies of the animals, we can little by little cause it to take on a virulence capable of once more producing an effect on adult fowls." Other curious cases have been recorded showing that the virulence of a microbe to one kind of animal may be wonderfully altered by passing it through another kind of animal. Hence we should make sure, not only that the microbes of chicken-cholera are not injurious to higher forms of life, but that they cannot gain in virulence by repeated transfer through rabbits or through other animals so as to be able to affect sheep.

8. Generally, I cannot but feel that there is great weight in the argument, that while chicken-cholera is a natural disease among birds—"a disastrous disease, showing itself everywhere in the poultry-yards," as Pasteur wrote in 1880—it has never prevailed as a natural epidemic among rabbits; and that, therefore, if we attempt to maintain and spread the disease in Australia, we may decimate our birds without sensibly affecting the rabbits. M. Pasteur's representatives may, however, have valuable evidence to submit with which I am not familiar. The whole domain of bacteriology is still beset with obscurity; facts are often doubtful, and inferences uncertain. It is clear that if the microbes of chicken-cholera are to exterminate rabbits, great care must be taken to maintain the disease in activity, and the old modes of rabbit destruction must not be omitted. Difficulties will be presented by rabbits which do not warren, and by rabbits in hilly country. Repeated exposure of poisoned food or introduction of infected rabbits will be necessary, and the risk to bird life will be great. Still, I am of opinion that the remedy should be tested, but with every possible precaution to prevent mischief. If the Governments of Australia do not provide for the full testing of such proposals under proper precautions, I fear that land-owners, driven to extremity, may try them without any precautions. I therefore suggest that the service of such experts as are available be retained, so that experiments may be conducted without delay under the general guidance of the Commission. In this way it would be possible (1) to ascertain by laboratory experiments what animals may be affected by chicken-cholera, with cultures not only from the fowl, but also from the rabbit and other animals; (2) to conduct experiments under natural conditions, either on an island or in a protected area on the mainland, or both. With the results of such experiments before it, the Commission would be able to advise the Government finally. An island, to be thoroughly suitable, should be fairly accessible, and yet so far from the coast that birds would not fly across, unless in perfect health. Shortly before leaving Melbourne I was informed that an island in the Kent group, between Victoria and Tasmania, is already infested with rabbits. Many of the suggestions which I have made apply to other diseases which may be recommended for rabbit destruction, as well as to chicken cholera; but I feel that I have already trespassed too long on your attention, and can only thank you for your patient hearing.

Dr. BANCROFT having stated that it was desirable the Commission should have the facts mentioned by Professor Allen in convenient form for reference, Mr. QUIN moved, and Dr. BANCROFT seconded, "That the address of Professor Allen be printed, and that the other speeches thereon should be reported *verbatim* and also printed." The motion was agreed to, and the Chairman directed that two copies in proof, marked "confidential," should be supplied each member for revision before being finally printed.

Mr. QUIN said:—I should like to say something with reference to what Professor Allen has said about rabbits not burrowing. It is true they lie in form as hares do during the greater portion of the year, but there are three months during the winter in which they do take to the burrows that are already made to their hands, and what is known locally as beelby, wombat, and other holes, which are of great extent, some several hundred feet across them, and in some cases being 22 feet deep. I think, with dogs during the winter months, the bulk of the rabbits could be driven to the burrows, and they no doubt would then become infected with any disease that was being experimented with. I should like to say that I do not think any experiments carried on on an island such as is proposed would be satisfactory, the conditions are so different. We have in the interior such a different climate, a small rainfall, and positively no dews for a period of six months. Now this cannot and does not happen on islands on the sea coast. The herbage of the interior is of a salsolaceous character which is not to be met with out of it. I should like to see some practical experiments carried on such as fencing in an area of country of (say) a couple of miles square, and within such an enclosure small enclosures of an acre or more each, which could be fenced over these vast burrows which I have referred to. Stock of all descriptions could be kept within the outer fence for purposes of experiment. If this were done we should have some useful information, conditions which have to be faced. I am quite sure if the Government were asked they would be gained under the prepared to do what they can towards having such experiments carried out, and the sooner they are asked to do so the better. I shall leave the pathological contingencies to be dealt with by the professional members of the Commission.

Dr. PATERSON said that recently his official duties brought him, he being Government Medical Officer for South Australia, to the Teetulpa Gold-field. His visit was made about six months ago, and he travelled

travelled between Yurta, the last station on the railway, and Teetulpa, a distance of over 30 miles, by coach, and, consequently, he had had a good opportunity of observing the country. The whole of the district was rabbit infested. He visited one of the largest stations in South Australia (the Parctoo), the lease of which had expired or was on the point of expiring, and he was assured by a practical man, who knew very well the value of things and who was perfectly disinterested, being a Government official, that the country was simply worthless. At Teetulpa he had driven round with the warden of the Gold-field for 15 or 20 miles, and there again he had witnessed the devastation which these wretched little creatures had caused. In one bit of country, where there was good food and water, the rabbits were simply hopping about in great numbers, leading disinterested men to the conviction that the country was practically worthless. It was not only the pastoralists who were affected in this way, but the agriculturalists also, because the rabbits were now invading their northern areas. Perhaps they did not know, but he would tell them that South Australia had suffered from the drought very badly, and for some time there had been very bad crops, though last year there had been a good one. The farmers were now looking to this, and these creatures came along, exhausted from starvation, and eat down everything. In fact they eat everything before them and were nearly as bad as locusts. This question had hitherto been treated as if it only affected pastoralists, but there were many other interests—the agricultural interest for one—which would be affected by the pest if it went much further. Take the interest of the Crown and the general Government. If the large stations had to be abandoned—and a good deal of country was being abandoned, as they might know—the Crown would lose its revenue, and what was worse, though he did not know what the law might be here, but in South Australia the occupation of the waste lands would not yield enough to keep down the rabbits. Therefore, if these runs had to be abandoned the Crown would not only lose its revenue, but it would have the responsibility of keeping down the pest thrown on it. It seemed to him that the very existence of the pastoral interest was threatened, so that this was a very serious matter indeed. People seemed to hardly realize the value of the pastoral interest, but, whatever it might be now, it was the pastoral interest that had made these Colonies what they are. This was true, not only of one Colony, but of every Colony in the group. The food supply of these communities was dependent on the pastoral interest. Supposing that large tracts of country were abandoned, how were the markets of these large cities to be supplied with food? If the encroachment of the pest on this country continued there was not a single man, woman, or child in the country that would not feel it? As for himself he did not own a single sheep, nor had he any interest whatever in the pastoral industry, but he was only telling the Commission the opinion which his judgment had led him to form, after having witnessed the rabbit infested country for himself. Well, what the pastoralist, as well as the unfortunate farmer, wanted, as Mr. Owen had pointed out, was a cheap and effective remedy of destroying these rabbits. This was the opinion not only of men connected with the pastoral industry in South Australia—men of sound judgment, and men who, like himself, were not in any way interested in stations, and who did not possess a single sheep—that the remedy must be provided by science, and that they look to it to provide some remedy; some virulent and spreading disease which would go through and infect the healthy animal and destroy it. If they could not have such an ideal disease made to order, then they should have some infectious disease which would be limited to rabbits, &c. This was what was wanted. He was somewhat sorry to say that he did not have the very sanguine expectations that had been formed by the promoters of the various schemes—M. Pasteur's scheme, the Tintanalogy scheme, the scheme of Professor Watson—as to the effectiveness of the disease, or as regards its exterminative powers. He reasoned from general principles in this way, that the rabbits in the first instance were artificially pushed on from time to time; and they were not likely to be destroyed effectually in a short period. What he thought might safely be expected was that the rabbits would be artificially kept up from time to time by persons interested. Some of these diseases might, however, become a powerful auxiliary in dealing with this wretched pest. What was the use of talking about rabbit-proof fencing to an impoverished pastoralist? He could not afford such a thing. A friend of his, interested as one of a syndicate in a station on the Murray, proposed to put up £6,000 worth of fencing before a single rabbit had been destroyed. He mentioned this fact to show the magnitude of the evil that they had to contend with. He asked them to look at the amount of capital invested in pastoral enterprise, and the employment it afforded, because it was necessary to do this in order to realize the calamity which would occur if this pest made much more headway. He had to repeat again, and with regret, that he did not entertain very sanguine expectations about the exterminative power of any disease; but still he thought it might take its place fairly with hunting with dogs, with trapping, and other measures that had already proved most valuable and useful auxiliaries. He might notice one objection which Mr. Quin had also dealt with, that it was difficult to spread any infectious disease when the rabbits did not burrow. The rabbits would burrow in good parts of country, for "bunny" knew when he came to a good tract of land; but in rocky country they would not burrow. As Mr. Quin had said, they lie in form. But they would see that infectious disease must be propagated not only by animals sleeping together, but when they came in contact in other ways. They might not get a sort of disease which would prove as instantly fatal amongst animals that did not burrow as amongst animals that did, still the disease would do a great amount of good by thinning the pest to some extent. He had listened with very great interest to Professor Allen's description of M. Pasteur's scheme, and he thought Professor Allen had handled his subject very thoroughly and completely, so that it was quite unnecessary for him to say much more. There was one scheme, however, which he had had an opportunity of investigating, and which he had thought a good deal out; and he would give the Commission, at all events, the results of his study on the matter. This was a report written by him in response to instructions from the Chief Secretary of South Australia, who called on him to report whether the introduction of Professor Watson's scheme would be injurious to human life, or to the life of stock. He knew that one or two Members of the Commission had seen this; but others might not have done so, and therefore he would hand it in for printing with the other proceedings of the Commission.

#### REPORT ON INTRODUCTION OF DISEASE AMONGST RABBITS.

REPORT of Dr. Paterson (Colonial Surgeon) relative to the danger to stock through the introduction of disease amongst rabbits.

Sir,

Colonial Surgeon's Office, 8 November, 1887.

I have the honor to report that, in pursuance of your instruction, I conferred with Professor Watson on the subject of the disease which he proposes to introduce for the extermination of rabbits—

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1st, in reference to the nature of the disease; 2nd, with a view to expressing an opinion whether the disease in question was communicable to man, horses, sheep, cattle, and pigs. I had an interview with Professor Watson, who readily furnished the information asked for, showed me the infected animals, and demonstrated the nature of the disease under the microscope.

The rabbits experimented on are confined within the precincts of the old powder magazine at the rear of the University buildings. They occupy a small area of ground, which is intersected with their burrows. A high wall, with deep foundations, prevents any possibility of escape either above or below the surface. I counted eight rabbits in this enclosure, of which, judging by the colour, two were wild, the remainder domesticated animals. Lying about were the dead bodies of a considerable number of young ones which had come to their full time, but were either stillborn or had died immediately after birth. This effect of the disease in checking fecundity should not be overlooked. One rabbit—a white one—was in an advanced stage of the disease: it was inactive and emaciated, the fur was falling off its body in places, and the face, about the nose and eyes, was without hair and covered with a scurfy incrustation. The animal having been caught, and a pinch of fur removed from its body, the scurf adhering to the roots of the hair was separated and placed under the microscope, and the presence of an insect parasite revealed. This parasite is the *Sarcoptes cuniculi*. Its existence denotes that the animal is affected with rabbit itch, or rabbit scab.

*Sarcoptes cuniculi* belongs to the family of the *Acarina*, or true "itch mites." Itch mites infest the bodies of a large number of animals, including man, horses, cattle, sheep, pigs, camels, dogs, cats, goats, lions, tigers, and others. They differ in size and external appearance, according to the species of animal whose body they inhabit. They are confined to the skin exclusively, never penetrating to the tissues below the skin. Their bodies and eggs cannot be taken up into the circulation, as they are larger than the capillary vessels, and so cannot effect an entrance. The itch mites of man and the lower animals have been variously estimated to live from twenty to forty days, and even two months, according as they are placed under unfavourable or favourable conditions. The total number of eggs laid by the female in the burrow, which she makes for herself in the skin, has been computed by Gerlach not to exceed fifty, but Hebra says he never saw in one burrow more than fourteen eggs besides ten or twelve empty shells.

The disease in question, rabbit scab, is rabbit itch. In the rabbit it corresponds to itch in the human subject, mange in horses, cattle, pigs, and dogs, and to scab in sheep; all of which diseases are dependent on the presence of an insect parasite. Itch in the human subject is due to an itch mite which has been variously named *Acarus scabiei hominis*, *Acarus exulcerans* (Linnaeus), *Sarcoptes hominis* (Raspail). In the horse it is called *Sarcoptes equi*, in the ox *Sarcoptes bovis*, in the pig *Sarcoptes suis*, in the dog *Sarcoptes canis*, in the cat *Sarcoptes catorum*. It is an eminently contagious disease. In the human being it is communicated from person to person by contact in eight cases out of ten, according to Bourguignon, by their sleeping together. It would be a waste of words to describe at length the extreme contagiousness of mange in horses, cattle, pigs, and dogs, or that of scab in sheep. Reference to any veterinary work will confirm what is said here both as to the virulence and nature of these affections.

In rabbits itch is not only a virulent but a fatal disease. Professor Watson assures me that every animal which has been exposed to the contagion has caught it and died. Its remarkable influence in restraining increase has been already mentioned. But the rabbit in captivity and the rabbit in its natural state in the open country are under very different conditions. The itch mite is said to be fond of warmth and to display increased liveliness when exposed to the rays of the sun; and the warmth engendered by the contact of two living bodies, as of two persons sleeping in the same bed, is believed to play a prominent part in the spread of the disease by inducing the creature to leave its burrow and wander about. The heat of our climate may operate in a similar way. But as a set-off against this it is to be borne in mind that itch, as observed in man in Europe, is not confined to warm latitudes, but is prevalent in the northern countries of that continent in an aggravated form. There the disease has been chiefly observed in rabbits reared in hutches. So far as I have been able to ascertain, it has not been observed in the wild rabbit, but my information on this point is scanty. There are many things in the environment of the wild rabbit, especially in certain localities, which would make against the virulence of the disease, some of which may be surmised, others, and these probably the most important, might escape conjecture—contact with saline or sulphurous substances in the earth, brackish water, the contact of fresh earth in the formation of new burrows, brushing the coat against aromatic shrubs, or, when the herbage fails, an enforced diet of leaves, like those of the eucalyptus, containing essential oils which are known to be poisonous to the mite, and the increased resisting power to the effect of the disease imparted to the animal by an active open-air life. All these would modify, and perhaps in the end render, the vitality of the mite impossible. Anyhow this can be said that history records no plague, however desolating, which by itself and unaided by other causes has exterminated man or animal.

## 2.—As regards the communicability of the disease to man, horse, ox, sheep, or pig.

As to man, as regards the human subject, there need be little or no ground for apprehension. The skin and fur of infected animals as articles of commerce are valueless, and therefore would not be handled; the carcase would be rejected for food, or if used, would be innocuous, as the disease did not penetrate below the skin.

Itch in man is a curable disease, and neither endangers life nor injures the health of the patient. Persons are known to have it from youth to old age without impairment of their general health. At the same time it is a disreputable and loathsome malady.

Kuchenmeister, in his manual of human parasites, states that the itch mites of the following animals have been accidentally transferred to man, and have been found upon him—*Sarcoptes cati* (cat); *Sarcoptes bovis* (ox); *Sarcoptes canis* (dog); *Sarcoptes equi* (horse). He also states that the *Sarcoptes catorum* may be transferred to a variety of animals, and among others to sheep, and quotes his authorities. Professor Watson has experimented on himself both with live rabbit mite (*Sarcoptes cuniculi*) and its ova without effect, and emphatically denies that rabbit itch is communicable to human beings.

With regard to the transference of certain itch mites from the lower animals and the communication of itch by them to man, some observers are of opinion that the insects so transferred die out without being able to reproduce themselves in their new locality. When the disease is of longer duration than is warranted by this belief, they explain its persistence by the repeated introduction of fresh batches of the creature by constant contact of the patient with the animal from which the contagion was derived in the first instance. Kuchenmeister expresses his belief that, if mites from the lower animals are able to establish

establish themselves permanently on man, it will apply only to those which have a close resemblance to the human parasite. Hebra, another eminent dermatologist, holds that there is no difference between the mites which infest man and the lower animals; that they are not different species of one family, but only variations of one and the same animal; that, in fact, the mites of the lower animals and man are identical. On this point Hebra is entirely at variance with veterinary surgeons of the English school. The following extract shows his views:—"Certain writers, among whom are Gerlach and Fürstenberg, have, in their very valuable works, given descriptions and figures of various kinds of *acari*, some of which has been found in different species of animals, while others had been taken from the human subject, and had been associated (as was supposed) with distinct forms of *scabies*. But, although I have the highest respect for the writers to whom I have referred, I cannot agree with them in this matter; my observations on the lower animals as well as on the human patients have led me to believe that not only several of the *acari* said by Gerlach to have been taken from different animals, but those described by Fürstenberg under the names of *Sarcoptes scabiei*, *S. scabiei crustaceæ* belong to the same genus and to the same species, or (it is better to say) are specimens of one and the same animal. Differences in length, thickness, breadth, or in the degree of transparency of the body, slight variations in form which is in some instances, a little more rounded, in others a little more elongated, these all seem to be an utterly insufficient basis for the creation of several distinct species of a little animal which cannot be seen plainly until it is magnified at least 100 times, and which undergoes several moultings and metamorphoses. On this question the opinion expressed by Gudden is similar to my own. There is no better proof of the identity of the *acari* which have hitherto been found in different animals, than the fact that the diseases produced by them have always been communicable, whether by design or accident, from those animals to man and *vice versa*. This I have myself observed both in the Vienna Museum of Natural History, and in the Imperial Menagerie at Schönbrunn. I am, then, firmly convinced that the different *acari* described and figured by Gerlach under the names of *Sarcoptes equi*, *S. canis*, *S. suis*, *S. cati*, and *S. cuniculi*, as well as those which Fürstenberg termed, *S. scabiei crustaceæ*, *S. vulpis*, *S. capra*, *S. squamiferus*, and *S. minor*, are identical. In other words, they do not form different species of one genus, but are merely varieties of the same animal, which (according to its seat, and according as it is found upon different animals) is sometimes retarded in its development, and at other times becomes larger and more rounded. It must be remembered that similar differences are observed in other *Epizoa*, and, indeed, throughout the organic kingdom. Species, whether of plants or animals, are commonly found to vary in different localities, being now strongly developed, presenting a more ample form, and more powerful members—now retarded in their growth, and (as it were) on a lower level of vitality. Surely, then, we may venture to apply these facts to the itch mite, and to assert, without hesitation, that the various forms of that animal belong to the same species, in spite of their apparent difference in shape and size."

*Is Sarcoptes cuniculi transferable to the horse, ox, or pig?*

Professor Watson replies to this that there are no experiments in the country, but that Krause, a recent German writer on the rabbit, denies its communicability to horses, cattle, or pigs.

Mange in horses is a highly contagious disorder, and is due to the presence of an itch mite, *Sarcoptes equi*. Mahew, author of various treatises on the horse, figures the mange insect, and at the conclusion of an excellent article on mange, expresses himself as follows:—"The question has been much debated whether man can derive the itch from an animal? Imaginary proofs, favouring the possibility, are every now and then confidently promulgated, but all doubts seem to have been put to rest by the investigations conducted by M. Bourguignon. That gentleman demonstrated the unfitness of one creature to support the parasite generated by another. Horses may be violently irritated by insects bred by fowls, but remove the birds, the supply ceases, and the irritation dies away. So an individual, handling many horses, may get some of the *acari* upon him, and cause vexatious itching, but let the man keep away from the contaminated stable, and the sensation is quickly lost. The repeated and repeated renewal of the pest gives a seeming warranty to the popular belief. Certain disorders assuredly are communicable throughout every species of life, as though to prove the stubbornness of mankind that all nature is akin. Such are hydrophobia in the dog, and glanders in the horse; were all affections, however, equally interchangeable, the inhabitants of this world would speedily become one breathing mass of disease."

I quote this extract because, though not bearing expressly on the transference of rabbit itch to the horse, it shows the wide divergence of opinion which prevails on the subject of the interchange of the disease.

*Is Sarcoptes cuniculi communicable to sheep?*

Professor Watson replies emphatically, no; and, in confirmation of his opinion, refers to experiments on three sheep belonging to the S. A. Stockowners' Association, which were under the care of M. Marceau. The sheep were in a pen in M. Marceau's backyard. They were young healthy animals, unshorn. About a month ago they had been inoculated by separating the wool all down the back, and applying the contagious material copiously to the skin of the back and other parts of the body. The animals were rather wild, but M. Marceau caught and threw one so as to allow of a careful examination. There was no disease apparent, and I believe none was present.

Professor Watson admits that, according to Krause, *Sarcoptes cuniculi* is communicable to cats. Now, Kuchenmeister states that *Sarcoptes catorum* is communicable among other animals to sheep. If Kuchenmeister is correct, there is a presumption that *Sarcoptes cuniculi* may also be communicable to sheep, either with or without passing in the first instance through the cat, and it would tend to confirm Hebra's view of the identity of the various itch mites, and that they are not different species, but only variations of one and the same animal.

*Is the disease communicable to marsupials?*

Professor Watson replies, possibly—yet to try.

I do not share Professor Watson's confident opinion that *Sarcoptes cuniculi* is not communicable to sheep, so far as it is based on the experiments that have been made here. The literature of itch contains numerous instances of unsuccessful experiments to communicate the disease by inoculation. For example, Hebra says:—"I have, for instance, often been unsuccessful when I had simply placed impregnated females on the skin at different spots, although I had already seen the animals penetrate the cuticle." To be of any value the experiments should be of more varied character and under more varied

varied conditions. They should be made on shorn as well as unshorn sheep, and the contagious material applied on a loose bandage round the body; quiet animals accustomed to be handled, such as have been brought up about a farm, would be preferable to those reared on a run. The natural mode of conveying the contagion might be imitated by introducing infected rabbits into the pen, and experiments should be made, not only with sheep, but with horses, cattle, and pigs. An instance is related of a cat communicating mange (*Sarcoptes*) to a horse by perching on its back in the stable.

So far as I can see the weight of evidence inclines to Hebra's view, that the itch mites in different animals are identical, and therefore interchangeable. But opinion on a matter of this sort is nothing but conjecture. The question can only be decided by direct experiment. If the scheme is to accomplish its purpose centres of infection must be multiplied indefinitely over the country infested by rabbits. The dissemination of scab and mange would be too high a price to pay even for bunny's annihilation, and before the Government can sanction such a step it should be in possession of evidence to satisfy the most sceptical minds that the disease is not communicable.

I do not see much force in the sentimental objections to the scheme, bunny's undue multiplication in outlying country being attributable to the absence of his natural enemies—man, dogs, and birds of prey; the reduction of his numbers by disease is only a scientific way of restoring the natural balance of life.

Professor Watson's scheme deserves further investigation. If it is harmless to stock, it may prove a useful auxiliary in dealing with the rabbit pest, even if it fails to eradicate it.

I have, &c.,

ALEX. S. PATERSON,  
Colonial Surgeon.

The Hon. the Chief Secretary.

HE did not think it was necessary to go any further into the details of this scheme than had been done in that paper; but he might say that, on the recommendation which he had then made, in the circumstances of South Australia, the Government in the concluding sentence of their minute expressed the opinion that "Professor Watson's scheme deserved investigation." He had already stated that the question raised could only be settled by experimental inquiry. He was glad to see that Professor Allen also had recommended experimental inquiry; and if the various Governments took this matter up at all, they would have to conduct it in a scientific way to the end. They had spent thousands of pounds already to no purpose; and there was no reason why facilities for conducting a strict and proper scientific inquiry into the matter should not be given. Professor Watson's scheme was of the nature of scab, and he had reported to the South Australian Government that he considered the risk of injury to the human subject was next to nothing at all. The parasitic animal that was the cause of the scab in the rabbit was of the same class as the itch insect in man, and the scab insect in sheep, and the scab that affected swine. Professor Watson asserted that this parasite was not transmissible from one animal to another; on that subject he had consulted Hebra, and also Kuchenmeister's manual on parasites. Hebra expressed a different opinion from Professor Watson, but the other authorities were not explicit on the point; but the veterinary surgeons were all agreed that the insect was not transmissible, or capable of causing disease in another animal. The question that they now had to settle was this:—As to whether one of the schemes, including *sarcoptes*, was capable of producing scab in sheep. What was the position of the pastoralists now in reference to this? They were willing, he understood, rather than have this pest let go on, to run the risk of having scab in sheep, at least so he was informed. This, at all events, would give them an idea of the magnitude of the evil that these men were disturbed by. He had no doubt that this scheme would engage the best attention of the Commission, and that the matter would be determined by experiments as to whether the disease could be communicated to stock or not, or was capable of producing scab in sheep. Then as to its effectiveness, that, too, would, of course, have to be settled by direct experiments. That was the burden of his report to the South Australian Government. His colleague, Dr. Stirling, would give the Commission further information on the subject. Until the contrary was proved he would hold to his opinion, that the question could only be settled by experimental inquiry,—only in this way could it be definitely settled whether these *sarcoptes* were capable of being transmitted from one animal to another. Should the Commission decide to test Professor Watson's scheme by experimental inquiry, he thought it should be done under natural conditions, and in the country which had to be dealt with. He would say distinctly that he apprehended no danger for experimental inquiry conducted with this scheme, if some portion of the country were fenced off, in which infected animals should be placed with sheep. The first point, of course, was as to whether the disease would be destructive to the rodent, and, next, was it communicable to the sheep. He thought they might fairly leave swine and horses out of the question. These points would certainly have to be dealt with and approved by the Commission before anything could be done.

MR. PEARSON did not think that M. Pasteur's disease was the best one with which to begin experiments for the extermination of the rabbits. In the first place it was doubtful whether the disease existed in the colonies or not. Now there was a number of diseases in operation in Australia, and they knew pretty well what their action had been hitherto. Everyone that was spoken to about rabbits would say that there had been diseases amongst them. It would surely be safer first of all to inquire into the nature and action of these diseases. But in any case he did not think that one disease would be sufficient, because there must always be a certain number of the pest that would not be susceptible to one disease, and therefore there should be two or three diseases working together in order to get at the others. It would be specially important to obtain evidence as to the disease that was known here as fowl-cholera; as for all they knew it might act on the rabbits in just the same way as M. Pasteur's disease. There was another matter that was against Pasteur's proposal, which was, that chicken-cholera was too quick in its action. It killed the rabbits in from twelve to twenty-four hours. They wanted some disease that would last for a sufficient period to enable other rabbits to catch the disease from the infected ones and spread it about. It appeared to him that before they decided upon giving M. Pasteur's proposal a trial in the Colony they should first of all ascertain whether there was or was not any chicken-cholera in the Colony. It did not matter as to whether the disease were precisely the same as the disease known as fowl-cholera in Europe. If it could be used for killing rabbits, it should be used in preference to the European disease, as then they would escape the risk of introducing a new disease into the country. They must also bear in mind that there were entirely different conditions of climate, &c., to be met with in different parts of the country where the schemes would have to be tried. Although it had been said that the rabbits in

Victoria

Victoria were kept in check, yet there were many farmers in the coast districts who would be very glad of some easier method of keeping the pest down than the ordinary methods of fencing, poisoning, &c. The disease that would be effective in a moist coast district would almost certainly not be effective in the hot dry districts of mallee country, which was, he believed, the country where the question was most pressing. It was very important that the experiments should be tried in two places,—one might be an island, which would represent the moister districts of the colonies, and the other might be some district in the back blocks. He should say it was more important to take some locality in the interior first, because the difficulty in the interior was the most pressing. There were a great many other things that might be said, but they would no doubt come out in the discussion that would ensue. In conclusion, he would say that before they tried M. Pasteur's method they should endeavour to get something better in the colonies, if such a thing existed.

Dr. STIRLING remarked that what he had to say would be in confirmation of the statements made by Mr. Quin and Dr. Paterson as to the severity of the evil that they had met to combat, if they could. He thought the remarks which had fallen from these gentlemen ought to make it clear that it was a matter of the most extreme urgency, and he would like to add his testimony to that fact too. There was not the slightest doubt that large parts of the Colony of South Australia were being abandoned in consequence of this plague. He was fairly well acquainted with the same kind of country that Mr. Quin had spoken of, and he could confirm what had been said as to the utter desolation that now prevailed in these districts. There was one question which, however, he was surprised Mr. Quin did not allude to in his address, and that was, that one of the great reasons why the rabbits were spreading was because of the fact that the men who were paid for destroying them were directly or indirectly the means of it. He knew very well that rabbits were being carted about by hawkers and others, that captured does were turned loose, and that the greatest pains were taken to destroy all enemies of the rabbits. These men, as many Members of the Commission must know, made large sums of money out of the destruction of rabbits, and there could be no question that so long as people got paid for the destruction of rabbits, on the scale on which they had been paid, the rabbit pest would break out again as fast as they were killed. He would now turn to the address of Professor Allen, which he thought showed considerable carefulness in preparation. The only objection that he could see to Professor Allen's address was that it suggested an inquiry of a far more complete character than the Commission had been called on to perform. He did not think that they would investigate the life history of the chicken-cholera or any other bacteria. It was hardly to be expected that the Members of the Commission, who were drawn from the ordinary walks of life, should attempt to settle matters which had been under the consideration of the professional bacteriologists for many years. There were certain diseases which it was said were capable of destroying the rabbits, and what they had to inquire into was would these diseases destroy rabbits in the natural conditions under which rabbits lived, and would they pay under the conditions in which they would have to be tried in this country, with safety at the same time to man and other animals. Was it practical, and could the country afford to pay the cost of it? As Professor Allen had already stated, if these microbes had to be put before each batch of rabbits, the disease would be far too expensive to apply. The question which now appeared quite clear and to which the Commission should devote all their attention was the contagiousness of Pasteur's disease. Would the disease spread from rabbit to rabbit as ordinary infectious diseases spread? It seemed to him that while they would be occupied in the inquiry, which Professor Allen suggested, the rabbits would keep on increasing, and the difficulty would become even larger than it now was. Now in regard to the safety of the disease, he thought they must consider it in the light of its reasonable safety. There was more or less danger in everything, and risks must be run in all experiments of this kind; all they could do was to reduce these risks to a minimum. He wished to bring into prominence the question of the practicability of the diseases in the conditions under which it would have to be applied in these colonies, and while Professor Allen had addressed his remarks to M. Pasteur's disease, the same remarks would apply to any other. Professor Allen had merely taken this for a text, but what he had said on this head was equally applicable to the other diseases as well as to M. Pasteur's. A great many other schemes of extermination by disease had been suggested. He was informed that there was a disease suggested by Dr. Ellis, and, here he might say, was a case where they might satisfy themselves, and might learn something without going so far as Tintinology. Dr. Ellis had some infected rabbits at his residence at Double Bay, which, he believed, was quite handy to Sydney. But he wished again to insist on one point, and that was the necessity of experiments being carried on under natural conditions. There was no doubt they might have different conditions of things where experiments would produce entirely different results; and while no one could raise any objections to experiments being carried on on an island, they could hardly be satisfactory so far as the interior of the country was concerned. As to the disease introduced by Professor Watson, he thought its efficacy was a matter entirely dependent on climate. It was, he knew, exceedingly fatal in wet weather, but in hot weather it stood almost still and tended to recovery. They all knew that the interior portions of Australia were exceedingly dry and hot, and these were the conditions which must stand out for in any experiments that might be attempted. The risks, of course—he would return again to that point, because it was a very important matter—were of such a character that he did not see how they could be determined, so far as man was concerned, unless some one was willing to swallow the microbes; but they might be tried, at all events, on the ordinary animals. And so far as the pastoralists of the country were concerned, their interest would be chiefly confined to whether the disease was capable of being transmitted to sheep, horses, and cattle. They knew that a great many birds might possibly be affected; and he supposed if they conducted experiments they would find that to be the case. But even so, there would not be any reason, to his mind, for opposing a scheme if otherwise it could be proved to be acceptable. He did not know that there was at present any information as to how wild birds were affected by any epidemic of chicken-cholera; and he believed it would be found that the disease was not the all-devastating element that it was thought to be by some people. With regard to Professor Watson's disease, he had frequently seen his rabbits die from extreme emaciation and enlargement and suppuration of abdominal and inguinal glands. More than one parasite could be detected upon them; but he did not think he need go further now into that subject. Several experiments were made as to the communicability of the disease to sheep, and he had seen three sheep which were inoculated some six times. They were shorn, and the parasite put in five or six times—twice, he believed, by Mr. Stanley, who belonged to this Colony and who would confirm what he said. He (Dr. Stirling) saw the sheep when he came away from Adelaide, and they were quite well. There had been six attempts at infection and were six months under observation, and yet they were now free from any disease. Professor Watson had tried this disease

upon himself, with nothing as a result but a temporary irritation—so confident was he that the thing was not communicable to man. The whole of his remarks, then, came to this: He thought they should be willing to give the most favorable consideration to any disease which would help the country in this matter of extreme urgency. And, although he did not believe that one single disease would be sufficient, they might by one or more produce a general effect on the vitality of the race of rabbits, which, coupled with the severity of the climate, would materially help in reducing the number of them. Although they might not be able to discover an absolute specific, they might get assistance from these diseases. So far as Dr. Paterson and he were concerned, what they should like to see done was a general scheme of experiments tending in the direction which he had indicated, in those diseases which seemed to be worthy of their consideration.

Dr. BANCROFT said that it appeared this disease of M. Pasteur's propagated itself amongst fowls, but not amongst rabbits. It would have to be worked up again and again if it were used against the rabbits. They had no history of its having been spontaneous in its action. They were aware that fowls obtained the disease, and that it passed from fowl to fowl in the old country, and the probability was that if introduced here it would act in the same way. It was purely a disease of fowls, and it struck him that it would not propagate itself amongst rabbits without very considerable assistance—such assistance as might possibly render it too expensive and too difficult to be carried out. He would like to see some island selected where experiments with this disease could be carried on without fear of mischief to other animals. It should be very fairly and very carefully considered, and he believed the Queensland Government would be glad to help in any way to have the question determined. Fortunately they had no rabbits in Queensland at the present time; but every effort would, he gathered, be made to help the other colonies to get rid of the plague. But except the experiments were very carefully carried out, he feared they might distribute more diseases than they wanted to distribute. It would be better if the whole of the knowledge to be acquired by any scientific Commission should be obtained before any efforts were made towards the distribution of the disease inland. He should much prefer to see all that they could get done, done on an island first, and they would then be free from all risks. They should be careful not to proceed too hastily, for this was a work which could not be done in a day, or in a week, or perhaps in a year. They might at least hope to reduce the pest, and there may be diseases perhaps which would assist them in doing so. He remembered having kept rabbits in Queensland which had diseased livers. A parasite existed in the liver, and the eggs discharged were in millions. All the rabbits that took it died. It propagated itself amongst young rabbits; and perhaps after the lapse of a month or two, if the livers were examined, a number of white spots were observable, showing where the destructive action was going on. The condition of the liver became worse and worse until the animal died. He had no doubt but that the scab disease spoken of by Professor Watson would help to reduce the pest. He had seen it at home, and it affected the rabbits very considerably. No doubt a drier country was more protected, because diseases would not spread so much where everything had a tendency to dry up. Wherever moisture was present, of course, life was more active. The influence of disease, in the matter of birds, was a very serious point. He did not like the idea of birds being destroyed, and he thought it would be very much safer to first carry out the experiments suggested by Professor Allen. He was very glad indeed to hear that there was an island in Bass's Straits where this experiment could be fairly tried, and where the experiments need not cost very much.

Mr. QUIN: Then there is Dangar Island, in Broken Bay.

Dr. BANCROFT thought that if a few men of ability were placed on this island, who had a medical and scientific education, good results would be obtainable from their observations. They could easily get up a history of the disease in twelve months time—in fact, of all possible diseases on rabbits; and then the Commission would be in a far better position to introduce disease into the back country. He thought this would be much the safer course, and therefore he would earnestly urge it on the Commission.

Mr. QUIN asked,—What was to become of the pastoral interest during those twelve months?

Dr. BANCROFT: Well, a perfect remedy could not be obtained in one month. If they did not apply the remedies with their eyes open, there was no use in going on with their eyes shut. It was far better to learn first what could be learned, and then proceed to action.

Mr. TABART said: I look upon the rabbit pest as the great question of the Australasian Colonies, and one that requires to be dealt with vigorously and stringently. At the same time, I do not consider it judicious to allow any foreign disease to be introduced, with the view of rabbit extermination, until it has been conclusively proved beyond a shadow of doubt that the disease introduced will not be communicated to sheep or other animals. The pastoral interest is an important one to tamper with, seeing that New South Wales numbers this year 47,000,000 of sheep, Tasmania, 1,500,000, and in the other Colonies correspondingly large numbers are depastured. Tasmania is suffering from this rabbit plague; the sheep have decreased during the past ten (10) years at the rate of 30,000 annually. I consider the primary cause is increase and extension of rabbits. I am pleased to find that Dr. Stirling holds the same opinions as to the extension of the rabbits, viz., the employment of trapping and hunting labour. This, with the bonus system, is conclusive evidence to me that these methods simply mean *rabbit farming*. Disease has upon several occasions attacked rabbits in different localities in Tasmania. About five years past, the late Mr. Willows, V.S. for New South Wales, and Mr. Archibald Park, V.S. for Tasmania, reported upon an outbreak of disease amongst rabbits upon the Ellenthorp Hall property. I believe the report is now in the possession of the present administration of the Rabbit Act of New South Wales. Small numbers died upon the first appearance of the disease, but the form was not sufficiently fatal to destroy all rabbits upon the property. I may also mention that upon two other occasions disease appeared upon two estates 60 miles from each other, and had the effect of killing all the rabbits. Unfortunately no investigation as to the nature of the disease was instituted, or how it originated. In conclusion, I consider that whatever experiments are made as to the efficacy to destroy rabbits by introduced disease, tests should be first conducted upon an island, and, if found that sheep and other stock are not susceptible, then it could be introduced with caution on to the mainland, and further trials made within a tract of land enclosed with rabbit-proof fencing.

Dr. WILKINSON complimented Professor Allen on the delivery of an able and exhaustive address. He went with Professor Allen a very long way in the points which he had considered as to the effectiveness of the methods of destroying the rabbits. But there were certain points in Professor Allen's address to which he desired to take exception. In the first place Professor Allen likened the action of this poison to the action of phosphorus or arsenic. Now there was a very essential difference between these poisons and a living germ capable of destroying life. In the one case we have to deal with a fixed quantity of dead

## EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 11

dead matter, and in the other with living matter which increased and multiplied to an enormous extent. Further, Professor Allen seemed to take exception to the experiments which had taken place on the Continent on the Pommeroy vineyard, because in this case the disease was communicated through food, and not apparently from rabbit to rabbit. Unfortunately he had not a description of those experiments with him, but he was quite certain that the wholesale destruction of the rabbits on that estate could not have been caused directly by the small quantity of the poison which had been spread on their food. This was his recollection of that particular experiment; but if this disease did not spread amongst the rabbits from one to the other, then from all they could learn there could be very little danger in introducing such a disease. One of the most important matters which the Commission would have to take in hand would be to recommend certain means by which it could be positively proved that this disease would be effective. He quite agreed with the remark which had been made by Dr. Bancroft, that this disease had not shown any natural affinity for the rabbit. There was no instance of any spontaneous outbreak of the disease amongst the rabbits, while there was evidence of a certain amount of value which made them believe that the disease could not spread itself amongst rabbits as effectually as it did amongst fowls. Therefore, if the disease were to be introduced, it would not only exterminate rabbits, but other animals would be endangered by it. He knew that this disease in fowls would kill mice. He had had an opportunity of making experiments in Berlin under Koch, and he remembered perfectly having introduced these germs into mice and killing them. The recommendations which Professor Allen had made were practically the same as those which he had made in a letter addressed to the Government some weeks ago. He would add something further, that as many as possible of the ordinary useful animals should be taken to this island to live with the diseased rabbits. They would have an opportunity of observing in such a case whether the disease would spread from one animal to another. If it were true that in this particular case the disease did not spread to any of our useful animals, it would be worth trying elsewhere. He quite agreed with Dr. Paterson and Mr. Quin with respect to the enormous harm that the increase of these rabbits in the back-blocks was doing. Professor Allen had made several other statements of a purely scientific nature to which he could not help taking exception. One of these was in regard to experiments which had taken place in 1878. Well, he would say that experiments made in 1878 were not experiments upon which the Commission could place absolute reliance. The whole question of bacteria was then in its infancy, and when experiments were made no precautions were taken to exclude contamination. The very history of investigations into the nature of tuberculosis was an instance of what he stated, for by many authorities in 1878, and even up to 1882, it was supposed that tuberculosis could be produced by irritative matter. But by more perfect and exact methods it was now proved, beyond doubt, that in all these cases there had been external contamination with tubercular matter. He was sorry he had been unable to carry the statement of Professor Allen fully in his mind, because it was necessary to examine details when considering a question like this. Professor Allen implies by his statements that there is such a close resemblance between the symptoms of swine plague, when conveyed to rabbits and birds by inoculation, and fowl-cholera, that even the best bacteriologists hesitate to say that the two diseases are distinct, indeed they seem to be cases of septicæmia. Now the Commission can place no trust in such statements. There may indeed be identity of symptoms, but that does not show the symptoms to be due to the same cause, to the same form of organism. If this were true, it would mean that all the work of Koch, and other leading bacteriologists, was to be upset. Klein has proved, beyond all question, that Pasteur was wrong, that his conclusions were drawn from experiments open to the gravest objections. If then, at this time, the Commission is to be swayed by the results of faulty and inexact experiments, we can come to no scientific conclusion in the important matters placed before us. Identity of symptoms is not proof of identity of cause. And it is not wise to use the term septicæmia or hæmorrhagic-septicæmia. We know that septicæmia means only the presence of certain bodies (ptomaines) in the blood which act prejudicially upon the red corpuscles and tissues. This condition may arise in mice and rabbits from different causes. But when we speak of mouse-septicæmia, we mean a form of septicæmia which is produced by a well defined, easily recognized fine bacillus, a bacillus so small that 10,000,000,000 of them can rest on the surface of a penny. Further, this bacillus is extremely fatal in house-mice—it is even said that one bacillus is enough to kill—and yet, strange to say, this same bacillus will leave quite unharmed a field-mouse. There then we have a change of function in the bacillus, not only most extraordinary, but developing in the most unexpected manner. Now it is such an unexpected change in the action of such bacilli that render it necessary for us to be extremely cautious in our investigations. Further illustrations of the altered virulence of organisms under different conditions are to be found in connection with symptomatic anthrax. It is found that a few drops of lactic acid have the power of enormously increasing the virulence of an attenuated virus from a case of symptomatic anthrax. On the other hand the virulence of malignant anthrax can be diminished, even it would seem, destroyed by the cocci of erysipelas, and, stranger still, by the colour producing micrococcus—the micrococcus prodigiosus. These then are good instances of altered virulence from entirely unexpected causes. But alteration of function is a very different thing to alteration of form. Practically it is now acknowledged by all the best bacteriologists that each variety of these minute forms of life has a fixed form always the same for the same variety. Thus the bacillus of anthrax has always a definite form, varying only with the stages of its existence. At first a rod of definite thickness, though varying in length, then a long filament joined from the rod by elongation, and finally a spore-containing filament, from which spores are liberated. These definite phases can always be defined, and under the same conditions are always the same for the same variety. Thus too the microbe of the cholera of fowls is always an oval micrococcus—never a bacillus or rod. This is a very important point that a bacillus cannot become a micrococcus nor a micrococcus a bacillus. If experiments seem to point otherwise, as has been often stated, it has so far always been proved that the change of form is really due to the introduction of contaminating micro-organisms through accident or want of skill in making these experiments. Therefore it is that I say that Professor Allen's account of Toussaint's experiments, and experiments of a similar kind may have a historical interest but cannot be of any practical value to the Commission in its important work. No doubt there are numbers of organisms of apparently the same form, which can be distinguished only by the minutest tests. Thus we know there are a score or more of micro-organisms which cause suppuration—all differing from one another in certain definite points, and yet all identical in their action of causing suppuration. Further there are organisms of the same appearance, some of which have distinct chemical, others physical, others physiological, others pathogenic effects. Yet all these forms can be separated

separated from one another with certainty by certain methods. But it is only by the very strictest precautions and constant care that exact work of this kind can be done. Without such precautions misleading results follow such as those of Toussaint and the other investigators to whom Professor Allen has referred. The practical question to his mind was that the Commission should be in a position to be able to pick out the best of the different methods of destruction. The question of funds was not a matter for the Commission, and there was no doubt that the Government would be willing to grant a sufficient allowance to enable the Commission to carry out its inquiries. Still this was a matter which chiefly concerned one great industry and one great class of the community, and they had a right to expect that this class would contribute a proportion to the cost of the experiments. Of course, the Government would supply the money from the public funds; but yet, as the matter was one chiefly affecting a particular class, they had a right to expect some contribution from that class.

Mr. QUIN: It is a matter of general interest.

Dr. WILKINSON: Yes, it did in some way affect every individual in the community; but, while it affected one particular class immensely, it affected another particular class very little. The greatest gain, undoubtedly, would be to the pastoralist and those engaged in trade connected with the pastoral industry.

Mr. QUIN: The question affected the general government, and of course the whole people. Was not the £50,000 paid by the squatters every year under the Rabbit Bill a contribution towards it?

Dr. WILKINSON: Yes, that is certainly something towards it.

Mr. QUIN: Surely, you do not want any more out of us?

Dr. WILKINSON said he wanted all that could be obtained. He was quite sure that the Government would do all that they could to assist the Commission in their work. It would have been unwise for them to bring scientific men from the different colonies unless they really wished to do some practical work, and this work should take the form of experiments under conditions which would ensure the country from disaster.

Mr. QUIN said he would like to move, that the speeches which had just been delivered, be printed and distributed to the Members of the Commission.

Dr. BANCROFT: I shall be glad to second that. Facts—such as those mentioned by Professor Allen—disappear quickly from people's minds, and I think they should be printed just as the proceedings of Parliament are printed.

The motion was agreed to.

Mr. QUIN moved,—“That, in order to test the safety, efficiency, and practicability of the application of disease to the purpose of rabbit extermination, experiments are necessary. The Commission therefore recommends that the Government permit the use of an island as well as an inland tract of land for the purpose, where the experiments may be conducted under proper supervision, and that the necessary funds be provided.”

Dr. STIRLING seconded the motion.

Mr. PEARSON supported the motion, but he thought they could get a block of land in the interior equally as isolated as any island could be.

The motion was agreed to.

It was moved by Dr. STIRLING, and seconded by Dr. PATERSON,—“That M. Pasteur's representatives are invited to meet the Commission at 10 a.m., and Dr. Ellis at 2 p.m., the next day.”

The motion was agreed to.

The Secretary was directed to obtain a map of the country infested by rabbits, and also returns of the cost of rabbit destruction.

At 5:30 p.m. the Commission adjourned until 10 a.m. on the following day.

#### TUESDAY, 17 APRIL, 1888.

The Commission met at 10 a.m., at the Colonial Secretary's Office, Sydney.

*Present* :—

*New South Wales* : WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.

EDWARD QUIN, Esq.

*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.

ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.

*South Australia* : EDWARD CHARLES STIRLING, Esq., M.D.

ALEXANDER STUART PATERSON, Esq., M.D.

*Queensland* : JOSEPH BANCROFT, Esq., M.D.

*Tasmania* : THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Dr. BANCROFT moved,—“That this meeting recommends that the methods of destroying rabbits by M. Pasteur's scheme, or by other diseases not now existing in Australia, be tested, in the first instance, and without delay, on an island, and that experiments inland in connection with each scheme be delayed until its safety and practical value have been demonstrated. Provided that this resolution shall not prevent the Commission from conducting laboratory experiments from time to time under such precautions as the Commission may determine.”

The motion was seconded by Dr. STIRLING, and carried.

It was moved by Dr. BANCROFT, and seconded by Dr. STIRLING,—“That experiments with any rabbit disease already existing in Australia be conducted without delay in some suitable inland areas.”

The motion was agreed to.

Mr. QUIN moved,—“That the Government be asked to enclose with rabbit-proof fencing an area of country not exceeding 10,000 acres in the infested portions of the interior of the Colony, and that all preparations that the Commission may deem necessary be made at once, so that experiments under their direction may be carried out without delay.”

Dr. PATERSON seconded the motion, which was carried.

Dr.

EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 13

Dr. STIRLING moved,—“That the Government be advised that M. Pasteur’s representatives be permitted to introduce into the Colony of New South Wales the cultivation of microbes of chicken cholera, provided that they undertake to conduct no experiments therewith without the sanction of the Commission.”

The motion was seconded by Dr. WILKINSON, and carried.

Dr. WILKINSON moved,—“That the Government be advised to provide a laboratory where experiments can be made under the control of the Commission, with a view to the investigation of the scheme of Pasteur, and any other of a similar kind.”

Dr. BANCROFT seconded, and the motion was carried.

Dr. STIRLING moved,—“That the resolutions hitherto adopted be transmitted to the Colonial Secretary at once, and that a reply be requested at his earliest convenience.”

The motion was seconded by Dr. WILKINSON and carried.

Frank Hinds, M.D., was called in and stated that the representatives of M. Pasteur would probably arrive in Sydney on Thursday.

Henry Augustus Ellis, M.B., was called in and examined concerning the so-called Tintinology disease.

Dr. STIRLING moved that the commission meet at 10:30 a.m., on the morrow, to proceed to Dr. Ellis’s residence to view the *post-mortem* examination of an infected rabbit and such specimens as Dr. Ellis may exhibit. Dr. WILKINSON seconded the motion, which was carried.

It was decided on the motion of Dr. STIRLING, seconded by Mr. PEARSON, that the commission at its rising should adjourn until Monday next at 10 o’clock, when the representatives of M. Pasteur would be afforded an interview.

A communication was received from the Under Secretary for Lands enclosing copies of letters from Dr. Hinds (M. Pasteur’s representative) and Messrs. Butcher and Ellis, in respect to their several schemes; also return showing cost of rabbit destruction.

It was moved by Dr. STIRLING, and seconded by Dr. PATERSON, that the commission requests the Honorable the Secretary for Lands to inform Messrs. Butcher and Ellis that, in accordance with the request contained in their letter, all particulars submitted by them concerning their suggested disease will be considered confidential, but that the commission will require its representatives to be associated with Messrs. Butcher and Ellis in the conduct of any experiments that may appear to it necessary. The motion was agreed to.

It was decided also to inform the Honorable the Minister for Lands that, in accordance with the terms of the proclamation of the Government of New South Wales, and with the request of M. Pasteur’s representatives, the commission would treat as confidential the details of any method that might be examined but not adopted for trial by the Government; and to request that Dr. Hinds be so informed.

It was decided to obtain from the Lands Department copies of all reports by Messrs. Vindin, Clarke, Tully, and Stanley concerning Drs. Ellis and Butcher’s experiments.

The Commission at 4:30 p.m. adjourned until Monday next, at 10 o’clock.

WEDNESDAY, 18 APRIL, 1888.

The Commission met at 10 a.m., at the Colonial Secretary’s Office, Sydney.

*Present* :—

*New South Wales* : WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.

*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.

*South Australia* : EDWARD CHARLES STIRLING, Esq., M.D.  
ALEXANDER STUART PATERSON, Esq., M.D.

*Queensland* : JOSEPH BANCROFT, Esq., M.D.

*Tasmania* : THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin) the Chair was taken by Professor ALLEN.

Dr. PATERSON inquired if the disease referred to as bladder fluke in New Zealand was one of the modes of destroying rabbits submitted for the consideration of the Commission. He alluded to a report which had appeared in one of the South Australian papers concerning the destructiveness of this disease, and there was also a remark in the same journal attributed to the Minister of Crown Lands in South Australia, to the effect that he thought that this was one of the disease schemes which would engage the attention of the Conference.

The question was postponed, pending the production of papers already asked for. It was understood that Dr. Bancroft would telegraph to Dr. Hector of New Zealand for specimens of bladder fluke.

Dr. STIRLING requested that all information possible should be obtained relative to the disease which had prevailed among rabbits in Tasmania, as mentioned by Mr. Tabart.

Mr. TABART stated that the papers relative to the inquiry into the disease conducted by Mr. Willows were in the office of the Rabbit Department in Sydney. He believed it was the same disease which had appeared at Tintinology.

It was agreed that application be made for these papers.

It was resolved to instruct the Secretary to summon Dr. Hinds and his colleagues representing M. Pasteur to give evidence on Monday next at 10:30 a.m.

It was resolved to instruct the secretary to telegraph to Professor Watson, Adelaide University, asking him to furnish in writing, as soon as possible, a short statement of particulars concerning his experiments with rabbit scab in reference to its effects on various forms of animal life.

Dr. BANCROFT suggested that the Hon. Mr. Macleay, Mr. Haswell, and Mr. Stanley be invited to give evidence before the Commission.

The suggestion was agreed to, and the Secretary was instructed to inform these gentlemen that the Commission propose to take their evidence during next week, on a day to be hereafter named.

It

It was also resolved that a copy of the Commission be supplied to each member thereof.

The Commission then proceeded to the residence of Dr. Ellis, and examined certain rabbits suffering from the disease which Dr. Ellis had described. Several rabbits were killed—some healthy, some diseased,—and *post-mortem* examinations were conducted.

MONDAY, 23 APRIL, 1888.

The Commission met at 10 a.m., at the Colonial Secretary's Office, Sydney.

*Present* :—

<i>New South Wales</i> :	HENRY NORMAN MACLAURIN, Esq., M.D. (President.) WILLIAM CAMAC WILKINSON, Esq., M.D., M.P. EDWARD QUIN, Esq.
<i>Victoria</i> :	HARRY BROOKES ALLEN, Esq., M.D. ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c. EDWARD HAREWOOD LASCELLES, Esq.
<i>New Zealand</i> :	ALFRED DILLON BELL, Esq.
<i>South Australia</i> :	EDWARD CHARLES STIRLING, Esq., M.D. ALEXANDER STUART PATERSON, Esq., M.D.
<i>Queensland</i> :	JOSEPH BANCROFT, Esq., M.D.
<i>Tasmania</i> :	THOMAS ALFRED TABART, Esq.

A communication was read from the Under Secretary for Lands having reference to the request that an island and an inland tract of country should be placed at the disposal of the Commission. The writer stated that Montague Island seemed most suitable, but if this did not meet with the views of the Commission the Broughton Isles might be examined. The Secretary of the Commission was directed to obtain further information about Montague Island. Subsequently a letter from the Secretary of the Marine Board was read giving the information required.

A further communication was received from the Under Secretary for Lands stating that the Government had received two offers of station holdings for carrying out experiments—"Tarella," and "Roto." The former was near Wilcannia and the latter adjacent to Hillston. Dr. Paterson proposed that the offer of Tarella station, which was near Tintinallong, should be accepted. The motion was seconded by Dr. Stirling and carried. Mr. Quin stated that he declined to vote on the matter, as Tarella was his property. He had offered to assist the Minister for Lands in any way he could, and had offered the use of Tarella run, the fences, plant, homestead, &c., free of any cost to the Government or to the Commission.

A further communication was received from the Under Secretary for Lands stating that the Principal Under Secretary had been requested to arrange with the Board of Health the fitting up of a laboratory where experiments could be carried out. The President stated that so far as the Board of Health was concerned nothing had yet been heard of the matter. Subsequently Dr. STIRLING moved, "That the Chairman (Professor Allen) be requested to see Mr. Macleay to make arrangements for the use of the Linnæan Society's laboratory if possible." Mr. BELL seconded the motion, which was carried.

It was resolved that a telegram be despatched to Dr. Oscar Katz, requesting his attendance on the Commission during the afternoon.

M. Loir, Dr. Germont, and Dr. Hinds, the representatives of M. Pasteur, were then introduced.

In the presence of the representatives of M. Pasteur the Secretary read the following letter:—

The Pasteur Institute, Paris, 20 February, 1888.

To the President of the Commission entrusted with the consideration of the scheme for the destruction of rabbits, proposed by M. Pasteur,—

Mr. President,

Paris, 20 February, 1888.

By a letter addressed to the journal *Le Temps*, of Paris, on the 29th November, 1887, I proposed a scheme for the destruction of rabbits in Australia, based on the employment of the disease known as chicken-cholera.

After the communication of my letter to the journal *Le Temps*, I made various experiments, both in my laboratory and on a more extensive scale, which allowed me to believe that the application of chicken-cholera to the destruction of rabbits would answer all the conditions of the scheme of reward proposed by the Government of New South Wales.

Consequently I decided to send to Sydney, at my own expense, three young *savants* entrusted with making, on my behalf, all the experiments of demonstration calculated to prove that the scheme in question for the destruction of rabbits is at once efficacious and practical.

Should the reward be adjudged to me when the Commission arrives at its decision, the delegates shall be bound to reveal to the Commission, in all its details, the process which shall have been applied, especially certain particulars without which it could not be made practical.

In the scheme of reward of the Government of Sydney, published in Europe at the end of the year 1887, it is stated 'that the scheme should not be judged by the Commission nominated for that purpose, until after a year's trial.'

I do not believe that so long a time is necessary, and I am persuaded that the Commission will share my opinion on this point.

I think that the Commission entrusted with adjudging the reward will be able to arrive at a conclusion after a month or six weeks trial.

Please accept, Mr. President, the assurance of my high regard.

L. PASTEUR,

Member of the Institute of France, of the Royal Society of London and of the Royal Society of New South Wales.

Annexed are two copies, one in English and one in French, of my note to the Agents-General.—

L.P.

Dr.

EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 15

Dr. Frank Hinds was then examined, and undertook, at the request of the Commission, to prepare a written statement concerning M. Pasteur's proposals. In answer to questions, he specified what provision M. Pasteur's representatives would require for the conduct of their experiments.

Professor ALLEN moved,—“That, after hearing the statement of Dr. Hinds, the Commission recommends that permission be granted to the representatives of M. Pasteur to cultivate the microbes introduced by them by inoculation into suitable animals, the place and details of the experiments to be approved of by the Commission.” Dr. BANCROFT seconded the motion, which was carried.

Mr. LASCELLES moved,—“That the netting to be used in erection of fence around the 10,000 acres, and on the small pieces to be enclosed within the large area shall be 48 inches in width, 16 or 17 gauge, and 1½ inch mesh, and that the Government be requested to at once procure the necessary material.” The motion was seconded by Mr. QUIN, and carried. The following was added on the motion of Dr. STIRLING, seconded by Mr. PEARSON, “That, in the first place, six enclosures of 50 or 100 acres each, be constructed in localities to be indicated by persons appointed by the Commission, to be within the larger general enclosure.” Direction was given that the Under Secretary for Lands be requested to furnish fifty rabbits for the purpose of conducting experiments.

It was then moved by Dr. STIRLING, and seconded by Dr. PATERSON—“That Professor Watson be asked to secure and forward to the Commission six rabbits infected with *sarcoptes cuniculi*.” The motion was carried.

Mr. PEARSON moved,—“That an advertisement be inserted in the newspapers inviting information from persons who have observed rabbits dying off as if by disease; also that the Commission desires to buy fowls suffering from fowl cholera.” Mr. LASCELLES seconded the motion, which was carried.

It was moved by Dr. STIRLING, and seconded by Mr. BELL, “That experiments be at once made on behalf of the Commission with the disease suggested by Drs. Butcher and Ellis.” The motion was carried.

Dr. WILKINSON moved,—“That application be made to the Government, through the Minister for Lands, for an advance of £500 to defray the necessary expenses of carrying on the work of the Commission.” Mr. QUIN seconded the motion, which was carried.

Dr. OSCAR KATZ, of Linnean Hall, Elizabeth Bay, was accorded an interview, and stated his qualifications for conducting such experiments as the Commission might require to be made. It was resolved to request Dr. Katz to attend again at 11 a.m. to-morrow.

It was also resolved,—“That Dr. Wilkinson, Dr. Stirling, Prof. Allen, Dr. Bancroft, Mr. Pearson, and Mr. Dillon Bell be a Committee to prepare a list of test experiments.”

Mr. LASCELLES moved,—“That facilities be given to M. Pasteur's representatives to conduct preliminary experiments at the laboratory of the Central Board of Health under such precaution as Dr. MacLaurin may prescribe.” The motion was seconded by Dr. STIRLING, and carried.

Professor ALLEN stated that he believed that the disease suggested by Drs. Ellis and Butcher was *coccidium oviforme*, and as he knew where a description of the disease was to be found he would, if the Commission so desired, prepare an abstract of it for the use of the Commission. Professor Allen was accordingly requested to prepare such an abstract.

It was directed that twelve copies of Report of Board of Health, and other papers *re* rabbit destruction, laid upon the Table of the Assembly in March, 1888, should be obtained. Also a copy of Dr. Mackellar's report, dated December, 1883, on “Tuberculosis in Rabbits.”

The Commission, at 5 o'clock, adjourned until 10:30 a.m. next day.

TUESDAY, 24 APRIL, 1888.

The Commission met at 10:30 a.m. at the Colonial Secretary's Office, Sydney.

Present:—

*New South Wales*: WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.

*Victoria*: HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., F.C.S., A.I.C.  
EDWARD HAREWOOD LASCELLES, Esq.

*New Zealand*: ALFRED DILLON BELL, Esq.

*South Australia*: EDWARD CHARLES STIRLING, Esq., M.D.  
ALEXANDER STUART PATERSON, Esq., M.D.

*Queensland*: JOSEPH BANCROFT, Esq., M.D.

*Tasmania*: THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

The CHAIRMAN stated that he had already seen the Hon. Mr. Macleay, who informed him that Dr. Katz was a member of the Linnean Society, and was entitled to the rooms, appliances, and instruments in the Linnean Laboratory. The question of admitting an assistant to Dr. Katz, must, however, be referred to the Council of the Society.

The CHAIRMAN stated that a difficulty in the use of the Linnean Society's Laboratory would arise from the necessity that M. Pasteur's representatives, and Drs. Butcher and Ellis, should have access to all experiments conducted in pursuance of their schemes.

The CHAIRMAN next submitted a schedule of experiments prepared by the Committee appointed at the previous meeting for that purpose.

CHICKEN-CHOLERA.

1. Infect 9 rabbits with food containing microbes of chicken-cholera:—Place 3 in wooden hutches, each with 2 healthy rabbits. Place 3 in wire-bottomed cages, each with 2 healthy rabbits. Place 3 in artificial burrows, each with 2 healthy rabbits. Place fresh excrement from diseased rabbits in a clean hutch, and introduce 2 healthy rabbits.

Report

Report condition of all rabbits every eight hours till time of death, or, failing death, till close of third day in the three first experiments, and till the end of a week in the last experiment.

2. The following animals to be fed once a day for six days with food containing microbes (cultures):—2 sheep, 2 cattle, 2 calves, 2 lambs, 2 horses, 2 pigs, 2 goats, 2 dogs, 2 cats, 2 rats, 2 mice.

If death or serious illness occurs in the case of any animal, 6 other such animals to be experimented upon—2 by inoculation with cultures; 2 by feeding with cultures; 2 by adding excrement of diseased rabbits to food. Special cultures to be made from such animal, and preserved specially marked.

3. Place the following birds in one large aviary:—2 fowls, 2 ducks, 2 geese, 1 turkey, 1 wild duck, 1 teal, 1 quail, 2 parrots, 1 magpie, 1 jackass, 1 crow, 1 sea-gull, and any other obtainable birds. Let infected broth be added to their food once a day for six days. If any bird do not contract the disease, inoculate it with cultures.

4. Infect 20 rabbits in successive series one from another, and test the comparative virulence in the 5th, 10th, 15th, and 20th cases by transmission to fowls. Report also on the history of each rabbit so infected. In this series transmission to be in every case by inoculation.

If fowl-cholera be discovered in the Colony, the symptoms, *post-mortem* appearances, cultures of organisms, and inoculation results should be at once compared with those observed in connection with M. Pasteur's microbes.

In experiments 2 and 3 all animals to be placed together in the same enclosure, so far as is practicable consistently with the object of the experiments.

#### THE TINTINALLOGY DISEASE.

1. Obtain 9 rabbits suffering from the disease, and conduct an experiment with them on the lines of Experiment 1 under Chicken-cholera. Keep diseased and healthy animals together for not less than a week. Keep animals under observation for at least three weeks.

2. Inoculate healthy rabbits with blood, pericardial fluid, discharge from nose and eyes, bile, and excrement from diseased rabbits. Eliminate carefully every other possible source of infection.

3. Feed healthy rabbits with food on which the following substances from diseased rabbits have been dropped:—Discharge from eyes and nose, excrement.

Feeding experiments on other animals to be postponed until the nature of the disease is made clear.

Dr. BANCROFT moved, and Mr. PEARSON seconded,—“That the Commission recommend that a house, approved of by them, having at least six rooms, with half an acre of land attached, having gas and water laid on, with stabling and other appurtenances, be rented for four months, and that officers appointed by the Government, on the advice of the Commission, be authorized to conduct experiments thereat concerning the various schemes proposed for the destruction of rabbits by disease.”

The motion was carried.

Mr. BELL moved,—“That the schedule of experiments as read be adopted as a general basis of direction to the chief expert to be appointed by the Commission, provided that such expert shall be invited to revise the schedule, and make suggestions thereon to the Commission.”

The motion was seconded by Mr. PEARSON, and carried.

Dr. KATZ was then introduced and the Chairman explained to him the resolution of the Commission, and stated that full discretion would be given him in the carrying out of experiments.

Dr. STIRLING moved,—“That the Commission recommend the appointment of Dr. KATZ, Ph.D., as chief expert officer for the conduct of experiments under the direction of the Royal Commission; that Dr. KATZ receive a salary at the rate of £60 per month, and be provided with such assistance as the Commission may think necessary.”

Mr. PEARSON seconded the motion, which was carried.

Dr. STIRLING moved,—“That the representatives of New South Wales, Dr. MacLaurin, Dr. Wilkinson, Mr. Quin, and Mr. Dillon Bell, of New Zealand, be a Committee to watch the proposed experiments on behalf of the Commission, and that the Committee be authorized to convene the Commission at the earliest convenient date for the consideration of the whole question.”

The motion was seconded by Dr. BANCROFT, and carried.

Dr. PATERSON moved,—“That progress reports of experiments be furnished to each member of the Conference at the discretion of the Committee.”

Mr. LASCELLES seconded the motion, which was carried.

It was ordered that a copy of the Schedule of experiments should be sent to Dr. KATZ. It was also resolved that Dr. HINDS should be informed that the Government and the Board of Health had been urged to give M. Pasteur's representatives facilities for as speedily as possible carrying out their experiments.

The three representatives of M. Pasteur were then introduced, and submitted a written statement, which was read, and upon which they were further examined.

The Chairman informed them that a portion of the Government Laboratory had been placed at their disposal.

Dr. HINDS stated that the cases containing their microbes would not arrive till the 26th inst.

The Chairman then inquired whether anything could be done in the meantime to facilitate their work.

On the motion of Mr. BELL, the Secretary was requested to place his services at the disposal of the representatives of M. Pasteur, so that no delay should take place in making arrangements with Mr. Hamlet, the Government Analyst.

Dr. STIRLING moved,—“That Dr. Bancroft, Mr. Lascelles, and Mr. Pearson be appointed a Committee to examine the correspondence and bring up a report on the subject; the report to be incorporated in the final report of the Commission.” Mr. BELL seconded, and the motion was agreed to.

Dr. STIRLING moved,—“That the name of Mr. Pearson be added to the Committee which has already been appointed to watch the experiments about to be conducted.” Mr. BELL seconded the motion, which was carried.

The Secretary was directed to send a letter to the Minister for Lands asking that immediate attention be given to the resolution adopted by the Commission having reference to the laboratory.

The Commission adjourned until 10:30 a.m., on the following day.

WEDNESDAY,

## EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 17

WEDNESDAY, 25 APRIL, 1888.

The Commission met at 10 a.m., at the Colonial Secretary's Office, Sydney.

*Present:—*

*New South Wales:* WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.

*Victoria:* HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.  
EDWARD HAREWOOD LASCELLES, Esq.

*New Zealand:* ALFRED DILLON BELL, Esq.

*South Australia:* EDWARD CHARLES STIRLING, Esq., M.D.  
ALEXANDER STUART PATERSON, Esq., M.D.

*Queensland:* JOSEPH BANCROFT, Esq., M.D.

*Tasmania:* THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Dr. PATERSON moved,—“That Dr. Bancroft's name be added to the Committee appointed to watch experiments.” The motion was carried.

The following motion, of which notice was given by Mr. Bell, was then called on by the Chairman:—“That in the opinion of this Commission the conditions requisite for a thoroughly practical and conclusive series of experiments to ascertain the value, for the purposes of the Commission, of any infectious disease are not consistent with the condition of an absolute guarantee of safety against the contagion of such disease spreading beyond the area devoted to the experiments; but that no real danger is to be anticipated from any such experiments under reasonable precautions. That in the opinion of this Commission the necessary experiments may be conducted, with all the possible safeguards obtainable, quite as safely, and far more conveniently, upon securely-fenced areas in the interior than upon small islands; and that the results of such tests will be of far greater practical value if recorded in connection with areas in the interior than if merely performed upon small islands. That this Commission therefore abandons its proposal to experiment upon islands, and resolves that its experimental investigations shall be concentrated firstly upon available areas on the mainland under such precautions as may be deemed sufficient, and secondly upon laboratory experiments under the proper conditions.”

Mr. Bell stated that he wished to give precedence to Mr. Lascelles' amendment, and on that account would not move the motion which stood in his name.

Mr. LASCELLES: I beg to move “That with a view to saving of time in determining results—and the equal or greater safety to be obtained—it is now decided that the first experiment (in addition to laboratory experiments) with Monsieur Pasteur's disease be tried in a wire netting enclosure of about 100 yards square, which shall also be roofed over with wire netting—and at a distance of two chains an outside netting fence to be erected.” I would like to enlarge upon my proposal still further, by explaining the nature of the enclosure which should be made. I would suggest 100 yards square, closed around with a  $\frac{3}{4}$ -in. mesh. The area of this would be about  $2\frac{1}{2}$  acres, and I would also propose that this 100 yards square enclosure shall be roofed with  $\frac{3}{4}$ -in. mesh, and that at a distance of 2 chains from this enclosure an outer ring of wire netting fence  $1\frac{1}{4}$ -in. mesh and 4 ft. high shall be erected. Into this enclosure I would put 200 rabbits, and then outside the enclosure in some adjacent place I would feed 20 rabbits on Pasteur's microbes. I would then turn the diseased rabbits into the enclosure. Of course the enclosure must be in a place suitable for the habitation of rabbits—burrows should exist there; and I would also have brushwood, hollow logs, and other things put into the enclosure. My contention is that experiments conducted in this way would be much safer than experiments conducted on an island a short distance from the coast, and that experiments in connection with the laboratory would not be nearly so satisfactory as those carried out under the scheme which I suggest, and for this reason: that, while rabbits, when placed in a cage, are naturally apt to huddle together, and possibly communicate the disease from one to another much more effectually than they would under their natural conditions, which I propose. The great fault that we have found hitherto with the method of M. Pasteur, as propounded by his representatives here, is the uncertainty which must be felt as to whether the disease will spread from diseased rabbits to sound ones. It may be that the disease will only spread by the direct eating of the poison. I feel confident that if, after such an experiment as I speak of, 200 rabbits, or a great portion of them die, that would be held to be a satisfactory experiment so far as disease goes by my brother pastoralists. I beg now to formally move this resolution.

Dr. Bancroft: I would like to know from Mr. Lascelles whether he proposes that this shall be done before the laboratory experiments shall have been completed or afterwards.

Mr. Lascelles: My proposal is that it shall be done after the laboratory experiments have been tried and completed. It may be, in case the representatives of M. Pasteur are not successful in the laboratory experiment, that we need not go any further. But it may be necessary for us to order the material for fencing, or to offer some intimation that it will be required, because the manufacturers point out that their machinery is inadequate to the demands which are likely to be made upon it. An order of this sort would take some three weeks in preparing, and we should let the makers know what in all probability will be required.

Mr. Bell: What is the smallest mesh they make regularly?

Mr. Lascelles: The smallest is  $\frac{1}{4}$  of an inch.

Mr. QUIN: I will second this resolution. I have not the same fear that some members of the Commission appear to have that this disease will spread to other animals, because after that trial in the Pommery vineyard, in France, no fowls in the immediate neighbourhood suffered. I am quite sure if any fowls had been destroyed by this disease that we would have heard of it, because the French are a thrifty agricultural people, not likely to overlook any danger following an experiment of this kind. And it seems to me that no precautions were taken in that case that the germs of the disease should not be carried away

by birds or by other means. After such a public trial as this, in which it is quite evident no care was taken that the germs should not be scattered about, I am amply satisfied that we are quite safe in doing as Mr. Lascelles suggests.

*Mr. Pearson:* I think I am in a position to give some evidence on this point, as to the spread of contagion. Before I came here, I came across an account of some extensive experiments in connection with fowl-cholera in America, conducted by Dr. Salmon, the chief veterinary surgeon to the United States Agricultural Department, and also by Dr. Detmers and Dr. Laws. In one instance it was noticed that a case of fowl-cholera broke out some 200 yards distant from the spot where the experiments were being conducted. That case was stamped out, but by and by another case broke out very near the same spot, though immediately around the place where the experiments were being conducted fowls were congregated, but no disease spread. It had been inferred that in these two cases the disease had been carried away by the flies, and that the flies were eaten by fowls outside. It was not a matter of much consequence in a place like France, where fowl-cholera already existed, that no precautions should have been observed, but we are not certain that fowl-cholera does exist in this country, and therefore we must be more careful. Until we are satisfied on that point, I think we should take into consideration the feelings of alarm which have been expressed by the public, and we should take all possible precautions in the preliminary experiments to avoid the spread of contagion. The first experiments that we have proposed are in the nature of a test as to whether the disease is worthy of further inquiry or not—whether it is sufficiently contagious to be worth further inquiry. Then we have experiments Nos. 2 and 3 which will have for their object to ascertain what may be the possible danger of this disease to other forms of life. I may say that these experiments, conducted in a somewhat confined enclosure, will be performed under more severe conditions than will ever occur outside the enclosure, because animals congregated in that way in a confined area are more liable to be attacked by germ diseases than animals living in the usual way. And I believe it is an acknowledged fact that disease germs are nearly always more apt to become virulent when kept in a confined space than when exposed freely to the air and the sun. So that experiments Nos. 2 and 3 carried out in this way will be performed under much more severe conditions than will ever occur in nature. Then, when it has been shown that no danger exists to the forms of life mentioned in the schedule, it will be time to go on with the experiments which Mr. Lascelles proposes, and if that be admitted on the part of Mr. Lascelles I am perfectly willing to support his resolution.

*Mr. Lascelles:* I understand that the laboratory experiments will be first tried, and also whether the microbes are alive, and whether rabbits can be directly infected by them or not. Those experiments are to be made to ascertain whether sound rabbits can be infected. I do not propose to wait until we see whether sheep or cattle can take the disease, but that when these other experiments are complete we should proceed to use this enclosure.

*Dr. Wilkinson:* It seems that the object of Mr. Lascelles is only what we have considered already, because we decided several days ago that after the experiments that have to be made in the laboratory have been completed, then further experiments shall be made under other conditions, one of which experiments will possibly be carried out in the interior. Now, what directed my attention to this notice of motion was that this should be the first experiment; that is, before the laboratory experiments, not after. Well, naturally I strongly object to such a motion as this, but it seems now that Mr. Lascelles does not mean it in that way, and therefore I do not wish to press my objection.

*Mr. Lascelles:* I am quite willing to alter the phraseology of the motion, in order to make its object more clear if necessary.

*Dr. Wilkinson:* But even then we will be in the same position prior to this resolution coming before the Commission. It seems to me that this preliminary must come sooner or later, if the experiments which are to be conducted in the laboratory bear out what M. Pasteur and his representatives have told us. But we have to prove or disprove what they state, and until we do that any motion of this sort is premature. (Hear, hear.) The experiments, for instance, of M. Pasteur in the Pommery vineyard are not absolutely conclusive.

*Mr. Lascelles:* Far from it.

*Dr. Wilkinson:* Now, the object of the laboratory experiments will be to complete the experiment which was begun in the Pommery vineyard. We want to find out by actual experiment whether any other animals can directly or indirectly become affected with this fowl-cholera. If the experiments in the laboratory prove that all other animals are immune, then the only point at issue is whether further experiments should be conducted on an island, say one of those in the harbour which are close by, or whether they shall be conducted in a stretch of land where rabbits already exist. We cannot lose sight of the fact that not only the public but also the scientific bodies are opposed to the introduction of this disease into the Colony until it has been proved with scientific accuracy that there is no danger to the public now or in the near future. If we gain that point, then we practically can proceed further; but until that point is proved we must not attempt to introduce the disease into any inland parts of the Colony. This is the essential point, and this is what the Commission have already decided not to do. Until it is proved with scientific accuracy as perfectly as it is possible to prove anything, that there is no danger of this nature, we must hold our hands and keep the disease from entering the Colony. It has been said it is likely that fowl-cholera exists here already, but there is absolutely no scientific proof whatever of its existence, and the mere fact that fowls have been affected with certain symptoms is no proof of the identity of that disease with the disease known as fowl-cholera. So that if the resolution means merely this, that we shall proceed with our experiments in the laboratory under the usual conditions, and that we shall not proceed further until we are sure that the disease cannot be transmitted, no member of the Commission can have any objection to the resolution. But I would strongly oppose a resolution framed in words capable of being construed into a direction that we should, without waiting for the result of the laboratory experiments, proceed at once to commence experiments inland with this fowl-cholera.

*Dr. Stirling:* I think it is abundantly clear that no member of this Commission wishes to proceed rashly. If there be any division amongst us at all it is merely in connection with the question as to the degree of safety. There is no question now, so far as I can see, about disease being introduced into the Colony, because we have recommended that it shall be done. We can only judge of the experiments suggested by Mr. Lascelles in conjunction with other suggested experiments. For my part I feel that the experiment which he suggests is certainly as safe, if not safer, than any similar experiment conducted on

## EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 19

an island—that is if there is to be a comparison between these two. I would go even further and say that I do not think there is any greater degree of danger in experimenting as Mr. Lascelles has suggested than in experimenting as we are now proposing to do in Sydney. I do not think that the animals to be experimented on down here will be as safe under lock and key as they will be under the experiment proposed by Mr. Lascelles. The insect element is a danger which has been alluded to and which must exist in any experiments that we can ever devise. It certainly will exist on an island just the same as it will exist with horses and cattle confined in a back yard.

*Mr. Pearson* : I think by the use of wire gauze that could be prevented.

*Dr. Stirling* : Well, I do not think that that element of danger can be got rid of under any circumstances, and although it has been suggested that we should yield to strong popular opinion, we must remember that public opinion on this question practically amounts to nothing. If experts who have investigated this question here and in Europe have not been able to reach fixed conclusions, it certainly is not to be expected that the ordinary public can have any complete knowledge, and I think that that danger is altogether exaggerated. I may fairly make this statement because we have some data to go upon. We know that chicken-cholera exists in America, and I believe in every country in Europe, but we have never heard of any wholesale destruction of birds. We know certainly that this disease is fatal to poultry-yards, but so are other diseases; and I say that there is no evidence before us where decimation or any wholesale destruction of birds has taken place in neighbourhoods where chicken-cholera epidemics have been frequent. So that, as I have said, we have some experience to go upon. And, so far as wild birds are concerned, I think it will be generally admitted that in Europe and America they have a great many more birds than we have here. And supposing there to be any risk of birds catching the disease, that risk would not be eliminated by carrying out our experiments on an island which is only a few miles off the coast. I am continuing my remarks entirely on the element of safety because it needs no argument to demonstrate the immense superiority, so far as convenience is concerned, of inland experiments over experiments conducted on a distant island. And in conclusion, I venture to suggest that the greatest danger in the consideration of this matter lies in extreme caution. We know that steps are now being taken to introduce diseases of this character without authority and without the safeguards of ordinary prudence. Those who have read through the correspondence will see that in several instances the introduction of rabies has been suggested. And supposing steps were taken to introduce it, who is to prevent it? So that while we wish to act as prudent men let us remember that there is an extreme of cautiousness which is a part of imprudence. As to the management of infectious diseases we have some knowledge of how these act and what we are to do with them. The Quarantine Ground is on the mainland, and is handy to the city, and yet diseases there are sufficiently well controlled. But I am glad to think that possibly there will be after all an almost unanimous feeling in this matter. As I understand Mr. Lascelles' proposal, it means this—that when we have gained some knowledge by laboratory experiments, we shall then as the next thing to be done proceed to experiment in the open. This is what I understand by the motion, and these are the reasons why I support it. I believe that in so doing I am acting with the same amount of prudence that has actuated myself in common with others in conducting in the laboratory the preliminary experiments already authorized.

*Mr. Lascelles* : I understand that this enclosuro will take some time in erection. We cannot get wire of this kind within a week, and by the time that we got it erected the first laboratory experiments will to a certain extent be proved. We should now lose no time, but take such steps as are necessary to have the wire ready when the time comes.

*Mr. Quin* : Might it not be better if some primary experiments were tried first? If this were done we might be able to save some expense.

*Dr. Stirling* : That question should be raised by and by, and might be given as an instruction to the Committee who have been appointed to watch experiments.

*Dr. Bancroft* : If I understand Mr. Lascelles correctly, he means that this experiment is to be proceeded with before the sheep and cattle experiments are concluded. That, I believe is the statement, and as to that I would say that there are objections. First, let us make the experiment with animals, and let us make ourselves quite certain that animals are not likely to suffer; and then we may be at liberty to consider out-of-door experiments; but until that question is settled, I think we should be hastening into danger if we allowed any other experiments. Now, as to this area of  $2\frac{1}{2}$  acres which it is proposed to fence in. A very considerable quantity of netting will be required to cover this enclosure in, and this will cost a great deal of money. It may possibly turn out, as Mr. Quin states, that as there have to be very careful experiments carried out on birds in the laboratory, there may be no necessity at all to keep birds out; and that we shall be able to carry out our experiments inland without any overhead netting. I would like that some attention were given to what Mr. Pearson has said in regard to flies spreading the disease. In making experiments in the laboratory of course it could not happen, but the expense of a mosquito net over a small area of ground would not be very much. But having satisfied ourselves that the thing will be perfectly safe, I think we may dispense with this overhead wire netting and mosquito netting as well. Now, with regard to disinfecting the country: suppose we introduce a disease, and that we afterwards wish to remove it from a piece of country—say  $2\frac{1}{2}$  acres—from which we are anxious to wipe this disease out again. Now I hold that such a thing never can be done. Even if we destroy everything else, the destruction of the grass seeds over that particular piece of country will be impossible. The spores of diseased secretions are equal to seeds when they get buried in the earth. We know that though fire goes over a piece of country yet it does not destroy the seeds which yield again and again; and disease, I think, would stand pretty much on the same footing; so that until we are quite sure that the introduction of this disease inland is perfectly correct and safe, I think we should hesitate. With regard to the island experiment that has been spoken of rather unfavourably by several gentlemen, I think it would be very well worth the consideration of this Commission. An island test would be the safest test to which you can ever put the scheme of M. Pasteur. It would be far more safe than any inland experiment; and if, as I understand, there is an island in Bass's Straits which is infected with thousands of rabbits, I am of opinion that it should be used. Dr. Cox told me that when he was passing by train through Tasmania on one or two occasions he noticed that the ground seemed to be in motion, and on looking closer he found that this arose from the movements of swarms of rabbits. For a long time he could not believe that this terrible upheaval was caused by live rabbits; but so it was. Now, suppose that an island in Bass's Straits were placed

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at the disposal of this Commission, or any other island possessing this enormous development of rabbits, I should say, take Pasteur's disease and give it a fair trial on that island. Ascertain, if possible, what has been overlooked in the vineyard experiment—because no inspection was made for a fortnight afterwards—in what way the rabbits were killed. Now, if on an island you cannot kill all the rabbits, if you leave there a few dozen pairs, we will know what is the value of Pasteur's scheme. We will know that it has pretty much the same action as phosphorus—that it kills well, but not altogether. I do think the island scheme is the grandest scheme that we could adopt, and though it might not be necessary to keep the representatives of M. Pasteur there, still some one might be delegated by us to see whether the island could be decimated of its rabbits. A steamer could get to one of these islands in a few hours, and the experiment could readily be tried. The experiment, besides being a great value to the scientific world, would give the Commission a valuable amount of information. Our functions here seem to be two-fold—to get rid of the rabbits and to protect the public health, as well as to save domesticated animals. I can assure the gentlemen who proposed this motion that, with a little patience, this pest will be got at—and very soon, too. I cannot quite support his motion, because I want to see animals experimented on before the inland experiments are undertaken.

*The Chairman* asked Mr. Lascelles to make his motion clear, that no experiments inland should be undertaken until after the laboratory experiments were completed.

*Mr. Lascelles* agreed to do this.

*Dr. Bancroft*: Then, in that case, I quite agree that no overhead netting will be required. I would like to know what is the good of buying this overhead netting if the Commission are not afraid of birds suffering. I do not see, under these circumstances, what is the good of buying the wire netting.

*Mr. Bell*: We know already that birds will suffer.

*Mr. Tabart*: A motion has already been passed that after the laboratory experiments have been completed, the other experiments shall be tried on an island, about which the Government of New South Wales have taken the trouble to gain information for us, and also have been inquiring as to whether rabbits exist on it or not. Now, so far as I am personally concerned, I may say that I do not intend to stultify myself by voting for any motion to abandon the scheme of experimenting on an island. I intend, therefore, to oppose this motion of which notice has been given by Mr. Lascelles. I am quite of opinion that in the interests of pastoralists, every possible precaution that can be taken should be taken by this Commission. We have at stake here some 50,000,000 of sheep which now exist on this continent. Of course it signifies very little to Mr. Bell or myself whether this disease be introduced or not, so far as it can have any effect on our stock. We are situated upon islands; but I believe the mainland here would suffer materially if it is found that Pasteur's disease is communicable to other animals than rabbits. I have here an extract from *The Mercury*, a newspaper published at Hobart, commenting on the proceedings of the Royal Society of Victoria, where this question was discussed. It is said:—"Dr. Wigg, who seems to have made a careful study of the question in all its bearings, maintains that M. Pasteur's remedy for the rabbit pest is uncertain and full of elements of danger. The spores of the chicken-cholera microbes, he says, with which the distinguished French scientist desires to infect the rabbits might be scattered broadcast in dust storms from one colony to another without losing any of their virulence, and disease and death would thus be carried thousands of miles. The microbes are practically indestructible. They can live in water heated nearly to boiling point, and can be frozen without endangering their existence, and once admitted into the colonies this disease would be virtually uncontrollable. It is idle to talk about carrying out experiments in these colonies safely within walled paddocks. We might as well erect a post and rail fence to keep out the cholera, or attempt to enclose small-pox within open wire network. Even an island would not ensure safety, for the germs might be blown across to the mainland, or carried in a boat or in the clothes and hair of the experimenters. Many of M. Pasteur's experiments with a view to determine whether the disease would effect other animals, have been made under conditions as to climate, &c., totally different from the conditions which obtain in Australia, so that they cannot be considered a safe guide. Other results of a disastrous character might follow similar experiments in the fierce heat of the Australian summer. No information is vouchsafed as to the particular kinds of birds the disease attacks, but it is almost certain that we should lose our domestic fowls and native insectivorous birds, and suffer a plague of locusts, grasshoppers, and other insect pests that would most certainly prove worse than the rabbit pest. A disease is generally most virulent and spreads with the greatest rapidity on virgin soil, whether it be small-pox in man or brambles and thistles in the earth. After a time the disease consumes the whole or a large portion of the material it requires for its growth, and either disappears altogether or is kept within bounds. This was exemplified in Fiji with regard to the measles. When introduced there that disease spread with appalling rapidity, and was singularly virulent, no fewer than 40,000 persons dying from its effects. Now, this disease is not more virulent in Fiji than it is in England. In France the plants and animals have been adapting themselves to each other for centuries, and have established a *modus vivendi*, whereas here the chicken-cholera would find new birds, new animals, a virgin soil, and new climatic conditions differing widely from those of Europe. Different conditions would probably produce different results, and no one can say for certain what would follow the introduction of a new choleraic disease into these colonies. Typhus, which was so virulent in England and Ireland, died out in Australia, and the yellow fever of America could not exist in England. These are facts, the significance of which can hardly be overestimated, and most people will be disposed to agree with Dr. Wigg that the Governments of the various colonies ought to seriously consider the possible danger to the flocks and the health of human beings before risking the prosperity of Australia by introducing the chicken-cholera. In the discussion that followed the reading of this paper Dr. Jamieson observed that the so-called fowl-cholera was not cholera at all. In Germany it was known as fowl typhoid. There was fair evidence that it would spread to any birds, and could not be limited to fowls and rabbits. In Germany it had killed pigeons, geese, turkeys, ducks, and pheasants, so that it was certain that the disease would make havoc with the bird life of the colonies. A most important point was the relation of fowl-cholera to diseases in other animals. In Germany a few years ago a disease destroyed large quantities of game, especially attacking deer. The organisms found in the animals affected were similar to the microbes of chicken-cholera. This would seem to indicate that there was some risk of the disease spreading to other animals. A similar view of the matter was taken by Mr. C. R. Blackett, the Government analytical chemist, and the following resolution was carried unanimously:—"That the Royal Society respectfully advises the Australian Governments to refuse their permission to any person to introduce

introduce any form of disease for the purpose of checking the rabbit plague until the whole question has been fully considered." Now, if this be the case—if this disease spreads, as is indicated in this paper—what would be the result if we once introduce it on to the mainland? It would be a most difficult matter to destroy it or to get rid of it if it were once introduced. We know what pleuro-pneumonia has cost these colonies, and I estimate that if chicken-cholera is once introduced—if it is found to be communicable to sheep—the result will be most disastrous. Therefore, upon these grounds, I shall oppose this motion.

*Dr. Paterson:* It seems to me that the question which we are now discussing is as to the locality where, under natural conditions, these experiments are to be made. This is a question which resolves itself into two parts—whether the experiments are to be carried out on an island or on an inland station. The advocates of the scheme for making experiments on an island say that the island will give safety. Now I do not see that there is any absolute safety on an island—very far from it. It is quite possible that birds and insects will communicate the contagion from the island to the mainland. I have not heard any of the advocates of the island scheme speak of adopting any precautions of having an overhead netting for birds or insects, and therefore, on that ground, I fail to see wherein the safety of the island consists. Then it is said that the distance from the coast renders it safe, and that a fence will not be necessary; but I am of opinion that any experiment made in an inaccessible place will lose a great part of its value from want of proper supervision. My idea is that sufficient precautions can be taken for almost perfect safety on an inland station. Of course there is always a certain amount of risk in everything we undertake. There is a certain amount of risk involved in travelling in a railway train—there is risk even in crossing a street—in doing many of the things which we do daily in our lives. There are remote risks in all these things, but I am of opinion that if reasonable precautions are adopted such experiments (under natural conditions), as are absolutely necessary to test these schemes, may fairly be carried out on some inland tract of country. The risk of communication—of the propagation of the germs by insect—has been alluded to; but, as was pointed out by the previous speaker, there is risk even in the laboratory experiments, and yet this reason has never been urged against our undertaking laboratory experiments. The conclusion which I have come to on this matter is this—that it is simply impossible to secure the conditions required by some speakers, and that if their ideas are to prevail no experiments at all may be made until you have shut out every possibility of every sort of risk. I think that these risks—whatever they may be—have been very much exaggerated. M. Pasteur's representatives told us yesterday—I think it was Mr. Loir who spoke—that he had witnessed three epidemics of chicken-cholera, and that he was not aware that in any case the epidemic had spread to wild birds. There have been epidemics of this sort in France, where the disease is well known, and yet there is not a record of an instance to show that in any of these epidemics in France, in Germany, or in part of the world, wild birds have been in any way affected. I think it is possible to exaggerate and to take an alarmist's view of a matter of this kind. I have known in my own personal experience a good deal of this sort of thing. I remember that when Torres Island, which is close to the city of Adelaide, was first recommended to the South Australian Government as a place of quarantine, a similar cry of alarm and danger was raised by a certain section of the community. It was pointed out then that smallpox was an excessively contagious disease, and that the currents of the atmosphere would carry the germs to the city, and that Adelaide, which is only 8 miles distant, would be infected with smallpox. Then a cry was raised about quarantined vessels lying a few miles off, and there were numbers of letters in the papers stating that the health of the people at the Semaphore was being endangered because the wind would carry the contagion into the town. Now, I need scarcely say that none of these accidents happened. Torres Island is still the quarantine station. The smallpox has never spread to the city, and the disease has never once been wafted from the vessels lying in the stream to the people at the Semaphore.

*Dr. Bancroft:* All that argument is in favour of adopting the island scheme.

*Dr. Paterson:* Well, if so, I can only say that my arguments were intended to prove something totally different. Dr. Bancroft has alluded to the impossibility of totally disinfecting an area of the germs of chicken-cholera which had been used for experimental purposes.

*Dr. Bancroft:* I said germs generally, not those of chicken-cholera in particular.

*Dr. Paterson:* Well, in that case I can hardly understand the force of my friend's argument. I made a note of that, and also his comparison between the vitality of these germs and the vitality of grass-seeds. Now, I know that Dr. Bancroft is a very good naturalist, and I would like, therefore, to ask him whether any reasonable comparison can be instituted between the vitality of Australian grass-seeds and the vitality of these germs, whose resistance, so far as temperature is concerned, is small. Mr. Pearson also brought forth an argument that he had discovered, that in some parts of America where experiments had been instituted insects carried the disease 200 yards away from the place where the experiments were made. Now, I fail to see what connection there was between the two things. The explanation or inference is that the disease had been carried by insects. Now, this is the *post hoc propter hoc* kind of logic, and we know how unscientific is this kind of argument. Because one occurrence took place after another, because one accident precedes another in point of time, the inference is drawn that one is the cause of the other. Now, I wish to say, that on an isolated instance of this sort, founded upon insufficient data, I place no reliance whatever. Another objection to the island scheme seems to be that, in addition to its inconvenience and the points that have already been indicated, it hardly possesses the conditions which exist inland; and I think if experiments are to be conclusive in this way, inland conditions should be observed as much as possible. There cannot be the slightest doubt that the inland conditions, as regards moisture, &c., are very different from those which exist on an island; on these grounds, and because I believe the proof of a laboratory experiment to be ample to allow us to proceed—I think that inland experiments, conducted with proper precautions, are safer, as regards public health, than experiments on an unguarded island. I shall support the motion to have these experiments conducted under natural conditions in the interior of the Colony.

*Mr. Bell:* In bringing forward the original motion of which I gave notice on Monday, and upon which, before it was discovered that it could not be discussed except upon notice given, I had already spoken my mind, I took an opportunity of stating to the Commission my views on the whole subject. But as none of my remarks were reported, and as the discussion upon Mr. Lascelles motion, which, by agreement between that gentleman and myself, I have permitted to replace my own for the present, has been ordered to be reported, I must to some extent repeat what I then said. Nevertheless, my opinion

opinion is before the Commission as fully as I could put it; and I do not propose, merely for the purpose of getting my words into print, to take up your time in repeating all of what I then said, more especially as many of the arguments which I then addressed to you have been urged with much more ability than I can command by the speakers who have preceded me to-day. It would not be desirable to occupy the time of the Commission in repeating such arguments—my object not being to impress you with what I have to say, but rather to further, in the best way that I can, the work which the Commission has been called on to perform. (Hear, hear.) It is, however, necessary for me to remark that in bringing forward the motion which I submitted the other day, my object was principally to eliminate the element which previously had been considered essential by the Members of the Commission in the conduct of experiments—the supposed necessity to conduct these experiments upon an island. You will remember that prior to my arrival here the Commission had passed a motion requiring as a condition precedent, that all such experiments should be carried on on an island some distance from the mainland. I could not, myself, agree with this condition as being either practically efficient or necessary, or in accordance with the conditions that it was desirable should be secured, or with the purpose of the experiments intended to elucidate the questions referred to this Commission. But I also thought it right that I should specially draw the attention of the Commission, in my former speech, to the fact that in this matter my opinion should be received with a certain amount of caution, inasmuch as I myself came from a distant island, which could not be affected by experiments conducted in the Australian mainland. The reasons which led me to bring forward the motion of which I gave notice, and which would have the effect of rescinding a previous resolution of the Commission, were shortly these. In the first place, I did not consider the choice of an island really secured the conditions of safety, which up to that time, it had apparently been thought to secure. The fact alone, that the disease with which we propose to experiment was originally derived from bird life, appeared to me to render it highly improbable that any experiments conducted upon an island would secure the element of safety at all. For it must be remembered that chicken-cholera originated in bird life, and that only in a secondary condition has it been transmitted to rabbits. We are dealing with animals that move through the air, and which cannot be restricted in their movements by small belts of sea. Another reason is this, that I do not think the conditions to be secured upon an island, or the ocean, bear a sufficiently close relationship to those attached to an inland station, to enable us to say whether the things which may be done on an island may also be done on a station in the interior. That I hold to be a very serious objection indeed. Then there is another reason, but as I do not attach very much importance to it, I will deal with it in a few words. I refer to the statement that perhaps the disease proposed to be introduced (though I do not assert it) already exists upon the Australian Continent.

*Dr. Wilkinson* : Then in that case we should proceed to the inland experiments at once, without waiting for the result of the laboratory experiments.

*Mr. Ball* : Quite so; that would certainly be a reason (if the disease existed) for not going on the island idea. A further reason of mine for objecting to this was that I am perfectly certain that the necessary precise scientific and practical attention could not possibly be given to experiments conducted upon an island in anything like the same degree as to experiments carried on in the mainland. It is proposed that this Commission should superintend such experiments and record the results in such a way that, being recorded, there could be no loose ideas about them. I am sure that the Commission fully recognize the necessity of this. They cannot desire that the records of their experiments should be of that extraordinarily loose and unsatisfactory kind—loose and unsatisfactory alike from the scientific and from the practical point of view—which, I regret to say, is characteristic of the published experiments of Mr. Pasteur on this subject, so far, at any rate, as we have been permitted to learn them from the mouths of his own representatives. Those experiments cannot be held to be in any sense decisive experiments; and the same kind of looseness would inevitably attach to any experiments carried out on an island, if such alone were allowed. Suppose, for instance, that a chemist were ordered to hold an investigation into poisoning by phosphorus, and that his laboratory was at the rooms of the Board of Health, which I visited this morning; and supposing that one of the conditions of his experiments was that he should live in Tasmania, and that a steamer called once a week to take him backward and forward. How, under such circumstances, could he watch and record the result of his experiments? I think the matter only requires to be stated in such terms as these to show that a record of any experiments to be conducted on an island would really be worthless; and for this cogent reason, that great doubts must attach to the experiments, I could not help feeling it my duty to traverse the previous resolution with the one which I had the honor to bring forward the other day. It has been pointed out to me in a particularly kind way that it was traversing a previous resolution of the Commission, and I at once expressed my regret that I should appear to be presumptuous enough to come to this Commission, after missing the first days of its work, and ask it, as one gentleman puts it, to stultify itself. If I have been forced into this position, it is with regret. I have acted simply in response to what I feel to be my duty as representing one of the parties to this Commission; and if I have been so unfortunate as to appear presumptuous in this matter, I can only regret it, and say that it was a sense of duty which induced me to take the stand I did. Now, Dr. Bancroft has very properly pointed out that there can be no possible objection to conduct experiments on an island. I quite admit that it would be a very interesting and instructive *additional* experiment to introduce upon an already infested island rabbits inoculated with Pasteur's disease, after the laboratory experiments, conducted under convenient conditions, have given results sufficiently encouraging to make it worth while to proceed with the matter at all. Dr. Bancroft has done valuable service in drawing our attention to this. But he would appear to think that of itself the island experiment would be sufficient and satisfactory, and to that I have pointed out several objections. A further one indicated already by Mr. Lascelles, consists in the fact that such an experiment, though it would have a considerable value of its own, would in some respects be like M. Pasteur's at Pommery. No exact numerical record of results could accrue: whereas, supposing that we introduced 200 rabbits into an enclosure, and allowed twenty diseased ones to go amongst them, and a number of these remained alive, we would then have some definite particulars and figures to go upon; we could count the number of dead and live rabbits on the place. This is one element of difference between the island experiment and the experiments which I recommend. Then as to whether chicken-cholera exists here already or not—and if it does, this extremity of precaution becomes absurd—I do not presume to offer a decisive opinion: all I can say is, it seems to me that the dreaded thing does already exist here. Now if that is the case, surely we can look at the matter in an altered way. Where fowl-cholera has prevailed for a long time, say in France for instance, in a natural

way,

way, we have an opportunity of seeing what is the worst result to be feared from its existence in the open country, under the very loosest possible conditions as regards precaution and disinfection. Fowl-cholera has admittedly existed for years in France, practically unchecked. Where are there any records of disastrous and horrible consequences to stock and to human beings? Where fowl-cholera has prevailed for a long time, we have nothing to show that there has ever been an epidemic amongst horses, amongst sheep, or amongst human beings; or that any one has died of fowl-cholera. Such a thing would at all events be new to the general public if not to the scientific world. It would be an indication for what it is worth of the possible danger of experimenting under careless conditions, and we are anxious that those extremely careless conditions shall have no existence, because we propose that every precaution shall be taken. In my original motion I inserted an expression which I thought would really elicit the opinion of the Commission upon this point—whether it was really possible to conduct an experiment which, on the one hand, would be absolutely satisfactory with regard to practical conditions, and, on the other, would be absolutely immune from any risk whatever. Now, in my opinion, that cannot be done; a certain amount of risk must be taken. All I required to be understood by the motion which I brought forward originally was that the element of confinement on an island which was prescribed as a condition precedent in a previous resolution adopted by the Commission should not be insisted on. And, as I think that the motion brought forward by Mr. Lascelles is a somewhat less aggressive one than mine, I am willing, in deference to his opinion, to adopt it, as it avoids a direct attack upon a previous resolution of the Commission. I therefore intend, although not withdrawing my original motion, and on the understanding that it will be placed on the minutes, to support the motion moved by Mr. Lascelles.

The Chairman reminded the members of the Commission that, according to the proclamation in which the reward of £25,000 was offered to the inventor of any effective scheme of exterminating rabbits, it was expressly provided that the execution of the scheme should involve no danger to horses, cattle, sheep, dogs, and other useful animals enumerated. Birds, however, were not mentioned in the proclamation. The Commission had therefore to determine, in respect of every scheme proposed, whether it would be effective and whether it would be safe. In order to test the efficiency of M. Pasteur's method, the Commission had resolved that a series of laboratory experiments should be conducted, which would demonstrate whether chicken-cholera would spread freely from one rabbit to others kept in close proximity in hutches, cages or artificial burrows. It might be that the cultures brought from France would be found dead or enfeebled, in which case delay would be unavoidable. It might be that the disease communicated to the first rabbits would not spread easily from them to other rabbits, though all the conditions were made as favourable as possible. In that event, M. Pasteur's proposal would be out of court at once. If the disease did spread, the mode of communication would be ascertained. While these experiments were in progress it should be possible to ascertain whether chicken-cholera now exists in New South Wales or Victoria, or perhaps even in other more distant colonies. If it were shown that the disease is now prevalent among poultry, the objections which had been expressed to an extensive trial of the disease among rabbits on an inland area would be largely removed. But if evidence of this character were not forthcoming it would be wise to proceed at once to test whether chicken-cholera in the fowl or in the rabbit is communicable to other animals. Very little time would be lost if the experiments on mammals and birds set forth in the schedule of experiments were conducted simultaneously or in immediate succession. If it were proved that horses, sheep, or cattle could be infected, M. Pasteur's proposal would probably be rejected. If it were shown that the disease could not be communicated to any useful animal, other experiments must be conducted under natural conditions. The question then remaining was whether these experiments should be conducted on an island or in some inland area completely enclosed in bird-proof netting. As he had been the first, during the meetings of the Commission, to suggest that the chicken-cholera be tried upon an island, he would shortly state his views on this part of the question. For the present purpose, islands might be divided into three classes: firstly, those in the harbour, which were suitable only for laboratory experiments; secondly, an island such as Montague Island, about 3 miles from the mainland, sufficiently accessible and already stocked with rabbits; thirdly, islands like the Kent Group, in Tasmanian waters, about 80 miles from the Port Phillip Heads, one of which was reported to be similarly infested. As to Montague Island, it was so near the coast that if the disease did spread to the wild-fowl upon it, they might decamp to the mainland taking the cholera with them. Concerning the risks of extermination of wild birds he would speak later; but the selection of such an island would not satisfy those whose fears had been aroused. If the Kent Group proved suitable for purposes of experiment, no danger whatever would arise. The procedure might be as follows: A Government Inspector, with assistants, would examine the island and estimate roughly the degree in which it was infested. Subsequently Dr. Katz, with the representatives of M. Pasteur, and any members of the Commission who were at liberty, would proceed to the island, taking with them a sufficient number of healthy rabbits so as to save time. These rabbits would then be infected and turned out on the island. After the lapse of a sufficient time the island would again be examined. If the rabbits were greatly thinned in number, if many were found dead, and if no evidence of great mortality among birds were discoverable, M. Pasteur's proposal would be viewed with great favour. If, on the other hand, the rabbits were as numerous as ever, the experiment might be repeated; and if it again failed, the scheme should be rejected. The success of chicken-cholera on an island would not guarantee its efficiency under the very different conditions which prevail in the interior of Australia; but its failure would probably be conclusive in the opposite direction. Even if an inland experiment were also conducted without delay, an island trial would give valuable information as to whether chicken-cholera would spread among the rabbits which are so abundant in the sands-hills and plains on large portions of the Victorian coast. He therefore submitted that, if the laboratory results were favourable, an experiment should be conducted on an island somewhat on the lines which he had described. With regard to testing the spread of the disease in an infected inland area under the precautions described by Mr. Lascelles, he did not think that any considerable danger would be incurred. If diseased rabbits were turned loose in an infested area of 2½ acres, shut in around and over-head with bird-proof netting, and protected by a neutral zone two chains wide surrounded by a rabbit-proof fence, surely the most timid critic must admit that all the conditions of reasonable safety were fulfilled. Even without such rigid precautions, a temporary experiment in an area enclosed in the ordinary way would be very different from a persistent attempt to sow the disease all over the colonies. But, adopting Mr. Lascelles' method, the danger was infinitesimal; assuming that there was a remote possibility that little local outbreaks of the disease might occur in the immediate vicinity, these could be easily suppressed. From what was known of the life history of the microbes of chicken-

chicken-cholera, it did not appear that there would be any difficulty in disinfecting the area within which the experiment was conducted. Too much might be made of the danger to wild-fowl. Birds flying at large were not liable to fowl-cholera and other septicæmic diseases in the same degree as poultry shut up in yards and sheds; and even if a few were infected, the disease would probably have a very limited spread. On the other hand, if the proposals of M. Pasteur and others were not fully tested, there was great danger that land-owners would experiment for themselves without any precautions; and it was not a little suggestive to find in the correspondence submitted to the Commission suggestions that the introduction of hydrophobia might be an effective solution of the rabbit question. Generally, therefore, he was in favour of the following procedure:—Firstly, test by laboratory experiment whether chicken-cholera can be passed freely from rabbit to rabbit; if it can be so passed, test whether it can be transmitted from rabbits by infected food, and if necessary by inoculation, to horses, cattle, sheep, and other animals mentioned in the proclamation. At the same time test its power over birds, including specially the native game and insectivorous birds. While these experiments are in progress, obtain information about a suitable island; and if the laboratory experiments are favourable, proceed to infect it in the manner described. As soon as it is proved that the disease can be transmitted freely from rabbit to rabbit, purchase bird-proof wire and make preparation for the experiment described by Mr. Lascelles. If that experiment is successful, test the method on a large scale at Tarella or some other suitable locality. If any difficulty were found in proceeding with the trial of M. Pasteur's scheme, attention should be concentrated chiefly on the method of Drs. Butcher and Ellis, in the manner already specified in the schedule of experiments.

*Mr. Pearson*: I wish to explain, in reference to the American case which I mentioned, that Dr. Salmon brought one fowl from a distance of over 100 miles into a district where fowl-cholera had never been known before. He put this fowl into an enclosure for experimental purposes, and it was after this that fowls 200 yards away, which were not to be experimented on, caught the disease, and after discussing the matter in detail he came to the conclusion that the disease had been carried by flies.

*Dr. Wilkinson*: If this motion is not to be withdrawn, I shall ask the mover to reverse the conditions.

*Mr. Lascelles*: I wish to draw attention to the fact that in these colonies the pastoral interest is being nearly ruined by the spread of the rabbits. The pastoralists are looking to see some substantial resolution adopted by this Commission. As a practical man, I say that the test under this resolution will amply satisfy us as to whether there is any good to be obtained from M. Pasteur's proposal or not. Harm and delay are, no doubt, caused in this way—that the people are neglecting the ordinary precautions which people should take, and are waiting for a miracle to come off. As pointed out by Mr. Bell, no such certainty can be obtained from any island experiments as may be obtained by the introduction of a certain number of diseased rabbits amongst a large number of sound rabbits in an enclosure under natural conditions.

*The Chairman*: There is one matter which I had overlooked, and which I would like to speak of—it is the matter of expense. I do not think we should order any fine netting until our preliminary experiments show that we can transmit the disease from rabbit to rabbit. When we have proved this, we can push on our arrangements without delay. If we wait, we will only lose a short time, and will be spared the risks that have been indicated elsewhere of having incurred expense without any necessity.

*Mr. Tabart*: Before this resolution is put to the vote, I think we ought to settle what is to be the voting power of the Commission, and it should be arranged before going further that three votes be given to each Colony. At the Australian Stock Conference, the Colonies were represented in a similar manner to that which I now suggest.

*The Chairman*: I think there is quite time to get our island experiments performed if we obtain exact information about the island which we select. If we at once infect the island, then in a short time—by the time our enclosures are ready—we shall be ready to proceed with our inland experiments.

*Dr. Bancroft*: We seem to be contending for carrying out inland experiments before experiments had been completed with the domestic animals. This seems to be the exact point of contention. Shall we conduct experiments with domestic animals before carrying out experiments inland? I think it would be very injudicious to omit doing this before we go inland to perform our other experiments.

*The Chairman* pointed out that there was no question about Montague Island, and if any island were to be taken, there must be a wide strip of sea between the island and the mainland.

*Mr. Bell*: There is nothing at all inconsistent in this resolution with the simultaneous trying of the Montague Island with the mainland experiments. I quite agree that it ought to be done, so long as it is not considered absolutely the whole thing, and that other experiments, more directly under our control, will be allowed. If the Minister for Lands and the lighthouse authorities have no objection to the introduction of the disease on to Montague Island, I should like to see experiments tried there.

*Dr. Bancroft*: I would suggest, with the Chairman, that the information with respect to the island which he formerly mentioned in Bass' Straits would be of value to this Commission and worth obtaining.

*The Chairman*: I am under the impression that the Kent group of islands are within the waters of Tasmania.

*Mr. Tabart*: I know that they are at least very close on the boundary.

*Dr. Stirling*: There is an idea amongst members now that these laboratory experiments should be antecedent to other experiments. Now, if sheep were found to be seriously affected by the disease, we would doubtless say that we would have nothing to do with this disease. But, supposing that we found, from a very vigorous application of this poison, that birds are affected, that is no reason why we should not use the disease, nor why we should not try it in the open.

*Dr. Paterson*: I think the laboratory experiments should be proceeded with first of all, because if certain contingencies happen, these other experiments may never be necessary. If the laboratory experiments show that experiments under natural conditions are required, all we need do is to be prepared to conduct experiments under natural conditions. But if it is proved that the disease is contagious to other animals, then these experiments in the open may be unnecessary, and the material to be used for fencing could be resold. I think we had better stick to the resolution originally tabled.

*Dr. Wilkinson*: I would propose that the following words be inserted in the resolution: "After it has been demonstrated by laboratory experiment or otherwise that there is no danger to animals other than birds or rabbits." A place with wire netting could be provided, because then the fatality of the disease as regards birds could be proved.

Subsequently

Subsequently the motion proposed by Mr. LASCELLES was verbally amended, and carried in the following form:—"That, in order to save time in determining results, and in view of the fact that inland experiments can be conducted with precautions rendering them as safe as, or safer than, experiments on an island, the Commission determine that so soon as it shall have been demonstrated by laboratory experiments or otherwise to the satisfaction of the Committee already appointed that the introduction of fowl-cholera among rabbits would entail no danger to horses, cattle, sheep, goats, swine, or dogs, experiments be conducted with chicken-cholera in a wire-netting enclosure measuring about 100 yards square, which shall, if the Committee deem necessary, be roofed over with similar wire netting, an outer rabbit-proof fence being constructed at a distance of 2 chains around the central enclosure."

It was moved by Mr. LASCELLES and seconded by Mr. QUIN,—“That  $\frac{3}{4}$ -inch netting be obtained for the construction of the said enclosure as soon as the virulence of the microbes brought by M. Pasteur's representatives has been established, and as soon as the power of the disease to spread from rabbit to rabbit has been demonstrated.” The motion was carried.

Dr. STIRLING moved,—“That the two foregoing resolutions be an instruction to the Committee already appointed to watch the experiments.” Dr. PATERSON seconded, and the motion was carried.

It was moved by Dr. BANCROFT, and seconded by Mr. TABART,—“That this Commission request the Tasmanian Government to obtain information about rabbit-infested islands on their coast, and the suitability thereof for experiments in connection with the destruction of rabbits—special attention being drawn to the Kent Islands.” The motion was carried.

Mr. LASCELLES moved,—“That the Experiment Committee have full discretion in all matters concerning the conduct of experiments within the original terms of the Commission, and in all matters regarding the prosecution of the inquiry subject to the limitations already determined by the Commission.” Mr. TABART seconded, and the motion was carried.

Correspondence addressed to Professor Allen was received from the Lands Department, Victoria, giving cost of rabbit destruction in the Colony.

The Committee was authorized to inspect memoranda and see what similar information could be obtained from other Colonies.

Mr. Lascelles promised that he would see the Minister for Lands, during the day, with regard to the question of taking evidence as to the utility of wire-netting fencing.

The Chairman mentioned, in conversation, that the Minister for Lands had promised to submit to the Commission all the mechanical devices that had been submitted to him for the purpose of rabbit extermination.

The Commission adjourned to 10 a.m. on the following day.

#### THURSDAY, 26 APRIL, 1888.

The Commission met at 10 a.m., at the Colonial Secretary's Office, Sydney.

*Present* :—

*New South Wales* : WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.

EDWARD QUIN, Esq.

*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.

ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.

EDWARD HAREWOOD LASCELLES, Esq.

*New Zealand* : ALFRED DILLON BELL, Esq.

*South Australia* : EDWARD CHARLES STIRLING, Esq., M.D.

ALEXANDER STUART PATERSON, Esq., M.D.

*Tasmania* : THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Dr. STIRLING moved,—“That the Commission is of opinion that licenses to prosecute their experiments with the so-called Tintinology diseases may be granted to Drs. Butcher and Ellis with safety to the public health.” Mr. BELL seconded the motion, which was carried.

Correspondence having been forwarded by the Under Secretary for Lands embracing a resolution passed by the Board of Health suggesting that the Commission should draw up regulations for the issue of licenses, and the subject having been considered,—

Mr. LASCELLES moved,—“The Commission is further of opinion that the drafting of regulations of general application under the Animals' Infectious Diseases Act of 1888 is within the function of the Central Board of Health, and the Commission cannot undertake more than to make recommendations in connection with any special scheme for the destruction of rabbits which is submitted for their consideration.” The motion was seconded by Mr. QUIN, and carried.

A letter was read from the Under Secretary for Lands stating that in order to comply with the Act, the licenses should state where microbes were to be propagated and also where the infected animals were to be kept in security.

Dr. Wilkinson stated in reference to this that he had verbally informed the Under Secretary for Lands that M. Pasteur's representatives would keep their microbes, animals &c., in the laboratory of the Board of Health. It was ordered that a formal intimation to this effect be conveyed to the Under Secretary for Lands.

A memo. was received from the Rabbit Department and a minute of Under Secretary for Lands thereon forwarding various mechanical devices for rabbit destruction. This having been submitted,

Mr. BELL moved,—“That the consideration by the Commission of the various mechanical schemes for the destruction of rabbits now submitted to the Commission be postponed until the completion of experiments upon diseases. That in the meantime the Minister for Lands be requested to cause the various appliances to be stored in some suitable room, if possible, so that they may be viewed by members of the Commission as opportunities present themselves.”

Mr. LASCELLES seconded the motion which was carried.

Mr. LASCELLES moved,—“That application be made through the Minister for Lands for free railway passes for Dr. Frank Hinds, Dr. Germont, and M. Loir.”

Mr. TABART seconded and the motion was carried.

A letter was read from Mr. J. P. Abbott, M.P., covering telegram from Mr. W. L. Reid, of Tolarno Station, offering the use of a 2,500 acre paddock, wire-netted and thickly infested with rabbits.

Dr. STIRLING moved,—“That in connection with Mr. W. L. Reid’s offer of a 2,500 acre netted paddock, at Tolarno homestead, and all labour for M. Pasteur’s experiments—Tolarno being described as one of the most heavily-infested districts—the Commission recommend that proceedings in the purchase of wire-netting be stayed until full information is obtained as to the suitability of Tolarno or any other netted paddock which may be offered for the experiments to be conducted by the Commission.”

Mr. LASCELLES seconded, and the motion was carried.

A further communication was read from the Under Secretary for Lands, stating that the difference in cost between the wire mentioned in the resolution adopted on Monday—48 inches in width, and 1½ mesh—and that of the standard wire used for boundary fences, would be £320. It was also stated that an order had been given for the latter to enclose the 10,000 acres previously determined on by the Commission, and that some of it had already been constructed.

Mr. LASCELLES : “That the attention of the Under Secretary for Lands be directed to the letter containing the offer made by Mr. W. L. Reid, and that he be informed that the Commission were led to recommend the use of special netting by the fact that such special netting is being employed in large quantities for the barrier fence between New South Wales and South Australia.”

The motion was agreed to.

A minute was received from the Hon. the Secretary for Lands inviting the Commission to take the question of width and mesh of wire fencing into consideration.

Mr. LASCELLES moved,—“That as it is impossible to obtain suitable evidence in Sydney as to the proper width and mesh of wire netting for rabbit proof fences, a committee be appointed consisting of Professor Allen, Mr. Pearson, and the mover, to any other member or members of committee who may choose to attend, to take evidence in Victoria of those who have had practical experience on the subject.” The Under-Secretary for Lands had stated in a letter just received that the regulation netting adopted by the Government will cost about £38 per mile. Now, I am prepared to sell wire which, I contend, will be equally as effective at the rate of £21 per mile. Of my own knowledge I know this can be done; and I can actually quote a figure to you, and I think I can prove by evidence taken in Victoria, that this would result in a saving of a quarter of a million of money to your Colony. Of course we have got to see whether the evidence will bear out what I say; but I think you will find it to be simply overwhelming in favour of using netting of a smaller height and a lesser mesh. In connection with this matter I may mention, that the Hon. Thomas Cumming, of Victoria, a gentleman of large experience, had used a 15-inch netting around his garden, and even at that small height the rabbits were kept out. I need hardly say any more, because in the letter which I wrote to the Minister for Lands, and which is contained in these papers, I fully explained my reasons for advocating the use of netting of the height and mesh that I have mentioned.

Mr. Quin said: I beg to second this motion, and in doing so I think the motion will be found to be in keeping with the land legislation proposed to be enacted in this Colony. We have now a Land Bill before the Parliament of New South Wales which proposes to offer a loan to the squatters for the erection of rabbit-proof fences, the amount advanced to be repaid by them over a period of years. Now, what I wish to point out is this: that this Land Bill proposes to make it compulsory upon the squatters to fence their runs; and if that Bill becomes law, the squatters will be forced to expend a large sum of money in fencing, although the great majority of them are not in a position to expend half-a-crown more than is actually necessary. I think the motion proposed by Mr. Lascelles is a very timely one. Why should a man be forced to pay £5,000 for fencing if he can do the same work, and do it just as effectually for £3,500. And I am of opinion that the estimate of the amount which will be saved made by Mr. Lascelles is considerably under the amount which will actually be saved. I think the saving in the western division alone will be over half a million of money, and therefore I have much pleasure in seconding this motion. It commits the country to nothing, while opening at the same time a useful field of inquiry, where we may obtain facts which will enable the country to get the work done at a considerably less cost than would otherwise be the case.

Mr. Tabart: I am very glad that such a motion as this has been proposed. It is one of the most important motions, in my opinion, which has yet come before this Commission. I have been for the past two years endeavouring to move my Government in this matter, trying to induce them to have these fences erected in Tasmania. I propose to do it in this way: For the Government to become the importers of wire netting; that they should supply this wire netting to those who are willing to enclose their properties with it, charging them a low rate of interest on the money expended and making the repayment of the loan a preferential charge on their properties. If this mode were adopted in a country like that which I have the honor to represent here, I consider that we would save the properties, fencing being in my opinion the backbone of rabbit destruction. Of one thing am I convinced that whatever means may be adopted in New Zealand, in Tasmania, or in any of the other colonies, the erection of rabbit-proof fences will be the primary step in the rabbit extermination. If you want to destroy this pest effectually you must limit the area in which it can exist, because apart from the mere disproportion between the areas, it will be far easier to clear 500 acres than to clear 5,000. The great thing in all these methods is to prevent the rabbits from travelling about, and so escaping from the efforts which are being made to destroy them.

Dr. Wilkinson: Before this question is put, I would wish to say that I have no objection to the collection of evidence, because all evidence of this nature must be of great value; but I have certainly heard it stated—and stated by men of very considerable experience—that low fences are not sufficient to keep out rabbits. I heard Mr. Lascelles speak just now of a 15-inch fence.

Mr. Quin: That was merely an allusion to one particular case.

Mr. Lascelles: 15 inches is too low, I admit; but the fence which I would propose would be 3 feet high.

Dr. Wilkinson: Well, I have heard of rabbits climbing up where the fence was placed at an angle.

Mr. Lascelles: But if a fence is properly constructed it will not be at an angle. I have had a great deal of experience with rabbits, but I have never yet known rabbits to climb, and I think I have made every possible inquiry on the subject.

Dr. Wilkinson: Of course I have no practical knowledge of this question, but the point which strikes me is this: that although fences under the condition which Mr. Lascelles has seen them working in small districts in Victoria may be very useful, still they would not be so here. We have larger areas to deal with, and the chances of the netting being knocked down by animals would be very great.

Mr. Lascelles: Well, as to that, I must say that my experience in connection with rabbit extermination has been gained on 500,000 acres of land. And I think I have erected more netting fences than any other man in the Colonies.

Dr.

EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 27

*Dr. Wilkinson*: I admit, of course, that this question is of vast importance, especially in view of the fact that the Government, under our proposed legislation, is to bear 50 per cent. of the cost of the material. In that respect that question is a most important one. It will mean that the Government of this Colony will have to order netting of an entirely different character to that which it is now using.

*Mr. Lascelles*: Well, but I contend that therein they will save money.

*Dr. Wilkinson*: Under those circumstances, then, I have no objection at all to this motion.

*The Chairman*: If this motion is carried it will be necessary for this Royal Commission to authorize a committee to issue advertisements in Victoria requesting those gentlemen who have had experience in connection with rabbit-proof fences to appear in Melbourne and give evidence. If it were done in any other way, it is quite possible that it might be said that the proceeding is a hole-and-corner one. I think, therefore, that there should be a public notification that the Commission propose to obtain Victorian evidence, and then a session can be held in due course. All the members of the Commission will receive notice of this meeting—the representatives from Victoria definitely undertaking to be present. I may add, in conclusion, that this would not tie the hands of the Commission at subsequent meetings from taking further evidence, if it were thought necessary to do so.

The motion was then unanimously carried, and the Committee were authorized to issue advertisements calling for evidence to be taken in Melbourne at such time as the Committee may appoint.

*Dr. Wilkinson* reported that he had made inquiry concerning a building suitable for experiments on animals to be conducted by the Committee. The Biological Institute, formerly occupied by Baron MacLay was unsuitable, as it was not provided with gas. It was possible that rooms in every way suitable might be placed at the disposal of the Commission in the new Physical Laboratory at the University by Professor Threlfall, with the sanction of the Senate. It was resolved that *Dr. Wilkinson* be authorized to confer further with Professor Threlfall on the matter.

Letters were read from *Dr. Marano* and *Mr. William Darchy*, the former asking to be allowed to obtain rabbits for experiments, and the latter requesting permission to enclose rabbits to experiment on them with various poisons. It was ordered that the letters be returned to the Under Secretary for Lands; that *Dr. Marano* be informed that he has not shown that his experiments in any way concern the work of the Commission; and that in respect of *Mr. Darchy's* application the Committee see no reason why his request should not be granted. Referring to a letter from the Under Secretary for Lands requesting that the particular purposes for which the advance of £500 was required should be stated for the information of the Treasury, *Dr. Wilkinson* was empowered to furnish schedule showing the approximate character of the expenses which will be incurred by the Commission.

*Dr. Stirling* moved,—“That cheques payable from the account of the Commission be signed by the President (*Dr. MacLaurin*) and one other member of the Commission, and be countersigned by the Secretary.” *Dr. Wilkinson* seconded, and the motion was carried.

*Dr. Stirling* moved,—“That on or about the 23rd of May the Commission meet in Adelaide, and investigate the action of the disease known as rabbit scab, and subsequently proceed to Silvertown, and if necessary to Tintinallong or elsewhere, to take evidence concerning the effects of the disease submitted for the consideration of the Commission by *Drs. Butcher and Ellis*; that the New South Wales Government be informed of the intention of the Commission, and be requested to instruct the Rabbit Inspectors who have had experience concerning the Tintinallong outbreak to be prepared to give evidence at Silvertown, and be requested also to invite the South Australian Government to provide facilities for the work of the Commission in that Colony.” The motion was seconded by *Dr. Wilkinson*, and carried.

*Dr. Stirling* moved,—“That Professor Allen be the convener of such meeting.” *Dr. Wilkinson* seconded, and the motion was carried.

*Mr. Pearson* moved,—“That two shall form a quorum of the Committee appointed to watch experiments.” *Dr. Stirling* seconded, and the motion was carried.

It was ordered that as soon as the report of the Correspondence Committee be completed it should be printed and circulated amongst the members; also that it be incorporated in the final report of the Commission.

It was also decided that the committee appointed to watch experiments should be requested to scrutinize the correspondence received bearing on the mechanical devices now in possession of the Minister for Lands.

It was also decided to request the same committee to elect a chairman to take general control of the experiments about to be conducted.

*Dr. Ellis* was then afforded an interview, and in reply to his questions the Chairman gave him certain information with respect to the intention of the Commission in dealing with the Tintinallong disease.

*Mr. Bell* proposed,—“That the thanks of the Commission be tendered to Professor Allen for his conduct in the Chair.” The motion was carried by acclamation. Professor ALLEN replied briefly, thanking the Commission for the vote.

The Commission then adjourned.

FRIDAY, 18 MAY, 1888.

The Commission met, informally, at 10 a.m., at the Crown Lands Office, Melbourne.

Present:—

*Victoria*: HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq.  
EDWARD HAREWOOD LASCELLES, Esq.  
*New Zealand*: ALFRED DILLON BELL, Esq.  
*Queensland*: JOSEPH BANCROFT, Esq., M.D.

In the absence of the President (*Dr. MacLaurin*), the Chair was taken by Professor ALLEN.

Robert Fawell Hudson and Alfred Lamb Gilbert were called in and gave information concerning the progress of the alleged disease amongst rabbits at Tintinallong.

The Commission adjourned.

MONDAY,

MONDAY, 21 MAY, 1888.

The Commission met at 10 a.m., at the Crown Lands Office, Melbourne.

*Present* :—

*New South Wales* : WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.  
*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
EDWARD HAREWOOD LASCELLES, Esq.  
ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.  
*New Zealand* : ALFRED DILLON BELL, Esq.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.  
*Tasmania* : THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

The following witnesses were called in and examined :—Charles Myles Officer, Agar Wynne, Joseph M'Gaw, John Bertram, Andrew Anderson, George Henry Greene, Edmund Hayes, James Finlay, Alexander M'Edwards, William Cumming, Hugh M'Cann, Robert Blyth Kerr.

Dr. WILKINSON moved,—“That the same questions regarding wire-netting fences be asked of the witnesses who may be examined at Silvertown.”

Mr. LASCELLES seconded. The motion was agreed to.

The Commission then adjourned.

WEDNESDAY, 23 MAY, 1888.

The Commission met at 10 a.m., at the office of the Commissioner of Crown Lands, Adelaide.

*Present* :—

*New South Wales* : WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.  
*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.  
EDWARD HAREWOOD LASCELLES, Esq.  
*New Zealand* : ALFRED DILLON BELL, Esq.  
*South Australia* : EDWARD CHARLES STIRLING, Esq., M.D.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.  
*Tasmania* : THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Dr. STIRLING.

The following witnesses were called in and examined :—Allan M'Farlane, Archibald Watson, James Francis Cudmore.

Dr. Stirling then left the Chair, which was taken by Professor ALLEN.

The following witnesses were then called in and examined :—Andrew Smith, Herbert Bristow Hughes.

Dr. STIRLING then resumed the Chair.

The following witness was then called in and examined :—George Riddock.

Dr. Stirling again left the Chair, which was taken by Professor ALLEN.

The following witness was then called in and examined :—Peter Waite.

Mr. TABART moved,—“That with a view to economize the time of the Commission, and in order to enable the Sydney experiments to be proceeded with at the earliest possible date, leave of absence from the further sittings of the Commission at Adelaide and Silvertown be granted to Dr. Bancroft, Dr. Wilkinson, Mr. Bell, and Mr. Tabart, and that they be instructed to proceed forthwith to Tintinallong Station, to make investigations there on behalf of the Commission, into the rabbit disease existing in that locality.”

Dr. WILKINSON seconded, and the motion was carried.

Prof. ALLEN moved,—“That the members so appointed be constituted an Executive Committee of the Commission, and be requested to furnish a written report to the Commission.”

Dr. STIRLING seconded the motion, which was carried.

The Commission then adjourned.

SATURDAY, 26 MAY, 1888.

The Commission met at 10 a.m., at Silvertown.

*Present* :—

*New South Wales* : EDWARD QUIN, Esq.  
*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
EDWARD HAREWOOD LASCELLES, Esq.  
*South Australia* : ALEXANDER STUART PATERSON, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

The following witnesses were called in and examined :—William Hogarth, Arthur Torrens.

MONDAY,

MONDAY, 28 MAY, 1888.

The Commission met at 10 a.m., at Silverton.

*Present* :—

*New South Wales* : EDWARD QUIN, Esq.  
*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
 EDWARD HAREWOOD LASCELLES, Esq.  
*South Australia* : ALEXANDER STUART PATERSON, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

The following witnesses were called in and examined :—Herbert Pickering Butcher, M.R.C.S. Eng., Charles William Reid, Herbert Pickering Butcher (recalled and re-examined), Alexander Bell, Harry Edmund Viudin, Abram John Clarke, John Andrew O'Flaherty, John Lynden M'Maugh, Mark James Curry Tully, David Brown, James Charles Wilkinson Crommolin, Henry Prideaux Richardson, John Andrew O'Flaherty (recalled and re-examined), Thomas Henry Elwin, George Urquhart, John Binnie.

The Commission then adjourned.

TUESDAY, 29 MAY, 1888.

The Commission met at 2:30 p.m., at the office of the Commissioner of Crown Lands, Adelaide.

*Present* :—

*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
*South Australia* : EDWARD CHARLES STIRLING, Esq., M.D.  
 ALEXANDER STUART PATERSON, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Dr. STIRLING.

The following witnesses were called in and examined :—Charles Jonas Valentine, Samuel Graü Hübbe, John Miller.

The Commission then adjourned.

WEDNESDAY, 6 JUNE, 1888.

The Commission met at 10:30 a.m., at the Crown Lands Office, Melbourne.

*Present* :—

*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
 ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN. Edward Micklethwaite Curr was called in and examined.

The Commission then adjourned.

TUESDAY, 19 JUNE, 1888.

The Commission met at 2:30 p.m., at the Colonial Secretary's Office, Sydney.

*Present* :—

*New South Wales* : WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
 ALFRED NAYLOR PEARSON, Esq.  
 EDWARD HAREWOOD LASCELLES, Esq.  
*New Zealand* : ALFRED DILLON BELL, Esq.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN. The Commission deliberated, and adjourned to Thursday next at 11 o'clock.

THURSDAY, 21 JUNE, 1888.

The Commission met at 11 a.m., at the Colonial Secretary's Office, Sydney.

*Present* :—

*New South Wales* : WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
 ALFRED NAYLOR PEARSON, Esq.  
 EDWARD HAREWOOD LASCELLES, Esq.  
*South Australia* : EDWARD CHARLES STIRLING, Esq., M.D.  
 ALEXANDER STUART PATERSON, Esq., M.D.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

The evidence taken at Tintinalloggy by the Executive Committee was received and ordered to be embodied in the printed evidence taken by the Commission.

Dr. BANCROFT and Dr. WILKINSON offered to furnish reports in writing of their individual observations during their visit to Tintinalloggy. It was resolved that such reports be accepted with thanks, and be printed among the proceedings of the Commission.

Dr. PATERSON handed in, on behalf of the Government of South Australia, papers *re* Bladder Fluke, by Mr. Coleman Phillips, of New Zealand.

It was ordered that the papers be placed with other correspondence 2421, on same subject, and that receipt of same be acknowledged.

A deputation was received from the Wynne-Hudson Rabbit Trapping and Preserving Company, introduced to the Commission by Mr. Sydney Burdekin, M.P., asking that a 5-mile block of land should be set apart for the use of the Company, and that the Commission should test the trap patented by Mr. Wynne.

After discussion, the CHAIRMAN informed the deputation that their scheme would have the consideration of the Commission.

Dr. WILKINSON having made a statement of the negotiations between the Experiment Committee and the representatives of M. Pasteur,\* and the correspondence and reports of proceedings of the Committee having been read and considered,

Dr. STIRLING moved:—"That the representatives of M. Pasteur be informed that the experiment which they propose to perform is not satisfactory to the Commission—that even if it be attended with positive results the Commission will not be able to infer that the disease will spread from rabbit to rabbit under natural conditions; that the Commission refuses to permit any broadcast dissemination of chicken-cholera microbes on any inland area until satisfactory proof shall have been given by experiments approved by the Commission, (1) That the disease is capable of spreading freely from rabbit to rabbit; (2) That the disease is innocuous to domestic animals; and that the Commission express its surprise that as M. Pasteur is seeking to obtain a reward of £25,000 for his scheme, his representatives should have absolutely declined to permit the fullest testing of its merits. The Commission will not object to the conduct of an experiment on the lines laid down by M. Pasteur; but it requests a final answer without delay whether M. Pasteur's representatives will allow the experiments proscribed by the Commission to be conducted, and whether they will furnish rabbits suffering from chicken-cholera for the purpose of experiments under the direction of the Commission. If M. Pasteur's representatives do not assent to these conditions the Commission will report accordingly to the Government of New South Wales, and will recommend, (1) That correspondence with M. Pasteur and his representatives be suspended; (2) That the permission granted to M. Pasteur's representatives to introduce into New South Wales and keep in New South Wales the microbes of chicken-cholera, and to perform experiments on rabbits with a view of maintaining a supply of the microbes in active state, be withdrawn; (3) That steps be taken to obtain the microbes of chicken-cholera from other sources, so that the utility of this disease for the extermination of rabbits may be tested in a satisfactory manner."

Dr. PATERSON seconded. The motion was unanimously carried.

Dr. BANCROFT moved,—“That Dr. Stirling be requested to obtain 12 tame rabbits (10 does and 2 bucks) from Adelaide, for the purpose of experiment.”

Mr. LASCELLES seconded. The motion was carried.

Dr. PATERSON moved,—“That the Commission advises that Drs. Butcher and Ellis be granted permission to employ the so-called Tintinology disease among rabbits in such districts as they may desire, provided that the places in which the disease is being employed be notified to the Commission.”

Mr. PEARSON seconded. The motion was carried.

It was ordered that a copy of this resolution be forwarded to the Minister, and that the Minister be requested to give the required permission to Dr. Ellis as soon as possible, as fears have been expressed that the control of the disease may be lost.

A minute having been received from the Hon. the Secretary for Lands, drawing attention to a complaint by the Parliamentary representatives of Balmain, that the rabbit experiments at Rodd Island might prove dangerous to the health of their constituents,

Mr. PEARSON moved,—“The Commission begs to report that all possible precautions have been taken to prevent the carriage of contagion from Rodd Island; the experiments will be conducted in an enclosure already surrounded and roofed with fine wire gauze; the drainage from the enclosure will be caught in a disinfecting tank; there is a broad belt of water around the island; and the Commission is satisfied that public health will not be endangered in the least by the experiments which will be conducted.”

Dr. BANCROFT seconded. The motion was carried.

The report of the Correspondence Committee† was adopted on the motion of Dr. STIRLING, seconded by Dr. WILKINSON; and the thanks of the Commission were given to Mr. Pearson for his services in the compilation of the report.

Dr. WILKINSON moved:—"That letters be addressed to Messrs. Bishop, Lanferon, Laplanche, Graham, and Richardson, asking for further particulars in support of their statements."

Dr. STIRLING seconded. The motion was carried.

The Commission adjourned to 10 o'clock on the following day.

#### FRIDAY, 22 JUNE, 1888.

The Commission met at 2 p.m., at the Colonial Secretary's Office, Sydney.

#### Present:—

*New South Wales:* WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.

*Victoria:* HARRY BROOKES ALLEN, Esq., M.D.

ALFRED NAYLOR PEARSON, Esq.

EDWARD HAREWOOD LASCELLES, Esq.

*South Australia:* EDWARD CHARLES STIRLING, Esq., M.D.

ALEXANDER STUART PATERSON, Esq., M.D.

*New Zealand:* ALFRED DILLON BELL, Esq.

*Queensland:* JOSEPH BANCROFT, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Mr. BELL said that with regard to the resolution adopted yesterday, dealing with the correspondence and interviews between the Experiment Committee and the agents of M. Pasteur, he wished to

\* See Section VII. of Report.

† See Appendix I. to this Report.

to express his entire concurrence with that resolution. The work of the Experiment Committee had been very much hampered by the trouble that had arisen with M. Pasteur's agents; and their desire had been to consider the nationality of these gentlemen and the distance they had come. The Committee had used every possible means of arriving at a *modus vivendi*. The Committee had gone a great deal further in that than they would have gone had they had to deal with ordinary people and ordinary circumstances. The resolution was one which he had been personally anxious to see carried in almost the identical form in which it appeared, and he had great pleasure, as a member of the Experiment Committee, whose action was reviewed by this resolution, in expressing his complete concurrence with it.

Mr. BELL moved,—“That Dr. Ellis be requested to forward to Dr. Katz, as soon as possible, fifty rabbits suffering from the so-called Tintinallgy disease; and if fifty are not quickly available, to send, in the first instance, such number as may be forthcoming.”

Mr. LASCELLES seconded. The motion was carried.

Mr. LASCELLES moved,—“That this Commission recommends the Governments of the respective Colonies to issue licenses, under suitable conditions, to responsible persons, who may desire to keep rabbits in confinement for the purpose of poison experiments.”

Dr. PATERSON seconded. The motion was carried.

Dr. BANCROFT moved,—“That the Commission recommends that licenses to keep rabbits in confinement be granted by the Governments of each Colony to any competent persons who may desire to conduct pathological inquiries concerning the destruction of rabbits.”

Dr. STIRLING seconded. The motion was carried.

It was ordered that these resolutions be transmitted to the Honorable the Secretary for Lands, and that he be requested to forward copies of them to the Governments of the other Colonies.

Dr. BANCROFT moved,—“That Sir James Hector and Professor Thomas, of New Zealand, be requested to confer with the Experiment Committee when visiting Australia, and be thanked for the assistance already rendered.”

The Chairman of the Experiment Committee reported that on 2nd May the following resolution was adopted by the Committee:—“That the expenses of the Executive Committee be defrayed by the various Governments represented on the Commission, in a proportion to be fixed by the said Governments,” and that such resolution was at once forwarded to the Government of New South Wales. He desired to move that the action of the Committee be confirmed.

In answer to a question the Chairman of Committee explained that the motion referred only to the personal expenses of members of the Experiment Committee in connection with the conduct of experiments on behalf of the full Commission during its first adjournment.

Subject to this explanation it was resolved, on the motion of Dr. WILKINSON, seconded by Mr. PEARSON,—“That the recommendation of the Experiment Committee be adopted, and that a copy of this resolution, and of the explanation relating thereto, be sent to the Minister for Lands.”

Dr. STIRLING moved,—“That, subject to the explanation of the Chairman of the Experiment Committee on the question as to the personal expenses of its members, the report of the Committee be taken as read, adopted, ordered to be printed, and incorporated with the proceedings of the Commission. (2.) The Commission expresses its thanks to the members of the Experiment Committee for the thorough and satisfactory manner in which they have discharged the important duties committed to them.”

Mr. LASCELLES seconded. The motion was unanimously carried.

Mr. BELL moved,—“That the Commission tender to the Government of New South Wales its thanks for the readiness and liberality with which the necessary assistance has been rendered to the Commission, especially in respect to the rapid and satisfactory completion of the works at Rodd Island.”

Mr. PEARSON seconded. The motion was carried.

The thanks of the Commission were then unanimously tendered to Professor Allen for his services as Chairman.

On resuming in the afternoon the chair was occupied by Dr. BANCROFT, and subsequently by Dr. STIRLING.

Dr. PATERSON moved,—“That Dr. Wilkinson be the convener of the next meeting of the Commission.”

Mr. LASCELLES seconded. The motion was carried.

Dr. STIRLING moved,—“That the Government of New South Wales be asked to accelerate the printing of the proceedings of the Commission to date; that after correction of the proofs six copies be forwarded to each member of the Commission; and that the Government of New South Wales be asked if they have any objection to the same being at the disposal of the Commissioners as part of any progress report they may desire to forward to their respective Governments.”

Dr. BELL seconded. The motion was carried.

It was ordered that, in conformity with this resolution, the Secretary ascertain from the Government of New South Wales whether the request of the Commissioners as to the use of the report as progress report for the various Governments has been acceded to, and that an intimation to this effect be forwarded with the documents.

Mr. LASCELLES moved,—“That the Secretary be instructed to write to the Minister for Lands stating that the evidence regarding the use of wire netting has been obtained; and that if he desires it the Commission is now prepared to come to a decision and send in an advance report on the subject.”

Dr. PATERSON seconded. The motion was carried.

Mr. BELL moved,—“That the Experiment Committee be authorized to subject to experiment, on the general experimental lines already laid down, any disease that may be submitted to them for examination, and that may seem to them to be worth investigation.”

Dr. STIRLING seconded. The motion was carried.

Dr. STIRLING moved,—“That in case of the representatives of M. Pasteur acceding to the proposals of the Commission embodied in the resolution of the 21st June, it be an instruction to the Experiment Committee to carry them out according to the instructions laid down; and in the case of the representatives of M. Pasteur declining to accede to such proposals or to such reasonable modifications thereof (not in any way traversing the general principles already determined in the resolution of the 21st June) as may seem to the Experiment Committee to be acceptable, the said Committee be instructed to make arrangements for getting a supply of the microbes from Europe, and to proceed with the authorized experiments.

Mr. PEARSON seconded. The motion was carried.

The

The Secretary submitted correspondence received since last meeting—the correspondence including a large number of applications for the Government reward.

It was ordered that the documents be referred to the Correspondence Committee for report to the Commission at its next meeting. The first report, already printed, to be headed "Interim Report."

It was also ordered that two rubber stamps be procured—one (small) inscribed "Correspondence Committee Rabbit Commission, Sydney, N.S.W.;" the other (large) inscribed "Intercolonial Rabbit Commission, Sydney, N.S.W."

The Commission then adjourned.

SATURDAY, 18 AUGUST, 1888.

The Commission met at 10 a.m., at the Crown Lands Office, Melbourne.

*Present:—*

*New South Wales:* WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.

*Victoria:* HARRY BROOKES ALLEN, Esq., M.D.

ALFRED NAYLOR PEARSON, Esq.

EDWARD HAREWOOD LASCELLES, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

A letter was read from the Government Printer, stating that the delay in printing the evidence of the Royal Commission arose from the necessity of completing work left over by Parliament. It was decided that the Secretary should urge the Printer to hasten the printing of the proceedings of the Commission.

A report was read from Dr. Katz, chief expert, on the experiments carried out at Rodd Island by the representatives of M. Pasteur.\*

The report was received, ordered to be printed, and embodied in the transactions of the Commission.

A statement was made by Dr. WILKINSON to the effect that Sir Henry Parkes, Acting Minister for Lands, had sent for him, and stated that the representatives of M. Pasteur had expressed a wish to sever their connection with the Commission. Dr. Wilkinson added that he had submitted a memo. to Sir Henry Parkes, explaining the situation. He had previously received an application from the agents of M. Pasteur, asking to be allowed to make experiments in the open country. To this he had replied that no experiments in the open could be allowed until the laboratory experiments were completed. Since giving this reply no further communication had been received from the agents of M. Pasteur.

It was resolved to obtain from the Colonial Secretary's Office, a copy of the memo. forwarded to Sir Henry Parkes, the same to be included in a written report by Dr. Wilkinson to be embodied in the proceedings of the Commission.

Mr. PEARSON proposed,—“That a copy of the resolution already adopted by the Commission ‘That no experiments would be permitted in the open until the laboratory experiments proved that chicken-cholera would spread effectively from rabbit to rabbit,’ be forwarded to Sir Henry Parkes in confirmation of the action of the Chairman of the Experiment Committee.”

Mr. LASCELLES seconded. The motion was agreed to.

In answer to the Chairman, Dr. WILKINSON reported that cultures of microbes of chicken-cholera were in possession of Dr. Katz, and that Dr. Katz was now making experiments with them.

Dr. WILKINSON also stated that the experiments specified by the Commission in its schedule concerning chicken-cholera were on the point of being carried out; that the necessary cultivations had been in progress for some days; that M. Pasteur's representatives were aware that such experiments were about to be conducted; that a difficulty had arisen concerning the right which M. Pasteur's representatives had been disposed to assume of visiting the laboratory at any time in connection with the experiments of the Commission; that Dr. Wilkinson had pointed out that such indiscriminate visiting to experiments of this nature could not be permitted, but that stated times for visits must be arranged.

Dr. Wilkinson's report was received, and his action confirmed.

Dr. WILKINSON also reported that no further communications had been received from Drs. Butcher and Ellis, with regard to the so-called Tintinology disease. He was unable to say when rabbits affected with this disease would be available, adding that no experiments with this disease had been conducted under the Commission, owing to rabbits not having been supplied.

It was resolved that a communication be addressed both to Dr. Butcher and Dr. Ellis, asking whether their experiments are being conducted in any new country, in accordance with the permission granted on 21st June last, and inquiring when they would be able to provide twenty rabbits, suffering from the said disease, for the purpose of experiments under the direction of the Commission; that Messrs. Butcher and Ellis be also reminded that the permission granted to them to establish this so-called disease in fresh country was merely intended to prevent the disease from being lost, and did not involve approval of their scheme by the Commission.

At the instance of the Commission, Dr. WILKINSON undertook to cause progress reports of each series of experiments to be distributed to the members of the Commission as soon as possible.

Dr. WILKINSON reported that Dr. Fischer had recently arrived in Sydney, and had handed to Dr. Katz specimens which he said were the microbes of chicken-cholera and of rabbit septicaemia. On examination, Dr. Katz found that the cultures of chicken-cholera microbes were contaminated, and that those of rabbit septicaemia were dead. Hence no experiments were made with such cultures.

Letters were read from Dr. MacLaurin, resigning, on account of the pressure of official duties, his position as President of the Commission, and from the Principal Under Secretary, intimating that Dr. MacLaurin's resignation, as a member of the Commission, had been accepted.

It was decided that Dr. MacLaurin's resignation be accepted with regret, and that he be so informed.

Mr. LASCELLES moved,—“That the Chairman of the Experiment Committee (William Camac Wilkinson, Esq., M.D., M.P.) and the Secretary be empowered to sign all cheques on behalf of the Commission; and that the Treasury be informed accordingly.”

Mr. PEARSON seconded. The motion was agreed to.

Regarding

## EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 33

Regarding the classified list of mechanical contrivances submitted to the Commission, the Secretary reported that, in accordance with the wish of the Under Secretary for Lands, he had engaged the assistance necessary to make out the lists required; but was then informed, by direction of the Under Secretary, that the list would be prepared in the Department of Lands.

It was decided that a meeting of the Commission should be held in Melbourne towards the end of September next, on such date as the Chairman of the Experiment Committee may determine, for receiving a progress report concerning experiments with disease, and to take the evidence of landholders from the Lower Darling concerning the rabbit plague.

It was further resolved that preliminary notice of the intended meeting be at once forwarded to the representatives of the various Colonies, and to the Government of Queensland.

The Commission then adjourned.

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SATURDAY, 13 OCTOBER, 1888.

The Commission met at 12 (noon), at the Crown Lands Office, Melbourne.

*Present:—*

<i>New South Wales:</i>	WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.
<i>Victoria:</i>	HARRY BROOKES ALLEN, Esq., M.D. ALFRED NAYLOR PEARSON, Esq. EDWARD HAREWOOD LASCELLES, Esq.
<i>New Zealand:</i>	ALFRED DILLON BELL, Esq.
<i>South Australia:</i>	EDWARD CHARLES STIRLING, Esq., M.D. ALEXANDER STUART PATERSON, Esq., M.D.
<i>Queensland:</i>	HENRY TRYON, Esq.
<i>Tasmania:</i>	THOMAS ALFRED TABART, Esq.

The Chair was taken by Professor ALLEN.

Mr. TRYON presented a document from the New South Wales Government appointing him one of the representatives of Queensland on the Commission.

In reply to the Chairman, Mr. TRYON stated that Dr. Bancroft, of Queensland, was still a member of the Commission.

The Secretary stated that the usual notice of meeting had been forwarded to Dr. Bancroft.

The Secretary read a letter from Mr. Quin stating that it was impossible for him to attend the present meeting.

The CHAIRMAN read letters from various members of the Commission, and from the Secretary, with regard to the progress of experiments, &c., at Rodd Island. Also letters from H. P. Butcher, Esq., M.D., and C. W. Reid, Esq., of Tintinallong, complaining that their accounts for expenses had not been attended to by the Secretary, and intimating that no infected rabbits would be forwarded until such accounts were paid and a guarantee given to refund the cost of the carriage of such rabbits to Sydney.

The Secretary handed in the claims of Dr. Butcher and Mr. Reid for £47 5s. and £18 18s. respectively; also a claim by Dr. Ellis for £25 for expenses; and a further claim by the Commissioner for Railways for £5, value of a pass over the railways which had been issued to Dr. Ellis.

The claims referred to, and the correspondence between Dr. Butcher and Mr. Reid and the Secretary, having been considered,

Mr. BELL moved,—“That the allowance to witnesses giving evidence before the Commission be as follows: The actual value of coach fare, or in lieu thereof a mileage allowance of 1s. 6d. per mile one way, together with £1 1s. per day for personal expenses.”

Dr. STIRLING seconded. The motion was carried.

It was further resolved as follows:—“That as a matter of routine those witnesses only shall be paid their expenses who have been summoned by the Commission of its own motion; and that the expenses of other witnesses be dealt with as the cases arise;

“That the expenses of C. W. Reid be paid on the above scale;

“That the claim of Dr. Ellis for £25 be allowed to stand over;

“That, with reference to the cost of the free pass issued to Dr. Ellis, a letter be addressed to the Under Secretary for Lands, inquiring what was the exact nature of the representations alleged to have been made by the Commission to the effect that Dr. Ellis' presence at Silvertown was necessary; whether such representations were in writing; and, if so, to ask for a copy thereof;

“That, in the opinion of the Commission, the Secretary had no option but to hold over these accounts for the consideration of the Commission.”

Dr. STIRLING moved:—“That the Commission again requests Drs. Butcher and Ellis, as speedily as possible, to forward to Sydney fifty rabbits suffering from the so-called Tintinallong disease, or such less number as may be forthcoming, the Commission undertaking to defray the expenses of conveying such rabbits to Sydney.”

Dr. PATERSON seconded. The motion was carried.

In response to a request by the Chairman, Dr. WILKINSON, M.P., made a statement with regard to the progress of experiments at Rodd Island.

A similar statement was made by Mr. TRYON, who had visited the experimental station.

Further consideration of this matter was postponed till Monday, 15th October.

A letter was read from Dr. Marano, of Sydney, asking for the use of Rodd Island for a fortnight to carry out a series of experiments for the extermination of rabbits. A minute of the head of the Rabbit Department thereon was also read, stating that in the event of such application being complied with, Dr. Marano was willing to defray any expenses incidental to his use of the Island.

It was resolved that in this and in all similar applications a sketch of the process to be adopted must be, in the first place, supplied to the Chairman of the Experiment Committee, and that the Chairman of the Experiment Committee should be authorized, at his discretion, to give or to withhold permission for the conduct of such experiments.

The CHAIRMAN read a statement (made in lieu of evidence) by Mr. E. H. Lascelles on the Rabbit Question.

It was ordered that the statement should be inserted in the Report of the Commission.

Mr. LASCELLES moved:—"That as the evidence from practical landowners or lessees who have erected wire-netting fences for the purpose of checking the spread of rabbits is almost unanimous in agreeing that netting 36 inches wide and of 1½-in. mesh is a sufficient fence, this Commission recommends the Minister for Lands to allow the use of such netting."

Subsequently the motion was withdrawn, and the following substituted by the mover:—"That this Commission is of opinion that in view of the great saving in cost, and almost equal efficiency for practical purposes of wire-netting of 3 ft. in height and 1½-in. mesh, as compared with netting of 3 ft. 6 in. in height and 1½-in. mesh (this being shown by a considerable proportion of the evidence taken), the use of netting of 3 ft. in height and 1½-in. mesh might be permitted by the Government of New South Wales."

Mr. BELL seconded. The motion was carried.

The Commission adjourned.

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MONDAY, 15 OCTOBER, 1888.

The Commission met at 9.30 a.m., at the Crown Lands Office, Melbourne.

*Present:—*

<i>Victoria:</i>	HARRY BROOKES ALLEN, Esq., M.D. ALFRED NAYLOR PEARSON, Esq.
<i>New Zealand:</i>	ALFRED DILLON BELL, Esq.
<i>South Australia:</i>	EDWARD CHARLES STIRLING, Esq., M.D. ALEXANDER STUART PATERSON, Esq., M.D.
<i>Queensland:</i>	HENRY TRYON, Esq.
<i>Tasmania:</i>	THOMAS ALFRED TABART, Esq.

The Chair was taken by Professor ALLEN.

A letter was read from Mr. A. N. Pearson stating that information was required concerning the preference which rabbits have for different kinds of poisons and for different flavouring substances, and remarking that Dr. Katz was willing to undertake experiments if desired to do so.

It was resolved, on the motion of Mr. BELL,—“That, provided such experiments be not allowed to interfere with, or delay experiments concerning disease, the Commission authorizes their performance, and requests Mr. Pearson to give the necessary instructions as to the nature of these experiments to Dr. Katz.”

Mr. Pearson also wrote drawing attention to two diseases recently discovered, and said to be peculiar to rabbits—namely, rabbit enteritis, discovered by Professor Ribbert, of Bonn; and a disease analogous to swine plague, but distinct from it, described by Professor Loeffler.

On the motion of Dr. STIRLING it was resolved,—“That Dr. Katz be requested to address letters to Professor Ribbert and Professor Loeffler, asking for particulars concerning these diseases; and, if possible, obtaining cultivations of the organisms of such diseases.”

With regard to the theory published by Dr. Gammaleia, of Odessa, that the microbes of chicken cholera existed naturally in the intestines of birds, it was resolved that Dr. Katz be authorized to make such experiments as he may think fit to test this theory.

James Ormond was called in and examined.

Mr. BELL moved,—“That the following experiment be tried at Rodd Island: That the Rodd Island enclosure be divided into two equal parts—A and B—by rabbit-proof netting, the two divisions to be separated by a clear space of one yard. Division A to include, as far as possible, existing burrows; new burrows to be formed in division B. That fifty healthy rabbits be turned loose in each division. That the rabbits in each division be fed and sheltered in like fashion. That five (5) rabbits, specially marked, be separately fed with green stuff, to which, in the case of each rabbit, 2 ccm. of broth, containing chicken-cholera microbes, have been added; and that after the meal these rabbits be placed in division A. That at the close of a week five other rabbits, differently marked, be similarly fed and placed in division A. That at the close of another week the process be repeated. That at the close of another week the experiment be terminated. That the five rabbits first fed with microbes, if they should die, be left in the enclosure. That other rabbits subsequently dying in either enclosure be also left, provided that great nuisance does not arise. That as soon as possible after the death of any rabbit in either enclosure, some blood be obtained from it with as little disturbance of the body as possible; and be examined so as to determine whether death was due to chicken-cholera. That, subject to the general intent of this experiment, Dr. Katz be authorized to exercise his discretion in matters of detail.”

Dr. STIRLING seconded. The motion was carried.

It was resolved, on the motion of Mr. TRYON, seconded by Mr. PEARSON,—“That the Secretary write to the Department of Lands, stating that a crucial and possibly a final experiment with chicken-cholera is about to be performed by the Commission; and ask that 150 rabbits be delivered, *alive*, at Rodd Island as speedily as possible. Also, to state that the date on which this crucial experiment will be completed will depend, in the first instance and mainly, on the promptitude with which rabbits can be supplied.”

It was further resolved,—“That from time to time, during the term of the large experiment just ordered, rabbits infected with chicken-cholera be placed in the aviary and allowed to die and remain there. That some fowls, with pigeons and other birds, be kept in that aviary during the term of the large experiment. That in case of death of any birds the cause of death be ascertained;

“That”

## EXTERMINATION OF RABBITS IN AUSTRALASIA—REPORT OF PROCEEDINGS. 35

“That Dr. Katz be requested to ascertain, by laboratory experiments, what is the influence of simple desiccation, at various temperatures, on the microbes of chicken-cholera;

“That a letter be sent to Mr. Reid, of Tolarno, asking whether Boolka Island is still available for experiments as to the use of disease for the extermination of rabbits; whether the island is still infested with rabbits; whether the rabbits are now healthy; and what arrangements would be necessary if experiments on the island were to be conducted.”

The CHAIRMAN drew the attention of the Commission to the difficulties experienced in the prompt conduct of its business, arising from the resignation of the President and the non-appointment of a successor. He suggested that the Government of New South Wales be requested to appoint, as speedily as possible, a representative who would be fully competent to undertake the duties which Dr. MacLaurin had been compelled, by pressure of his official work, to relinquish.

MR. BELL reviewed the past proceedings of the Commission. He concurred with the Chairman that the appointment of a President was essential to the prompt and effective conduct of the work of the Commission; but, speaking for himself, he would move that Professor Allen be requested to accept the office of President. He felt sure that every member of the Commission appreciated the energy and ability with which Professor Allen, as Chairman, had conducted the business of the Commission; and he was satisfied that no other appointment would lead to equally satisfactory results.

Dr. STIRLING seconded the motion, and several other members having spoken,

Professor ALLEN thanked the members present for their appreciation of any services which he had been able to render; but said that, in his opinion, it was in every way advisable that the President should be a representative of New South Wales, and should be resident in Sydney. His own time, too, was already engrossed. He therefore was unable to consent to his nomination as President, unless the Government of New South Wales found it impossible to induce any competent gentleman in that Colony to accept the position.

Dr. STIRLING moved:—“That the Government of New South Wales be informed that the work of the Commission has been, and is still being, greatly hindered by the absence of a President to actively direct the work of the Commission. That this Commission respectfully urge the immediate appointment of a thoroughly qualified representative of New South Wales as President, possessing the scientific attainments, the business ability, and the time to act as working President of the Commission, in the room of Dr. MacLaurin, who has resigned. That in the opinion of this Commission the appointment of either the Hon. Dr. Mackellar, Professor Anderson Stuart, or Dr. F. Norton Manning, would meet these requirements. That in the event of all these gentlemen declining absolutely to undertake the important duties of President, the Commission requests that Professor Allen, of Melbourne, be without delay appointed to the position. In the event of such appointment of Professor Allen, it is still advisable that the vacancy in the representation of New South Wales be filled at once, and the Commission suggests that Dr. Ashburton Thompson be appointed. The Commission has considered the letter from the Under Secretary for Lands, dated 25th August, inquiring as to the time and expenditure which will be involved in its further work; but is unable to reply explicitly until the difficulty concerning the Presidency shall have been removed. The Commission, therefore, urge that immediate action be taken in accordance with its request, so that unnecessary loss of time may be prevented.”

MR. BELL seconded. The motion was carried.

The Commission adjourned.

## TUESDAY, 16 OCTOBER, 1888.

The Commission met at 9:30 a.m., at the Crown Lands Office, Melbourne.

*Present:*

<i>Victoria:</i>	HARRY BROOKES ALLEN, Esq., M.D. ALFRED NAYLOR PEARSON, Esq.
<i>New Zealand:</i>	ALFRED DILLON BELL, Esq.
<i>South Australia:</i>	EDWARD CHARLES STIRLING, Esq., M.D. ALEXANDER STUART PATERSON, Esq., M.D.
<i>Queensland:</i>	HENRY TRYON, Esq.

The Chair was taken by Professor ALLEN.

It was resolved that the Chairman should be empowered to examine the minutes of previous meetings, and sign them after any needful amendment.

The CHAIRMAN submitted a plan for the rearrangement of the evidence and papers to be included in the Report of the Commission.

The Secretary was instructed to write to the Commissioner of Crown Lands, Adelaide, asking for a statement of the annual expenditure, by Government only, for the last seven years on rabbit destruction in South Australia.

It was resolved that Dr. Katz be requested to furnish a description of the symptoms and post-mortem appearances in fowls suffering from *choléra des poules*, as detailed by M. Pasteur, and to add thereto any comments which he may think necessary.

It was further resolved that Professor Thomas' report on the disappearance of the rabbits in the Wairarapa district of New Zealand be printed in full.

The CHAIRMAN then submitted a draft of the general lines on which a progress report might be drawn up. General discussion ensued.

MR. BELL moved,—“That the Chairman be requested to draft a progress report on the lines now agreed upon; that copies of the progress report in duplicate be sent to each member of the Commission; that members be requested to return one copy with such alterations or additions as they individually think necessary;

“That the Chairman be authorized to have the progress report printed under his own supervision.”

Dr. STIRLING seconded. The motion was carried.

It was resolved that the name of Mr. Tryon be added to the Correspondence Committee.

It

It was also resolved that the Correspondence Committee examine the classified list of mechanical contrivances, &c., prepared by the Lands Department of New South Wales, and the original letters on which the list is based; and if necessary reduce the list to such form as will render it serviceable to the Commission.

With respect to the further information that was requested from certain gentlemen regarding diseases proposed for the extermination of rabbits, the Secretary reported that no replies had yet been received.

It was resolved,—“That Dr. Katz be requested to forward notes of any additional inquiries made by him into the question whether chicken-cholera exists in the Australasian colonies, with a view to the incorporation of such additional inquiries in his report already received;

“That Dr. Katz be requested to forward any reports available of further experiments conducted at Rodd Island as soon as possible, as a progress report will shortly be submitted to the Government of New South Wales.”

It was resolved that the proceedings of the Commission, the evidence, and the appendices, be printed in the form indicated by the Chairman.

It was further resolved,—“That the Under Secretary for Lands be informed, in reply to his letter of 25th August, that a progress report on the whole work of the Commission to date is now being finally revised, and that such report will be forwarded as speedily as possible.”

The CHAIRMAN read the following:—

“Crown Lands Office, Melbourne, 16 October, 1888.

“My Dear Professor Allen,

“In consequence of my having become the inventor of certain improvements in wire-netting and in fences to be constructed thereof, these improvements being of so fundamental a character that there is reasonable cause for supposing that I may become largely interested in the manufacture and sale of wire-netting, it has appeared to me that my position as a member of the Royal Commission of Inquiry into Schemes for the Destruction of Rabbits has become materially altered. Even should the report of the Commission be confined to the question originally referred to it, namely, the use of diseases as a means of extirpation, still the usefulness or otherwise of wire-netting as an adjunct in the application of disease must be dealt with.

“I do not desire that there should be any possibility of my fellow-commissioners being compromised by my remaining amongst them under these altered circumstances; and it has appeared to me desirable that I should express my willingness to resign my commission.

“I beg, therefore, to place this matter before you; and should feel obliged if you would do me the favour of conveying to me the feeling of my fellow-commissioners with regard to it.

“Yours very truly,

“A. N. PEARSON.”

The foregoing having been considered,

Mr. BELL moved,—“That in the opinion of this Commission the interests of the work in hand are likely to be more seriously affected by the withdrawal of Mr. Pearson at the present stage than by any possible conflict of his private interests with the work of the Commission; and that he be, therefore, asked to retain his seat.”

Dr. PATERSON seconded. The motion was carried.

With reference to the memo. from Dr. Wilkinson to the Premier, explanatory of the relations between the Commission and the agents of M. Pasteur, the Secretary reported that application had been made, as requested, to the Colonial Secretary for a copy. His letter had been since returned with a verbal intimation that no trace of the document could be discovered. Application had since been made to M. Pasteur's agents for a copy, but no reply had as yet been received.

It was resolved,—“That the accounts of the Commission with the Lands Department be adjusted as soon as possible; and that the Secretary for Lands be then asked for a further advance of £500.”

It was further resolved,—“That the next meeting of the Commission be held in Melbourne; and that Professor Allen or the newly-appointed President be the convener.”

The Commission adjourned.

## SECTION II.

## MINUTES OF EVIDENCE.

TUESDAY, 17 APRIL.

The Commission met at 10 a.m., at the Colonial Secretary's Office, Sydney.

*Present:—*

<i>New South Wales :</i>	WILLIAM CAMAC WILKINSON, Esq., M.D., M.P. EDWARD QUIN, Esq.
<i>Victoria :</i>	HARRY BROOKES ALLEN, Esq., M.D. ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.
<i>South Australia :</i>	EDWARD CHARLES STERLING, Esq., M.D. ALEXANDER STUART PEARSON, Esq., M.D.
<i>Queensland :</i>	JOSEPH BANCROFT, Esq., M.D.
<i>Tasmania :</i>	THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Henry Augustus Ellis called in and examined:—

1. *Professor Allen.*] What is your professional qualification? I am a Bachelor of Medicine of Trinity College, Dublin.
2. How long have you been in this Colony? About two years and eight months.
3. Where do you now reside? At Double Bay, near Sydney. I am practising my profession there.
4. When did you first become acquainted with this disease amongst rabbits at Tintinallogy? The first information that I obtained on the subject was in October of last year. The exact date is in a report laid upon the Table of the House. That was a report written by Dr. Butcher and myself in a general way to the Minister for Mines, who at the time had charge of the Rabbit Department. I think Dr. Butcher has known the disease since July of last year.
5. *Dr. Wilkinson.*] Was it Dr. Butcher who first noticed the disease? Yes; he knew of the disease sometime before I did.
6. *Professor Allen.*] I presume that you are authorized to speak here on behalf of Dr. Butcher? I am.
7. Can you give us the particulars about Dr. Butcher's first observations? I am under the impression that at the time Dr. Butcher was making experiments with poisons as to the effect of strychnine and arsenic on rabbits, he then had occasion to use a considerable number of rabbits, and one was brought to him which was caught by the dogs which developed some very curious external appearances of ulceration with scabs on the surface of the body. He and I had had a conversation about two years before on the question of disease, and we came to the conclusion that disease would probably some time spring up amongst the rabbits.
8. *Dr. Wilkinson.*] Where did he make these experiments? The experiments were made at Tintinallogy. All the original experiments were made there. He found then that the disease presented by this rabbit was a very infectious one. It not only contaminated healthy rabbits placed in contact with diseased ones, but if the bag or crate which contained a diseased rabbit were subsequently used for the keeping of a healthy rabbit, the healthy rabbit contracted the disease. Practically that was the position of affairs when the Minister for Mines, or rather the head of the Rabbit Department, telegraphed up to destroy all our rabbits, which was done.
9. *Professor Allen.*] On what date was that? It was some time in September. We knew then that the disease existed on a very isolated portion of the run, near the woolshed. Shortly after the rabbits were destroyed Dr. Butcher came down to Sydney, and we had an interview with the Minister for Mines on the subject, with the result that we then got leave—it having been proved that the rabbits had been destroyed in consequence of a departmental error—we again got leave to make our experiments. Dr. Butcher returned to Tintinallogy, and having obtained some diseased rabbits recommenced his experiments with the disease.
10. *Dr. Wilkinson.*] When was that? Dr. Butcher must have gone up there about the time the reward was offered by the Minister for Mines, or about two weeks afterwards. He continued to conduct experiments until I went up there, and he sent me down a batch of rabbits when he got back. I had them put at my place down at Double Bay and looked after.
11. Were these rabbits animals which had got infection from the rabbits that had been previously experimented on, or did you kill all diseased rabbits when directed to do so? We did not kill them; it was the Government Inspector who did that. He arrived one night and killed all our rabbits next morning.
12. *Professor Allen.*] Will you give us a connected history of the disease so far as you can? I got my first batch of rabbits only about ten days before I started for Tintinallogy. I went up there on the 20th November. I made the journey principally with a view to prove the fact that the disease did not affect stock. At that time we had not begun to disseminate it over the run, and my object was to see whether it would affect stock. Besides this, we had a sort of guarantee from the Government that if we could kill all the rabbits on the land which we had fenced with rabbit-proof wire, and where we kept all kinds of stock—if the veterinary surgeon said the stock had not been affected—then we would have perfect leave to use the disease broadcast over the country, if we thought it advisable. This was the condition under which I went up. I then infected some stock and made more accurate experiments.

13. What stock did you inoculate? A record of the infections are in the report which we made to the Government. At the same time we inoculated rabbits with the same virus to prove that there could be no mistake in the material that we were using. We inoculated sheep on the inside of the thighs, and also horses. To inoculate the horses we used one of the old machines for wet cupping. We thought it would make a proper scarifier. Besides this we had a calf and some poddy lambs, and kept them in an enclosed place with the diseased rabbits—to make quite sure that they would have an opportunity of catching the disease. None of these animals presented any symptoms of the disease, even at the seat of the inoculation. They were inspected from time to time while I was up there, and Mr. Stanley, who made a subsequent inspection, came, I believe, to the same opinion.

14. *Dr. Wilkinson*] How long after this did Mr. Stanley see the stock and arrive at the same opinion? I think it was about three weeks subsequently.

15. And were the animals under observation during these three weeks? They were under my direct observation for five weeks. We also inoculated a cow, and the milk of the animal was used in the camp. We likewise had a cat and dog and some guinea pigs. I do not remember what other animals we actually had.

16. *Professor Allen*] And in all cases the animals presented no symptoms of the disease? Not the slightest symptoms of the disease developed in them—either general or local.

17. *Dr. Bancroft*] You did not give the milk of the cow to the rabbits? No; we only wanted to prove that the disease did not infect stock in any way.

18. *Professor Allen*] Have the animals which had been inoculated in this way been watched for any length of time? Yes; they had been under observation for some three months altogether, and Mr. Vindin sent in a report the other day to the Minister for Lands, which will be supplied to you. I think he refers in it to the stock that had been inoculated. With regard to the rabbits I then instituted much more careful experiments than had been made up to that time.

19. When was this? That was when I was on the station, where I remained until the end of December. I made some investigations as to the form in which we should find inoculation most virulent, and the result was that we found no one form of inoculation produced greater virulence than another. One of the best cases that I had was from intravenous inoculation with the blood of a diseased animal. This produced the best case I had while I was up there. We were in the habit of using for inoculation the abdominal fluid and the pericardial fluid or the substance of the liver broken up in a mortar with sterilized water, or the substance of the mesenteric glands broken up in the same way. Subsequently to this Dr. Butcher used setons dipped in all of these fluids, and that almost gave more certain results than the other methods.

20. Then you found the fluid of the peritoneum, the pericardium, the braised extract of liver and of the mesenteric glands all thoroughly active? Yes; and we found that an alteration occurred in the disease while in our hands. I may say that while I was inoculating no local symptoms appeared at the seat of inoculation in the rabbits. But we had some changes occurring in the disease; the great change was that the ulceration and scab so marked in the earlier cases almost entirely disappeared. Dr. Butcher at first thought that this might be a rabbit scab. So far as I know the only certain symptom of the disease which has never been absent is the extreme emaciation, which is of a most peculiar and marked character. In a proper case after infection, on the second day, there is generally a watery discharge from the nose and eyes and the fur looks a little ruffled. On the question of temperature I have had a great deal of difficulty; and I have not yet made up my mind whether the temperature is raised or not, owing to the discovery of the fact that a rabbit in struggling raises its temperature. Its temperature may rise four or five degrees, and in consequence of this we were a good deal put out at first.

21. *Dr. Bancroft*] Can you tell me what is the normal temperature of the rabbit? Well I have never been able to find that out. I believe it varies from 101 to 103. We never operated on the station without the temperature rising over 102; and we found in all the cases that we tried on the station that there was a marked rise in the temperature a few days after the disease had started. Down here this is not by any means so apparent, so that I am very doubtful on this question whether there is a rise of temperature or not. Down here there is always a fall of temperature at the end of disease, the temperature sometimes falling as low as 95.

22. *Dr. Wilkinson*] That is shortly before death? Yes; two, three, or five days before death. This I attribute to the extreme emaciation from the want of tissue change which takes place. The rabbit begins to show its emaciation about the fifth or sixth day, and the emaciation continues with varying rapidity, subject to the food and temperature under which the animal is placed.

23. Could any loss of weight be noticed before the fifth or sixth day? I think it could be detected by weighing, but not by general appearance. That is an extremely difficult point, because a rabbit eats so much that you have to be very careful all the time. We tried some experiments in feeding the rabbits up there, just to show the difficulty of accurate weight-taking, and we found that the rabbit eats from 1 to 2½ lb. of green food in the course of the day; but even while eating this enormous quantity of food he is still emaciated.

24. *Dr. Paterson*] I presume that was an infected rabbit? Yes.

25. And the emaciation went on? It did, and towards the end of the disease the emaciation became very marked, and gave some very peculiar and characteristic symptoms. Dr. Butcher and myself can tell at once on seeing a rabbit in the open whether he has been attacked by the disease or not.

26. *Professor Allen*] You mean you can tell when you see the rabbit in an advanced stage of the disease? Well it is very difficult to make an exact statement about the date. You can tell fairly early that a rabbit has the disease from the peculiar way in which he runs. He loses power in the hinder extremities from the absence of muscular tissue. It is very difficult to describe the way that he runs. Rabbits that are diseased always droop their tails, and, though it is impossible to describe their run, there is an obvious weakness in the hind limbs. They go on getting so weak that they can no longer pull the hinder legs up after they have been stretched out, but push themselves back by their front legs in order to rise.

27. Is there a visible wasting of the limbs? Yes; but in the fore limbs you cannot observe the waste so well. If you grasp the hind leg of one of these diseased rabbits you feel no muscle at all.

28. *Dr. Bancroft*] Do not all animals lose power in their hind legs when they become paralytic? Yes; but this is not a case of paralysis at all. I paid very great attention to that point. I have not tried the electrical reaction because I have not had time to do so down here. The rabbit displays no want of power to use its legs if you do not put a weight on them, and it is just as sensitive to touch; but the instant

instant you put a weight on it cannot move, simply because it has no muscular power. This emaciation goes on until the animal slowly dies. In one case I made a *post-mortem* examination immediately after death, and I found the heart beating although respiration had ceased. From that indication, together with the dark color of the blood, I came to the conclusion that the rabbits die from asphyxia—from loss of muscular power to breathe.

29. *Professor Allen.*] Before leaving this, are there any other symptoms that you can tell us about? There is the discharge from the eyes, the increase in temperature, and emaciation in progressive stages to the end.

30. Are there any other symptoms you can tell us about? I might perhaps give you the weight of the animal in one of the most remarkable instances that occurred. The rabbit, when I inoculated him, was a very fine animal, weighing  $3\frac{1}{2}$  lb. When I killed him ten days subsequently he only weighed 2 lb. 6 oz.—that is, he had lost one-third of his weight in ten days although he ate rapaciously the whole time.

31. *Mr. Tabart.*] Where were these rabbits secured? I got the first lot from Liverpool and the rest from the Hay district, so as to make sure that they could not be rabbits that were already infected. At present I get my rabbits from Hay.

32. *Dr. Stirling.*] You said something about the mesenteric glands? Yes; I am going to go fully into the details of the *post-mortem* examination.

33. *Professor Allen.*] And as regards the scabs and ulceration? We got that in greater numbers of those affected by the natural disease than we did in those having the inoculated disease. I do not know why, unless it is that the rabbits scratch each other, which they do to a tremendous extent in the open, thus causing those sores which in diseased rabbits at least have little tendency to heal. The sores are very characteristic; they are perfectly cleanly cut and go right through the skin, sometimes through the adjacent muscle. They vary in size. We have one rabbit which is covered all over with these sores.

34. Then you have these circular sores with clear-cut edges? Yes; the base of them is of fascia or of any tissue to which the sore reaches. It is covered with a thick, hard scab.

35. *Dr. Wilkinson.*] Does this sore affect any particular part of the rabbit generally? No; at least not so far as we can make out. The matter inside the sore is very peculiar and characteristic. It is sometimes there in great quantities, and sometimes it is barely present at all. It is more like a caseous gland than anything else; it is softer, but of cheesy, homogeneous matter. Wherever you find these sores original, there you will find this matter.

36. *Professor Allen.*] Are these crusts prominent, or do they extend deeply? It goes right under the skin and has a tendency to calcify, so that you get hard lumps in the muscles occasionally.

37. Then collections of this cheesy matter occur in the muscles? Yes, and some of them come to the surface and break out. We used a lot of this for inoculation in our early stages, and we found that the rabbits so inoculated, if properly done, took the disease all right, but presented no local symptoms of a very serious nature.

38. Then these calcified deposits are not at all essential to the disease? So far as I know they are not.

39. And you also state that in your laboratory experiments you do not get them at all? No. Of the animals that run in the open a good many present these deposits and a good many others are free from them. Dr. Butcher has paid a good deal more attention to this than I have, and he shows that how they commence is by a falling out of the hair over spots on the skin. Then they get red, and eventually I think they burst.

40. *Dr. Wilkinson.*] Has he ever observed these consecutive appearances in one animal? Yes; but I have never seen one case right through. We do not get nearly the same number now that we did at first.

41. *Professor Allen.*] You think these sores might be attributed to irritation? Yes; with the disease together. But it is very difficult to say, because it sometimes occurs in places on the body of the animal where they could not be scratched; in other places about the face and the inside of the thigh. Indeed they frequently get it where they could not be scratched at all, so that I can really give no account of the cause of these deposits. And I am not aware what is really their connection with the disease. The duration of the disease depends very much upon the nature of the food. It depends also upon the virulence of the disease, and so far as I have observed it is more rapid in the well-nourished animal than in the animal which has been poorly nourished. If you feed a rabbit on lettuce and carrots, as I feed mine, you will rarely get a death in twenty days, and frequently they last from thirty to fifty days. On the other hand up at Tintinallong, where the rabbits get the food that they are accustomed to—grass cut and put into them—the duration of the disease is much more certain. It is almost always between fifteen and twenty days—in fact it takes only seventeen days with by far the largest number of rabbits.

42. *Dr. Bancroft.*] In what time would the ordinary rabbit, in the natural way, die if he did not get the disease? Well, I got down from Tintinallong six rabbits, four of which were diseased. I got from Hay six more. As regards the deaths of some of these I cannot give you information, because I made a mistake when I came back from Tintinallong, and boxed them all together. Some of the rabbits that had been separated got mixed, and the result was that they killed each other. As regards the disease I cannot say that one died certainly from that. I have got three of them still alive. Of the uninfected ones I infected two, and another died; but all the other rabbits remained healthy until I returned from Tintinallong. There was not a single death from the beginning of November until the middle of January.

43. *Professor Allen.*] Then this disease is not necessarily a fatal one? Not necessarily.

44. Have you any idea to what extent it is fatal? Well, recoveries are by no means common. The whole of the first lot sent down to me recovered. The next lot I got down from Tintinallong—I got eight down—and there is one alive now. The rest all died of the disease; and of the last batch I got from Tintinallong I think there are two alive at present.

45. In animals that recover, what is the general duration of the disease? They take two or three months before they begin to get back their condition or any power to run.

46. Do you find that in both kinds of the disease—those that have the deposits and those that have not—recoveries take place? I cannot give you any facts about those with deposit; but I have known one or two to recover.

47. In your own inoculated cases you had no deposits? No.

48. How about the recoveries in your inoculated cases? In inoculated cases recovery is very rare. They take sometimes a long time to die, and only very rarely do they ultimately recover. I have only one rabbit that I have inoculated which is in good condition—only one which caught the disease by infection, and which is at all in good condition; and that rabbit has a contracted leg from the disease.

49. *Dr. Wilkinson.*] Are there any instances of absolute resistance to the disease? I will come to that later on.

50. *Professor Allen.*] You say that in some cases in which you inoculated the disease death occurred only after a very long time? Yes.

51. About how long may life be prolonged? The longest that we had was a little over two months. But when you get into these long periods you are introducing an element of doubt, because death may have ensued from another disease, owing to the condition of the rabbit. I count nothing as certain in the long cases when a rabbit dies.

52. *Dr. Paterson.*] Do you know whether during a case where the disease is prolonged copulation takes place? I cannot say that; but I take it that it would not, on account of the want of muscular power. At the *post-mortem* examination the first thing you notice after you have taken off the skin is the extreme emaciation of the animal, and on opening the abdomen, which I always do, there is generally a considerable quantity of abdominal fluid present. This fluid is perfectly clear. There is almost a complete absence of omentum; and the fluid varies from a few drops up to about 2oz. I think the food has something to do with that. In all the cases I have seen there is generally about from 1 to 2 drachms of abdominal fluid. You would never notice the omentum, and if you hunted for it you would probably find it, but without any fat at all.

53. *Dr. Stirling.*] But the vessels would be there? Yes; but the omentum is very thin and shrivelled, and without any fat. The intestines are perfectly healthy, and there is plenty of food in them to show that the animal has not died of starvation. In some instances there is local inflammation, but that is likely to be misleading. The next thing is the liver, which is certainly the most infected organ, so far as I can make out.

54. What appearance does it present? I am not very well up in the size of the liver, but I think it is rather small; and it is very friable. I have examined healthy rabbits, but, as I have said, I am not up in the size of their livers. In any case it is almost impossible to give an opinion, as the liver varies so much. Still I think in this disease the liver is really very small. It is more than usually friable, and it is almost impossible to take it out without tearing it. It has peculiar points all over it—they look more like tubercle than anything else, at a first glance. These things are on the surface, and through the substance of the liver as well. And when you come to examine them you find that they are abscesses, filled with some kind of matter.

55. Also tending to calcify? In some instances they have undoubtedly calcified. I have never seen any particularly large ones in the liver, but Dr. Butcher has. But I always took Dr. Butcher's statements about the result of *post-mortem* examinations with some degree of caution, as some of these may be septic cases.

56. *Dr. Wilkinson.*] But did you find these conditions with rabbits which were inoculated or which caught the disease spontaneously. It is the most certain pathological condition of this disease. It is present in nearly all cases—whether it is due to the disease or not is a matter of doubt. I have some doubt myself whether it has any real relation to the disease or not. There is just this element of doubt left, because I got it once in a rabbit which I had every reason to believe was healthy. Whether it was of a similar character or whether the rabbit had caught the disease in some way that I could not trace, I cannot say.

57. You did not try any inoculation experiments with these abscesses? Dr. Butcher did it from the abscesses perfectly in the larger ones. I do not know the size, but he got some very big ones. The usual abscess is about the size of a millet seed—about the size of a small tubercle. I found them and put them under the microscope. And I believe that they will be found to be present in all instances if a sufficiently careful examination can be made.

58. *Professor Allen.*] Is there any inflammation of the capsule of the liver? Yes; but there is no peritoneal inflammation at all, even over these abscesses in the liver. It is not actual pus which forms in them—at least under the microscope it does not appear to be fluid. They are round and perfectly circular as far as I saw, in the liver. But Dr. McCormack, who is making a microscopical examination, will give you better evidence.

59. *Mr. Tabart.*] Have you seen this in young rabbits? Usually the young rabbits died—their life tenure under experiments is very doubtful. They die from confinement without being inoculated at all. Occasionally the mesenteric glands are found to be degenerated. I have never noticed these spots pigmented. They are of whitish color. I have never seen these mesenteric glands affected, but Dr. Butcher says that they are more or less choosy, with a tendency to cysts. I have only seen one or two of these. They were very common at the first before I got to the station, but since then they have disappeared. The disease in our hands is tending to have fewer and fewer symptoms.

60. *Dr. Stirling.*] Are you aware whether these cysts can be the cystercerci to which the rabbit is liable? I am not aware.

61. *Professor Allen.*] Now we will take the other organs? There are two glands near the kidney in the abdomen—two little whitish bodies between the kidney and the spinal cord. These glands certainly show signs of alteration. They are red and even black—at least Dr. Butcher says so. I have seen them more marked, red in colour, instead of being white. I have not made a sufficient examination of rabbits before I took up the question—almost all my examinations have been made on diseased rabbits. The experiments that I made here cost me 10s. 6d. per rabbit, and I was not anxious to make experiments at that price.

62. Now with regard to the chest? The lungs were perfectly healthy and the spleen very small. I have once seen some of these little tiny yellowish spots, but I unfortunately spoiled them in making a section. The lungs were healthy, and there was no congestion, they being of uniform pink colour. Of course before I came to the lungs of the rabbit the blood had all been let out of the abdomen and the pericardial sac always contains a considerable amount of fluid, but I cannot say how much. I think it goes up very close to a drachm.

63. *Dr. Wilkinson.*] Never only a few drops? I have always seen them well lubricated. There is a certain amount of clear fluid between this and the heart.

64. What about the cavities of the heart? I have noticed nothing about them except this fluid, which is one of the common things which we always used for inoculation. The cavities of the heart always contain blood—generally dark-coloured blood—but I have not examined it carefully enough to say whether it is on both sides.

65. *Professor Allen.*] Now, about the nervous centres? The few spines that I have taken out have had fluid in them, but whether the quantity was abnormal or not I cannot say. This was under the membranes, and so far as I can roughly say there was not an abnormal quantity present. I have had some brains and spinal cord in spirits for some time.

66. Now, with regard to the general character of the blood? I have examined the blood very carefully, but on a great many occasions I was looking for germs in it. As regards its general characteristics, as to white corpuscles, I do not know what is their number in the healthy rabbit. I have only looked at this question so far in a commercial way, as it were, and I am not aware what is the natural proportion of red corpuscles to white corpuscles in the rabbit.

67. *Dr. Wilkinson.*] Have you found any fat in the sub-cutaneous tissue? Not in the advanced stages of the disease.

68. And the muscles? The fat is entirely absent from them. The wasting away is something extraordinary. No ordinary case of phthisis comes near it.

69. *Professor Allen.*] And you have noticed this cheesy or partly calcified collection of matter in the muscles? Yes. The calcified ones grow only in the muscles with the exception of the liver. There are no hæmorrhages in the organs, and the animal dies without any violent convulsions. There is no vomiting or diarrhœa, and the excreta are natural.

70. How, then, do you account for this disease spreading itself from rabbit to rabbit? The disease is very infectious. I have examined the hair and fur, and have never found any scab in it.

71. *Dr. Bancroft.*] I think it is of very great importance that we should have tame rabbits here for investigation. Wild rabbits will die in confinement, and they do not give us an opportunity for making experiments.

72. *Dr. Stirling.*] Professor Watson has found that the wild rabbit possesses greater power of resistance to scab than the tame rabbit.

73. *Professor Allen.*] Now, in regard to infection. Will you kindly give us some information about it? The best experiment I have had with regard to infection occurred the other day in a very virulent case of disease—that one I mentioned of a healthy rabbit being infected from being confined in a box where a diseased one had been kept. The rabbit was out of the box for about ten days, and there were so many in the last batch that I got down, that I had no place to put all the rabbits without using this box. I put a rabbit into this box, and it is now dead. It was put in on Easter Monday, and it died last Saturday.

74. How do you think this disease spreads from one animal to the other? It goes partly by infected burrows, but whether by the breath or excrement or the nasal discharge I cannot say.

75. Have you tried inoculation with this discharge or excrement? We used the discharge from the nose frequently for inoculation and for scarification, and it caused the disease. I never tried inoculating with the excrement or urine. The discharge from the nose passes away about the fourth day. It is very mild, but it is always present in some degree. If kept in confinement a rabbit has the tendency to get its eyes sore. I do not know why this should be so, but it certainly is so.

76. Is there any period of latency? There is a period of about two days in which I think the disease remains latent. I am speaking now from my experience of a large number of rabbits.

77. Can you tell us now something about the history of the disease, and the manner in which it first originated? I have not the remotest idea of its origin. Dozens of diseases have sprung up in the same way, worked for a time and then disappeared. There was one in Tasmania some years ago and another on the Darling last year.

78. Have you had any reason to think that this disease has existed before? I have no reason to think so, and no evidence to lead me to say so. The disease which worked on the Darling decimated the opossums. I do not know how long ago, but the district between Bourke and Broken Hill was alive with them some years ago, and they have now disappeared.

79. What about kangaroos and wallabies? We cannot get any of them. We tried the disease on each.

80. *Dr. Paterson.*] Is this disease confined to Dr. Butcher's station? At first it was confined to one paddock on Tintinallogy, but since then we have been inoculating all over, and the disease has spread to a much larger area. We have heard of it near, and then further and further away.

81. *Dr. Wilkinson.*] And has that area become free from rabbits? No; no area that we know of is perfectly free, but I have heard to-day from Mr. Taylor, of the Rabbit Brauch, that a squatter had told him that the rabbits on his station were ten times less than they were three months ago. They must have diminished very considerably.

82. *Dr. Stirling.*] Can you give us any collateral evidence to bear out what you say? We can give you the Government reports on the subject, and I do not think there can be anything better. In addition I have some private letters at home which bear on the point.

83. *Professor Allen.*] Do you think that this disease would spread, apart from maintaining it by keeping up the stock of infected rabbits? We propose to infect every block in twenty places, and to put down a single rabbit in each place. Two months subsequently we would do the same, and three months afterwards we would repeat the same experiment, and the same again if the rabbits showed in any place on the run more than they should show.

84. *Dr. Stirling.*] What area do you mean when you speak of a block? I mean a block of ten miles square.

85. *Professor Allen.*] When did Dr. Butcher commence these experiments? He commenced in July last, but he did not begin inoculating until December, and that was not done until we were sure that the disease did not affect stock. Tintinallogy has been carefully inoculated everywhere, but we have not had the necessary time to go any further. It has been repeated a couple of times since, as we thought it important that inoculation should be properly carried out. There can be no doubt but that there is a mild form of the disease; that is to say, that some rabbits will recover from it. If the disease is allowed to go on its own course it is sure to develop a mild form in some corner or other, which will give protection to them.

86. Have you any evidence of that? Yes: we have had some rabbits down here which we could not give the disease to. They were fat and strong and healthy—as fine rabbits as you ever came across. I fancy they had had the disease and had got over it. An experiment which first proved that conclusively was made during February. I took two rabbits which came to me in November,—one had the disease, and another one had been sent down without catching it. I inoculated both of them with setons steeped in the

the blood of diseased animals. The one rabbit that had had the disease previously never lost in weight more than 2 oz., and showed no other symptoms of the disease, but the other rabbit steadily lost weight and died, I think, in about three weeks. That, to my mind, was a very satisfactory experiment. That rabbit I inoculated again the other day, and I have another one which I inoculated at the same time, to prove that the fluid that I inoculated with was virulent; so that this last one will practically settle the matter. But it had been practically settled before, because we have had several rabbits on the station that would not take the disease.

87. *Dr. Stirling.*] Then if you had 1,000 miles of country to deal with you would require twenty rabbits for every 10-mile block, which would be 2,000 diseased rabbits for the whole area? Yes; and I would repeat it at stated intervals, as I have already said, so that you would require about 6,000 rabbits. I do not think that an excessive number. The inoculation would have to be repeated two or three times, which would make it necessary that 6,000 diseased rabbits should actually be turned out. We have passed through our hands already over 1,000 diseased rabbits. It may only require a lesser number, but I consider this a very fair estimate. It might, of course, require even more.

88. How do you get the rabbits for this purpose? Well, that is a matter to which we have given a good deal of attention. Apertures are made in the wire-netting around the tanks; but sometimes we were in the habit of riding them down on horseback. In that way we could ride down about twenty-five rabbits in two hours. That is, I should say, the best way of getting big ones. By making apertures in the wire-netting around his tanks, Mr. J. Riddock, of Weinterriga, caught 2,000 to 3,000 in a night.

89. *Professor Allen.*] Have you any burrows in the Tintinallongy country? Yes; but when you go back into the black soil country there are no burrows except small slip burrows. In those parts of the country where there are no burrows we ride the rabbits down. I am not sure whether they burrow in winter or not.

90. Do you know how the rabbits propagate while diseased? While I was up at Tintinallongy there was next to no propagation going on. We found many nests with rabbits dead in them, but we never knew what was the cause of death. In one case, in the open country, we found three abortions.

91. *Dr. Stirling.*] But you have not told us anything about their confinement? They brought forth young, but the young died while in confinement with us. I have had three batches of rabbits in my own house, but they always died all the same. As far as I can ascertain, there is no record of the size of the Australian rabbit, which I think is an important matter in regard to wire netting.

92. *Dr. Paterson.*] Have you ever inoculated the pregnant doe? One of our rabbits which the Government were kind enough to destroy was a pregnant doe, and she was destroyed before we could do anything with her. Mr. Reid, the owner of the station, offered £25 for the rabbit, but we could not give her to him. The diseased rabbit cannot possibly bring forth healthy young in the open country.

93. *Mr. Tabart.*] Were any other methods adopted for destroying the rabbits while this was going on? Yes, by poisoning; but that was stopped since the end of December. All the experiments by poisoning were done in fenced-in areas.

94. *Mr. Pearson.*] Are there any rabbits at all which are not susceptible to the disease? We have had, I think, only one rabbit out of 1,000 that was not susceptible to the disease. We have had one in hand that was not susceptible, but we think it likely that this one has had the disease at a previous period. However, this is merely a surmise.

95. *Professor Allen.*] Have you paid any attention to any possible bacterial origin of the disease? Well, as regards bacteria, I have made very careful examinations, and I have gone through every organ of the body dozens of times, with stains and other fluids. I have also examined the blood and stained it, and practically the result was a negative one; I found no organism which I could say was connected with the disease. I have gone further, and made cultivation experiments; but all the known methods have yielded absolutely a negative result. Even with matter taken from an ulcer with a scab over it the results have been negative.

96. And then, speaking generally, apart from the emaciation, the only strongly defined feature of the disease is the presence of this cheesy mass under the skin, in the muscles, in the liver, and sometimes in the mesenteric glands; but you are not absolutely certain that these are a part of the disease? Well, in the few cases that I had of livers I found that it was probably bacterial disease which had caused the degeneration of the liver. You can account for the emaciation on three grounds. One is that the food taken in is not properly prepared in passing through the glands before arriving at the muscles. The view I take is that the liver will not work, and that the animal starves owing to the food not being properly assimilated. If this is not what causes the emaciation, it must be that the micro-organisms in the blood take up the food which ought to go to the muscles; but to imagine that you must imagine such a large quantity that it cannot be overlooked on microscopical examination, unless the bacteria directly attack the muscular tissue.

97. *Dr. Wilkinson.*] Then in your opinion this disease is bacterial? Yes, it is probably so.

98. *Professor Allen.*] What papers did you speak of as being the best for us to apply for in connection with this disease? Well, I think Mr. Vindin's report is the most recent on the subject, and probably the most satisfactory. It can be obtained from Mr. Oliver. I think it would be well if you got all the papers that are in the hands of the Government on the subject. The reports of Messrs. Clarke and Tully, stock inspectors, and of Mr. Stauley, the Government veterinarian, are amongst the other recent publications.

The Commission adjourned.

MONDAY, 23 APRIL, 1888.

The Commission met at 10 a.m., at the Colonial Secretary's Office, Sydney.

Present :—

*New South Wales* : HENRY NORMAN MACLAUREN, Esq., M.D. (President).  
WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.

*Victoria* : HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq., F.R., Met. Soc., &c.  
EDWARD HAREWOOD LASCELLES, Esq.

*New Zealand* : ALFRED DILLON BELL, Esq.

*South Australia* : EDWARD CHARLES STIRLING, Esq., M.D.  
ALEXANDER STUART PATERSON, Esq., M.D.

*Queensland* : JOSEPH BANCROFT, Esq., M.D.

*Tasmania* : THOMAS ALFRED TABART, Esq.

Dr. Frank Hinds (with M. Loir and Dr. Germont) called in and examined :—

99. *The President.*] I understand that you, gentlemen, come here as the representatives of M. Pasteur, in regard to the claim which he has made for the reward of £25,000 offered by the Government of New South Wales to the person who introduces a successful means of exterminating rabbits? That is so.
100. Have you brought any written credentials? No, excepting the letter which you have had from M. Pasteur himself. We have not received letters to the Commission, but we have brought introductions to Sir Henry Parkes and the President of the Royal Society.
101. You have brought a letter to the Government? Yes, a letter to Sir Henry Parkes.
102. Have you the letter here? No; it has been presented to Sir Henry Parkes. I understand that a telegram was despatched by your Government to Sir Daniel Cooper, asking that M. Pasteur should send some microbes to Australia, and also directions as to how they were to be used. It is partly in response to that telegram that we have come here.
103. Are you fully and completely acquainted with the details of the scheme which M. Pasteur has discovered? Yes.
104. And you are prepared to put it in operation, if need be? Yes.
105. Have you been long associated with M. Pasteur? I was only with M. Pasteur for ten days before starting from Paris.
106. Have you made a study of micropathology during the course of your education? Not particularly; but rather incidentally and generally. I have studied the subject a good deal in London.
107. In what laboratories? I have worked with Professor Horsley at the Brown Institution, and also at University College.
108. Then, with regard to M. Loir, has he been long with M. Pasteur in matters of this nature? Yes.
109. How long? Some eight years.
110. In the study of this department of micropathology? Yes.
111. And Dr. Germont? He has been with M. Pasteur for one year.
112. With M. Pasteur, in his laboratory? Yes.
113. Are you provided with all the materials required for carrying out this scheme? We are.
114. Have you a sufficient supply of microbes? We believe so. We have yet to make preliminary experiments to see how the microbes which we have brought with us have stood the voyage. There is no doubt about their being sufficient if they have stood the voyage.
115. Then you did not consider it necessary during the voyage to keep the supply fresh? Yes; we took measures to keep it alive, which we believe to be successful.
116. But you did not make any fresh cultures? No.
117. *Dr. Bancroft.*] Were no experiments made on birds during the voyage? No; no experiments were made on the voyage at all.
118. *The President.*] How was the material preserved? It was preserved in hermetically-sealed tubes.
119. Were these tubes completely hermetically sealed? Yes.
120. I understand you to imply that you only imagine there is a possibility that the fluid may have been deteriorated by the voyage? Yes; there is a possibility of that.
121. And you now desire an opportunity of recovering it by a fresh cultivation, if possible? Yes, we do.
122. You find it necessary, in order to do this, to have the authority of the Commission? Yes. We had proposed to experiment directly we arrived in Australia; but in the meantime we found that a law had been passed making this illegal.
123. *Professor Allen.*] Will you be satisfied with the recultivation of the germs in broth, or would the inoculation of animals be necessary? We would desire to inoculate animals.
124. *Mr. Lascelles.*] I think it would be advisable to get a supply of rabbits at once.
125. *The President.*] In carrying out these preliminary experiments, have you made such plans and precautions as may be considered necessary in order to prevent the disease from spreading to other animals? We would simply adopt those precautions that had been adopted in laboratories in Paris and London; that is to say, the animals would be caged; after their death the cages would be disinfected, and the remains of the animals that had been examined would be destroyed by some chemical method, or by burning.
126. In what way would you propose to disinfect the cages? With dilute solutions of sulphuric or carbolic acid.
127. *Dr. Stirling.*] Can you give us any information with regard to the extent of chicken-cholera in Europe?
128. *Professor Allen.*] There is a great deal to do before we come to that.
129. *Dr. Wilkinson.*] Would it not be well to have a direct statement from the representatives of M. Pasteur, and then this statement might be criticised and questions asked.

130. *The President.*] We will first have to give them specific authority to keep up their supply of microbes.
131. *Mr. Bell.*] Permission having now been granted to inoculate suitable animals with the virus, can you say how long it will take before you can report to the Commission whether the virus is now in a satisfactory condition? Two or three days.
132. *The President.*] It has been suggested that time would be saved if we requested the delegates to give a direct statement on the subject;—can you do so? Yes. The method that we propose to pursue is, briefly speaking, to poison the food used by the rabbits in the infested country. The rabbits will eat it and will die; and others will become infected with the disease, and will suffer in the same way as those that actually partook of the food. A great many points have to be considered. The poison will have to be distributed on the food in the same way as mineral poisons are at present distributed; but the action of this disease is much more extensive than that of mineral poisons, because many other individuals are affected besides those that actually take the food. The first thing which we propose to do is to prepare a broth for cultivation of the microbes. That will be done by preparing broth with the flesh of either chicken, rabbit, sheep, or fowl, filtering and sterilizing. Then the cultures will be made in the sterilized broth, and will be put all over the food. It will be easy to make any quantity of cultures at the station itself, and from the station the poisoned *bouillon* could be carried to any district on the station.
133. That is practically the statement you wish to make? Yes.
134. *Mr. Lascelles.*] I suppose you are aware that in the scrub country a great many rabbits do not go into burrows at all, but are scattered about thinly all over the country. In that case would there be sufficient contact to render your scheme effective? Yes; I think so, as with the mineral poisons at present.
135. But how could it act where the rabbits are thinly scattered? If the diseased rabbits do not come in contact with the healthy ones the latter will not suffer.
136. *The President.*] Would there be any modification of this disease in order that it might be applied to the different conditions of Australia? There is no particular modification, and how far it will reach the rabbits that do not live in burrows must be decided simply by experiment.
137. In fact you cannot at present give us any information on that subject? No.
138. *Mr. Pearson.*] May I ask how rabbits contract the disease? Simply by contact with one another. If you place rabbits that have the disease in contact with others, the latter will take it and die.
139. *Mr. Bell.*] Then so far as your experiments go, your disease requires that there shall be absolute contact? No; it is sufficient if rabbits are placed in a cage where diseased rabbits have been.
140. But that is contact with some object which diseased rabbits have touched; that is, contact not with each other but with the poison? Yes; certainly.
141. *The President.*] Have you yourself seen rabbits die from this disease? Yes; I have seen them die in the Laboratory in Paris, but not in the open country. So far as I am aware, only one experiment has been made in the open country.
142. *Dr. Wilkinson.*] If a healthy rabbit is placed in contact with a diseased rabbit, you think the healthy rabbit would contract the disease? It would all depend on what you mean by contact. If you mean by that certain touch together, probably not.
143. In fact the disease has to be conveyed from one rabbit to the other by the excreta; that is, may it reach a healthy rabbit directly in the air, or must the rabbit eat the food which has been contaminated with these microbes? Yes.
144. Then the infectious material is in the tissues, and in the blood, and not in the skin on the surface? Yes.
145. *Mr. Lascelles.*] Have you ever heard that rabbits are in the habit of going to a certain place and dropping their excrement. Would not a healthy rabbit going to a place where a diseased rabbit had dropped his excrement take the disease? Yes; it would get the stuff in its feet, and then probably into its mouth.
146. *Mr. Quin.*] If the germs of your disease are exposed for any length of time to the sun, are they likely to remain sufficiently strong to affect any animal —
147. *Professor Allen.*] A host of such questions will arise by and by. The question is rather premature now.
148. *The President.*] Will you tell us exactly what you have seen done in the destruction of rabbits by these microbes, and the conditions under which it has been done? —
149. *Professor Allen.*] I would suggest that these gentlemen should be allowed to do this in writing.  
[The suggestion was agreed to, and the witness promised to prepare a statement on the subject.]
150. *Professor Allen.*] What do you require to carry out your experiments? We would like to have a laboratory—a single room would be sufficient, if it had gas in it, and was big enough to hold a sterilizer. We would have to have the exclusive use of the room, and we would require about twenty rabbits.
151. *The President.*] Are these experiments for the purpose of cultivation? They are for the purpose of demonstrating to you the virulence of the disease.
152. *Dr. Wilkinson.*] I would wish to ask Dr. Hinds one question: Some time ago we heard of there being some secret in the application of this method. I wish to know whether there is not some special method of applying this disease of which we have at present no knowledge. Is there any secret method of application which M. Pasteur has not yet revealed? I will reply to that with the other questions.
153. *Mr. Bell.*] But we all want to know whether such a method exists—we do not want to know the particulars? I would rather wait and answer that question with the other questions.

The representatives of M. Pasteur then retired.

The Commission adjourned.

TUESDAY, 24 APRIL, 1888.

The Commission met at 10:30 a.m., at the Colonial Secretary's Office, Sydney.

*Present:—*

*New South Wales:* WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.

*Victoria:* HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., F.C.S., &c.  
EDWARD HARKWOOD LASCELLES, Esq.

*New Zealand:* ALFRED DILLON BELL, Esq.

*South Australia:* EDWARD CHARLES STIRLING, Esq., M.D.  
ALEXANDER STUART PATERSON, Esq., M.D.

*Queensland:* JOSEPH BANCROFT, Esq., M.D.

*Tasmania:* THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Dr. Germont, M. Loir, and Dr. Hinds, the representatives of M. Pasteur, called in and examined:—

154. *The Chairman:* Have you prepared a statement in connection with M. Pasteur's proposals for the destruction of rabbits?155. *Dr. Hinds:* Yes; I will read it to the Commission. When M. Pasteur was engaged upon the subject of chicken-cholera ten years ago he noticed accidentally that rabbits were exceedingly susceptible to the disease, they dying when placed in the cages in which fowls suffering from the disease had lived. After seeing in the journals the notice of the Government of New South Wales, with regard to the destruction of rabbits, he resumed experiments on chicken-cholera in its relation to rabbits, he arrived at the conclusion that there was no means more efficacious and rapid for their destruction than chicken-cholera. To establish his convictions, he instituted fresh experiments, some of which the details are published on page 14 of the papers printed by the Government after the report of the Board of Health on the proposal to destroy rabbits by means of disease. Food was sprinkled over with the microbes of chicken-cholera; the rabbits ate of it and died in from fifteen to thirty hours. It is impossible to say the number of times the experiment was repeated, but the result was always the same. A fresh confirmation was furnished by the experiment at Mme. Pommery's.

The ground at Mme. Pommery's was covered with snow, and a little before sunset M. Loir spread on the ground in a field near the burrows three small bundles of lucerne, and on this he sprinkled 4 litres (a little less than 1 gallon) of infected broth which he had brought from Paris. After half an hour he again visited the field: all the food had been eaten. Next day nineteen dead rabbits were found outside the burrows, and on the Monday following thirteen more. No live rabbits were seen after Saturday night. It is impossible to say if every rabbit at Mme. Pommery's actually ate the poisoned food or not, but it is thought that insufficient was spread around for all to have taken it, and that some, therefore, died from the disease which they had taken from their neighbours.

The conclusion derived from these experiments is that the contagion is more or less active according to circumstances, as is evidenced by the mortality of rabbits placed in contact with others who have died from the disease, or who are suffering from it—this mortality being generally more than half.

How is the disease communicated? It is probable that it is generally by means of the excrement, but it has not been shown that this is the only means of communication. Different animals have been fed upon food over which the microbes have been sprinkled in quantities greater than it would be possible for them to obtain in a state of nature and have suffered in no way; microbes have not been found in their blood. These animals were sheep, dogs, goats, horses, cows, or a donkey. As regards man it is, of course, impossible to give direct proofs that the microbe is innocuous. But under natural conditions there is no recorded case of man having contracted the disease. In France chickens which have died of the disease are often sold in the market, and there is no record of any accident among those who have handled or eaten them; on the other hand there are reasons for believing that no danger would result from drinking the milk of a cow which was fed on hay over which the microbes of *choléra des poules* had been sprinkled. In consideration of these facts, M. Pasteur has thought desirable to send us to Australia to demonstrate to the Commission appointed by the Government of New South Wales that the method advocated by him is at once efficacious, harmless to domestic animals, except fowls, and practicable. We have no authority to speak of experiments made by us individually; we are the delegates of M. Pasteur, and our only function is to interpret exactly his idea. It is difficult for us to give in detail the plan to be followed at any particular station before we have actually observed for ourselves the habits of the rabbits and the nature of the country of that particular station. It is obvious that the manner of action will have to be altered according as the rabbits live in burrows or not, and also according to the time of year. If there is grass it will be possible to carry some to the neighbourhood of the burrows and to water it with a cultivation of microbe. It would also be possible to fence off a small piece of land in which grass might be allowed to grow; when there was sufficient grass it could be watered with the infected broth, and the fencing removed, and the rabbits would at once come to feed on the best grown patch of grass in the neighbourhood. If these methods were not available, it would be necessary to spread the microbes on artificial food, as is done with mineral poisons, the artificial food to be the cheapest procurable in the neighbourhood. It must always be remembered that the microbe would lose not only its virulence but its vitality if long exposed to the air. It is easy to prepare any quantity of the broth and cultivations, which will be distributed in the early morn and evening, to obviate, as far as possible, the effect of the sun's heat, which would speedily kill the microbe if excessive. For this purpose, a dépôt would be established for a certain district, at which broth would be prepared and cultures made. From this quantities would be supplied in vessels to the squatters, who would give it their labourers to distribute  
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in what spots they thought most thickly infected. Depôts could be established at points most convenient for the transmission of the cultivations to the different stations. Of course, details of preparation and distribution would probably be altered as we gained practical experience of the country. We consider that it will not be difficult to free a station of the rabbits which are upon it by the means which we have indicated, but it is impossible to answer, except in a manner somewhat general, to the question as to how we would proceed to clear a large station. The Commission has asked what are the relations between chicken-cholera and swine fever or between chicken-cholera and septicæmia of rabbits. A pig inoculated with chicken-cholera germs has never suffered from swine fever. If there exists a relation between the swine fever and the diseases of other animals it is, according to certain writers, with the septicæmia of mice. (Löffler.) Davaine and Koch have described a malady very like chicken-cholera, known as septicæmia of rabbits, but their identity has not been absolutely proved, though the germs and their action on cultivation are very similar in the two cases. We have said above that heat and desiccation destroy the virulence and then the life of the microbe. It perishes at  $51\text{ C} = 124^{\circ}\text{ F}$ . M. Pasteur has shown that prolonged exposure to air causes a diminution of its virulence, and it was from studies on this organism that he proved the fact of the attenuation of virus, which he has extended to other organisms.

It is on account of this weakening of the poison by exposure that it is necessary to cultivate it artificially, in order to have a supply of the most active poison, under certain conditions, and it is of this that M. Pasteur has spoken in his letter to the President of Commission, of the knowledge of certain details, without which the method would often prove unsuccessful. This is simply the details of manipulation which we will show to the Commission actually when performing their experiments, as they are difficult to explain, but easily understood when demonstrated. From what has been said of the attenuation of the virus, it is easily understood why the disease has not spread from the farm-yards to the rabbits widely, notwithstanding its persistence among fowls.

The chicken also do not come into immediate contact with wild rabbits, and therefore one would not expect the disease to spread on a large scale among rabbits.

With regard to statistics we know of none; but the vaccine of chicken-cholera is supplied to veterinary surgeons for 3,000 or 4,000 cases every year; and the correctness of diagnosis is proved by discovery of microbes before the vaccine is sent. From this statement and certain idea of the prevalence of the disease, the number of cases has been given in a table up to 1885, in the Health Exhibition in London.

If it is true that, as suggested to the Commission, the *choléra des poules* already exists in Australia, we have not introduced a new disease; and we ask that our experiments may be made without restrictions other than are applied to the methods with other diseases which are now being considered.

We propose to make experiments, and to ask for a paper stating the results and nature of experiments signed by ourselves and members of Commission at end of each experiment:—

- 1st.—In the laboratory, upon ten or twenty rabbits, to prove that the disease is fatal to them. For this purpose we shall make broth, by mincing meat, boiling for one hour; filtering, sterilizing, and neutralizing; and in this we shall sow some of the germs of chicken-cholera. We obtain a cultivation, and feed the rabbits with a little sprinkled on their food.
- 2nd.—To feed sheep and the other animals in the same way, to prove that they are unaffected by the microbes—5–6 feeds.
- 3rd.—To make an experiment on a larger scale in a space in the country, enclosed with rabbit-proof fencing, but otherwise under natural conditions.

For this purpose we would go to a station, prepare there the broth, and make a cultivation; and this we would spread on food (natural, if available; if not, an artificial food—the cheapest to be procured in the neighbourhood) where the rabbits are thickest. From day to day we would go to different parts of the area to spread the disease.

We ask for this purpose an area of not greater extent than about 500 acres, for if we are able to prove that rabbits can be poisoned under natural conditions, the only question for future consideration will be the distribution of the poison.

We consider, that if we practically clear the area given to us for experiments, it will be a fair and good test of the efficacy and practicability of the method advocated by M. Pasteur.

156. *The Chairman*: The most important point appears to be with respect to the conduct of the experiments. This Commission has requested the Government to appoint Dr. Katz chief expert officer under the Commission, and he will be provided with what assistance may be necessary. We have also asked that a temporary laboratory be obtained by renting a house near Sydney with half an acre of land attached, with gas and water laid on, and a complete stock of sterilizing apparatus will be provided there. Our proposition would be that you associate with Dr. Katz, and work with him as our representative in conducting your experiments. We have prepared a list of experiments which we want performed, and if you desire to make any suggestions in connection with this, we will try to meet your views as far as possible; any experiments that you think necessary will certainly be performed, but experiments must be conducted under the direct control of one of our own officers.

157. *Dr. Hinds*: We will agree to that.

158. *The Chairman*: Dr. Katz has been instructed that all work concerning chicken-cholera shall be performed in association with you. In the first place the Government will be asked to assent to Dr. Katz's appointment and he will be appointed, so that you can go on with small experiments directly you get your cultures from Melbourne and have them ready. You, then, associated with the other gentlemen who represent M. Pasteur, will have the laboratory at your disposal and Dr. Katz will associate with you in carrying out these experiments.

159. *Dr. Hinds*: Yes.

160. *The Chairman*: I think that is as satisfactory an arrangement as we can make.

161. *Dr. Hinds*: Yes.

162. *The Chairman*: If you would like time to consult on this point you can obtain it.

163. *Dr. Hinds*: We accept your proposals at once.

164. *The Chairman*: First of all I have a letter here from the Board of Health which I wish to communicate to you. We wrote to the Board of Health asking that a laboratory should be placed at your disposal, and the reply which we have received is as follows:—

Board of Health Office, 127, Macquarie-street,

Sydney, 24 April, 1888.

Sir,

I have the honor, by direction of the President of this Board, to inform you that he has arranged for a portion of the Government Laboratory, in Albert-street, to be placed at the disposal of Mr. Pasteur's representatives. These gentlemen should be requested to call on Mr. Hamlet, the Government Analyst, with a view to the necessary arrangements being made for the carrying out of their experiments under the proper precautions.

I have, &c.,

EDMUND SAGER,

Secretary.

H. Mahon, Esq., Secretary, Rabbit Commission.

165. *Dr. Hinds*: Our cases containing the microbes will not arrive from Melbourne until the day after to-morrow.

166. *The Chairman*: Is there anything we can do meanwhile to facilitate your work?

167. *Dr. Hinds*: I think we would sooner wait until we receive all our material.

168. *The Chairman*: Are you likely to want any animals? We have made a request that fifty rabbits be supplied at once.

169. *Dr. Hinds*: We would like to have a few of those.

170. *Mr. Lascelles*: Dr. Ellis told me that he could spare a number of rabbits, if necessary.

171. *The Chairman*: There are a few points on which I would like to obtain information. I think you said that chicken-cholera was harmless to all domestic birds except fowls.

172. *Dr. Hinds*: I said domestic animals.

173. *The Chairman*: That means that all kinds of poultry are liable to the disease?

174. *Dr. Germont*: We do not know that yet.

175. *Dr. Hinds*: Actual experiments have been made on pheasants, sparrows, and other birds.

176. *The Chairman*: Then the next point is with regard to the spread of the disease from rabbit to rabbit. Most of the evidence is with regard to the spread of the disease to rabbits from food infected; but, as I have said, there is no great evidence as regards the spread from rabbit to rabbit. I presume that requires farther testing?

177. *Dr. Hinds*: Yes; and on a large scale.

178. *The Chairman*: I would wish to read an extract from the report of these experiments. M. Pasteur says:—

“I recapitulate some of the experiments that were made by Mons. Loir, a student attached to my laboratory, at my instigation:—

“On the 27th of November five rabbits were put into a box; they remained there without food until 6 o'clock in the evening. At that hour 100 centigrammes of a virulent growth of chicken-cholera were placed in a small basin where the leaves of a cabbage were soaking. These leaves were allowed to drain, and were then given to the five rabbits to be eaten, and in five minutes they had finished their meal. At midnight three fresh uninfected rabbits are placed with the others.

“At 8 o'clock in the morning of the 28th November, the five infected rabbits seemed ill. At 11 o'clock, that is to say, seventeen hours after their meal, two of them were dead. The remaining three died at 3 in the afternoon, twenty hours after their meal.

“On the 28th of November, at 7 in the evening, one of the rabbits that had been confined on the previous day at midnight with those that had eaten the tainted food was found to be dead. The two other rabbits did not become sick; of those put in the first day none remained alive.”

179. *M. Loir*: In the experiment No. 1, on page 14 of the Board of Health papers, the rabbits which were infected with poisoned food were removed from the boxes directly they died.

180. *The Chairman*: It is said here, “I recapitulate some of the experiments, &c.” Have you had a number of such experiments?

181. *M. Loir*: Yes; I have had a great many experiments, all of which M. Pasteur took an interest in.

182. *The Chairman*: But of experiments of this kind—poisoning rabbits with infected food—then putting fresh rabbits in the place where the diseased rabbits had been?

183. *M. Loir*: Yes; I have made many of these, and the fresh rabbits died.

184. *The Chairman*: Have you satisfied yourself that these fresh rabbits died of chicken-cholera or of something else?

185. *M. Loir*: I have made certain of it, by microscopical examination, that they died of chicken-cholera. The proper tests were applied, and satisfied M. Pasteur that the rabbits were infected with chicken-cholera, and that they died from it. You will see that if you read further on in the same report.

186. *The Chairman*: Yes, I see that now. M. Pasteur further says:—“At 5 o'clock on the evening of Saturday, the 3rd of December, some cabbage leaves—upon which 10 centigrammes of virulent growth of chicken-cholera had been spread, diluted with 100 centigrammes of sterilized water—were given to four rabbits. At midnight all the food had disappeared some hours before, and four fresh rabbits were placed with the others. At 8 o'clock on the morning of the 4th of December, two of the rabbits seemed unwell. At 11 o'clock one of them was dead; at 2 o'clock two others died, and at 4 o'clock the last of those that had eaten was dead. The carcasses were left in the box with the fresh rabbits that were put there at midnight on the previous day. On the 5th of December one of the rabbits was found to be dead; one on the 6th; a third on the 7th; and the fourth died on the 9th of December. All of these were tame rabbits. On the 17th of December 10 centigrammes of the growth of chicken-cholera were administered to a wild rabbit on a cabbage leaf. On the 18th it was dead. In all the foregoing instances it has been placed beyond doubt that death was owing to the microbe of chicken-cholera.”

187. Now, with regard to pigs, Dr. Hinds states that pigs inoculated with chicken-cholera have never suffered from swine plague. Now, has not the inoculation of fowl-cholera or food in which fowl-cholera microbes had been spread, ever produced serious disease in pigs?

188. *M. Loir*: No, never.

189. *The Chairman*: In the experiments that were performed to test whether the disease could be transmitted to sheep have the cultures from rabbits been used as well as the cultures from fowls?

190. *M. Loir*: Yes; the cultures from rabbits have been used.

191. *The Chairman* : Can you give us any definite information as to whether the virus is attenuated by transmission through rabbit to rabbit ?
192. *Dr. Hinds* : No ; it is not.
193. *The Chairman* : It remains as strong as it was originally ?
194. *Dr. Hinds* : Yes.
195. *M. Loir* : If anything it increases, and is not attenuated at all.
196. *Mr. Lascelles* : I would like to hear that question answered again.
197. *The Chairman* : Is there any evidence that the virus becomes weakened by transmission from one rabbit to another ?
198. *Dr. Germont* : No ; the reverse is true.
199. *The Chairman* : Can you tell the Commission whether that increase occurs generation after generation for many generations, or whether the maximum of virulence is soon attained ?
200. *Dr. Hinds* : The maximum of virulence is soon attained.
201. *The Chairman* : And there is no receding or going back from that virulence afterwards ?
202. *M. Loir* : No ; its virulence is fixed. It has been transmitted by experiments from rabbit to rabbit through ten successions. The Pommery experiment was conducted with a culture of the tenth generation ?
203. *Mr. Pearson* : I am not quite clear as to that. Is it the tenth generation of the microbe, or is it that the poison passed through ten rabbits ?
204. *The Chairman* : Does the poison that you now speak of mean that the disease had been ten times transmitted from rabbit to rabbit ?
205. *M. Loir* : Yes ; from rabbit to rabbit.
206. *The Chairman* : Then I understand you that no case is on record in France in which chicken-cholera naturally spreads amongst rabbits ?
207. *Dr. Germont* : We are not aware of any case. Yes, it is a fact that chicken-cholera in France has been more or less prevalent amongst fowls. It has not been observed that epidemics amongst fowls have spread to rabbits in France.
208. *The Chairman* : It has been stated that fowls and rabbits which died of chicken-cholera were sold in the markets, and that no evil results followed. What rabbits were those that were sold in the markets ?
209. *Dr. Hinds* : I think this has been known only in the case of fowls. I am under the impression that it must be a mistake ; it did not occur with rabbits.
210. *The Chairman* : Have you any information about the spread of chicken-cholera in different kinds of districts amongst fowls—as to any difference in well-watered parts and in dry parts ?
211. *Dr. Hinds* : No, we have no knowledge.
212. *The Chairman* : You do not know whether the rainfall largely affects the spread of the disease ?
213. *Dr. Germont* : No ; there is nothing definite known on the matter.
214. *The Chairman* : Have any spores yet been discovered in the microbes ? No.
215. *M. Loir* : At 51 centigrade, the microbe is dead.
216. *Dr. Paterson* : There was a reference to milk with microbes being harmless ?
217. *Dr. Hinds* : No ; but there is a reference to milk sprinkled with microbes. It was stated that there were reasons for believing that the milk of a cow fed on food sprinkled with microbes would be harmless to human beings.
218. *Dr. Paterson* : But that has not been demonstrated by actual experiments ?
219. *Dr. Hinds* : No.
220. *Mr. Tubart* : What became of those sheep that the experiments were made upon—were they watched for any length of time ?
221. *Dr. Hinds* : They were watched for two months and were perfectly healthy then. They were afterwards sold and sent to the butchers. Two of those that were not sold were sent to the veterinary school in Paris.
222. *The Chairman* : And were they examined there or used for dissecting purposes ?
223. *M. Loir* : They were used for dissection.
224. *The Chairman* : Have any further experiments been performed on sheep which are not so thoroughly explained in this paper.
225. *M. Loir* : Experiments have been made on six different sheep at different times.
226. *Dr. Wilkinson* : And were they all perfectly healthy ?
227. *Dr. Germont* : Yes ; very healthy sheep.
228. *The Chairman* : In any case was chicken-cholera or any serious disease produced ?
229. *Dr. Germont* : No.
230. *Dr. Wilkinson* : Did you ever try this disease upon sick or weakly sheep ?
231. *Dr. Germont* : No ; the sheep were good, but not very fat.
232. *Mr. Lascelles* : What evidence is there to show that there were 1,000 rabbits at Pommery. To us it seems as if that amount of poison laid for 1,000 rabbits was insufficient for the purpose ?
233. *Dr. Hinds* : That was an estimate. The number of rabbits was estimated as being more than 1,000 by the work people on the estate of Pommery. The thirty-two that were found outside we know to be a very small proportion of those that were in the burrows. When the burrows were taken up a large number of rabbits was found lying in them.
234. *Dr. Wilkinson* : How long had the place been infested with rabbits ?
235. *Dr. Germont* : About eight years.
236. *The Chairman* : I understand that food containing microbes was placed for the rabbits on the Friday, and on Saturday some live rabbits were seen. No live rabbits were seen after the Saturday. Food not poisoned was set out for the rabbits on Saturday morning, and some of that was eaten. No one went near the place on Sunday, and on Monday food was put out again but was not touched ?
237. *M. Loir* : That is correct. It snowed on the Saturday night, and there were no footprints of the rabbits seen on Monday.
238. *The Chairman* : Was a careful search made for live rabbits during the two or three weeks which followed this experiment ?
239. *Dr. Hinds* : No ; I think not ; but none have been heard of since as a matter of fact.
240. *The Chairman* : Do you believe, then, that every rabbit on the Pommery Estate was killed ?
241. *Dr. Hinds* : Yes.

242. *The Chairman*: Dr. Stirling wishes me to inquire whether any of M. Pasteur's representatives have ever witnessed a natural epidemic of fowl-cholera.
243. *Dr. Germont*: No.
244. *M. Loir*: I have.
245. *The Chairman*: Can you state whether wild birds died when poultry were dying of fowl-cholera?
246. *M. Loir*: I do not know. I cannot say that I have seen it. I have seen two epidemics, and in neither case did I hear of wild fowl being killed.
247. *The Chairman*: Can you say that wild birds were not killed?
248. *M. Loir*: No; I cannot say; I have never heard.
249. *Dr. Stirling*: What fowls were killed?
250. *M. Loir*: I have seen chicken, duck, turkey, pheasant, and pigeon killed, but no geese.
251. *Dr. Stirling*: Was a large number of tame birds killed in the epidemics which you witnessed?
252. *M. Loir*: Yes; at least one-half of them were killed.
253. *Dr. Stirling*: Where was this epidemic?
254. *M. Loir*: I have seen one in Eu, a town on the sea coast near Orleans, not far from the Château d'Eu.
255. *Dr. Stirling*: Do you know the temperature here—how hot it sometimes is in Australia?
256. *M. Loir*: We do.
257. *Dr. Stirling*: And are you aware that it is often as hot as eighty-two centigrades in the sun?
258. *Dr. Germont*: Yes; but it is not necessary to pick the hottest part of day either to prepare or distribute the food.
259. *The Chairman*: Have calves and lambs ever been fed on food charged with microbes?
260. *M. Loir*: Not that we are aware of.
261. *The Chairman*: The next is an important question, and I do not wish you to answer it hastily. In your opinion, are there any reliable means of ascertaining, in regard to the Pommery experiment, whether all the rabbits were poisoned by directly eating the poisoned food; or on the other hand, did some only eat the poisoned food while the rest perished in a secondary way?
262. *M. Loir*: It is impossible to answer that definitely, but we think that the disease must have been communicated from one to the other, as the small quantity of food which was placed there would not have been sufficient for the whole of the rabbits.
263. *The Chairman*: Well, have you had any observations which would lead you to believe that infection could kill off such a large number of rabbits in such a very short time. Did not the phenomena seem more like those of poisoning than those of infection, by reason of the rapid and complete extirpation of rabbits?
264. *Dr. Germont*: It is impossible to give an absolute opinion.
265. *Dr. Wilkinson*: I would like to ask one question with respect to this loss of virulence. You state that the loss of virulence was the effect of exposure to air, and not merely the effect of heat. That also was the opinion said to have been held by M. Pasteur in respect to the virus of anthrax, which has since been proved to be incorrect.
266. *Dr. Germont*: I think it would have an effect from the air in both cases.
267. *Dr. Wilkinson*: But have any experiments been made, excluding the presence of everything else except air?
268. *Dr. Germont*: Yes.
269. *Dr. Wilkinson*: And in that case the air has reduced the virulence of the virus?
270. *Dr. Germont*: It has.
271. *Dr. Wilkinson*: With regard to the septicæmia of the rabbit, referred to by Davaine and Koch—have you worked with it?
272. *Dr. Germont*: No.
273. *Dr. Wilkinson*: Koch has held that that is quite different.
274. *Dr. Hinds*: That is a question which M. Pasteur has left open. He says it is still a matter of doubt whether the *choléra des poules* is like to some form of septicæmia.
275. *Dr. Wilkinson*: But is not the matter of doubt only this—that is to say, whether the micro-organism in the two things is the same?
276. *Dr. Germont*: In septicæmia of rabbit the microbe is larger than that of chicken-cholera, and it requires a higher temperature to cause death.
277. *Dr. Wilkinson*: You have not worked with the cultivation in the solid media—both Davaine's and the other.
278. *Dr. Germont*: Yes; the cultivation is the same.
279. *Dr. Wilkinson*: But does this Davaine micro-organism kill fowls in the same way?
280. *M. Loir*: We do not know that.
281. *The Chairman*: But it seems, at all events, that there is a possibility that several different diseases may kill fowls and rabbits, with very similar symptoms and similar *post mortem* appearances?
282. *Dr. Germont*: Yes; that is true of rabbits, but not of fowls.
283. *The Chairman*: Swine plague kills off fowls with symptoms something like those of fowl-cholera, does it not?
284. *M. Loir*: This is a very different disease.
285. *The Chairman*: Pasteur himself no longer thinks the disease is attributable to any organism resembling that of fowl-cholera?
286. *M. Loir*: The only resemblance is in its very small size. The microbe of swine plague is a minute bacillus.
287. *Dr. Wilkinson*: Have you ever known of a case where a rabbit has resisted this particular disease?
288. *M. Loir*: No, never—not that we have seen.

The Commission adjourned.

MONDAY, 21 MAY, 1888.

The Commission met at 10 a.m., at the Crown Lands Office, Melbourne.

*Present:—*

<i>New South Wales :</i>	WILLIAM CAMAC WILKINSON, Esq., M.D., M.P. EDWARD QUIN, Esq.
<i>Victoria :</i>	HARRY BROOKES ALLEN, Esq., M.D. EDWARD HAREWOOD LASCELLES, Esq. ALFRED NAYLOR PEARSON, Esq.
<i>New Zealand :</i>	ALFRED DILLON BELL, Esq.
<i>Queensland :</i>	JOSEPH BANCROFT, Esq., M.D.
<i>Tasmania :</i>	THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Charles Myles Officer called in and examined:—

289. *The Chairman.*] What is your occupation? I am a landowner at Mount Talbot, in the Wimmera district, in this Colony.
290. Have you erected wire-netting fences? Yes; about 15 miles, more or less.
291. When did you erect the first line of such fence? I think about 2½ years ago, as near as I can recollect. Five miles of the fence was of netting 3 feet 6 inches wide.
292. Have you altered either the height or width of the netting since? I have not altered the height, but I have altered the mesh to 1½ inch. I find it quite sufficient.
293. Is your land leasehold or freehold? Freehold.
294. What is the value approximately per acre of the land which you have enclosed? About £2 10s. or £2 15s.
295. Have you personally found rabbits to go through a mesh of 1½ inch? I have never known a rabbit to get through myself, but I have been told that small rabbits have got through—a very small rabbit.
296. Do you think that such a small rabbit would be able to live, and establish itself in its new home? No; I do not.
297. What height of netting have you found a rabbit to jump or climb over? I never knew a rabbit to try to jump or climb over. I never tried any lower height of fence than 2 feet 6 inches out of the ground.
298. Have you heard from any trustworthy source of rabbits getting over netting 2 feet 6 inches out of the ground? No.
299. In erecting rabbit-proof netting fences around a large run, say of 100,000 to 500,000 acres, what height of netting and what width of mesh would you use? Three feet netting and 1½-in. mesh, No. 18.
300. *Mr. Lascelles.*] The gauge does not matter? No.
301. *The Chairman.*] How many inches do you reckon the netting should be sunk in the ground? Six inches; but I would point out that in all cases I do not sink it in the ground. In light sandy soil I have found it better to turn six inches of the wire down, with a lap outwards, so as to make a flange.
302. That would prevent rabbits passing in one direction, but would it prevent them from passing in another? No; that is the chief difficulty; but I think there would be very few rabbits inclined to go out. Whatever fence may be erected, it requires constant supervision. Of course, one rabbit occasionally will be more cunning than others. Such a one will get in, and will soon establish a run, so that constant supervision is necessary even with the most careful wire-netting.
303. Then it is your opinion that no matter how you arrange the netting some rabbits will get in from time to time? Yes; and constant supervision is therefore necessary.
304. Is there any other information which you would desire to give this Commission concerning the gauge and mesh of rabbit proof-netting? No; merely with regard to its erection. Later experience satisfies me that it is better in every case to sink the wire 6 inches in the ground.
305. Would the arrangement you suggest for erecting fences in sandy soil be suitable in the case of fences erected at the joint expense of two proprietors? No, I should think not; but in my case Crown land adjoins, and I have not considered the Crown at all, as they do not pay me anything. I had to bear the whole expense myself.
306. In the case of subdivisional fences in sandy soil, what would you do? I would turn the netting down with a lap one way; but with regard to this I may say that I never think of subdivisional fences, merely boundary fences. When once you have the rabbits excluded you can easily deal with them.
307. You do not think that in dealing with very large areas owned by one person it would be necessary to have subdivisional fences? No; I would never go to that expense.
308. *Mr. Pearson.*] What is the value of this land? It is worth about £2 10s., and would carry two sheep to three acres.
309. *Mr. Quin.*] Do you think this plan would be satisfactory in country which carry only one sheep to 10 or 15 acres? No. That would be very poor land. I endeavour to erect fences in the cheapest possible way. You must have the cheapest netting for such land.
310. *The Chairman.*] The question is whether in dealing with very large areas and very poor land it would be possible, as a practical matter, to deal with the whole of a large run at once, or whether some subdivision would not be necessary? I think the expense would be a great obstacle in attempting anything like subdivision on the poorer land, where it is more necessary to practise economy. I would deal with the run as a whole, and merely fence the boundary.
311. *Mr. Quin.*] Would you not think the Government should encourage holders to divide runs into small areas, in which the rabbits could be more effectually dealt with? I think it would be advisable if the Government could be got to assist. I think it should be done in this case; it is a mere matter of expense.

312. *The Chairman.*] Will the country stand the expense? It depends exactly on the position of the leaseholder. If he is in a position to pay the expense, it will pay him to do so.

313. *Mr. Lascelles.*] You have a large run on the Darling, I believe. If it were enclosed, could you not deal with the rabbits better than by any present known method? Yes; a year or eighteen months ago I was firmly impressed with the absolute necessity of getting wire netting to fence the run whether the Government assisted or not. I thought, as the Government was deeply interested in the matter, that it was their duty to help the pastoral tenant. But since that time I have come to the conclusion that wire netting is not necessary at all. There are two reasons for this:—There is a disease prevalent on the Darling. How it was introduced I don't know, but the rabbits have disappeared by thousands, and I am, therefore, under the impression that we are not required to go to the expense of wire netting since the rabbits have decreased, so that it is now hardly possible to see one.

314. *The Chairman.*] Do you know this by personal observation or by hearsay? I heard it from my manager. I have not been on the Darling since the rabbits first appeared there. Although disease is a very powerful auxiliary, I place far more reliance on the methods we have in our own hands, such as destroying the rabbits by poisoned grain; distributed by Messrs. Lascelles and Anderson's machines. With the aid of these distributors I do not fear the rabbits at all, nor did I think we will have to go to the expense of enclosing the run with wire netting.

315. *Dr. Wilkinson.*] Can you give us any idea of the cost of fencing in a run with wire of the description given? When I first commenced fencing at Mount Talbot wire netting was very costly—something like £50 per mile, but I believe the work can now be done at a very considerably less cost. Most of my fences were erected, and all I had to do was to attach the netting to them. I think it can be done now for about £30 per mile. I have not purchased any netting for the last eighteen months, but I think mine has cost me some £50 per mile, including the fixing of it in position.

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Agar Wynne called in and examined:—

316. *The Chairman.*] Where do you reside? I am a landowner at Terrinallum, Darlington, near Camperdown, in the western district of Victoria. I have erected 50 or 60 miles of wire netting fences.

317. When did you erect the first line of such fence? Part of it was erected before we purchased the place, in August, 1881. The fence was commenced two or three years before that. I am practically acquainted with the results gained from such fencing since 1882.

318. What height of fence and what width of mesh did you adopt? Part of the fence is enclosed by stone walls. The other part, on the plain country, is open wire fences. On the walls we used 2 ft. 6 in. netting, 1½-in. mesh, and 16-in. gauge.

319. *Mr. Bell.*] What is 16-in. gauge? It is a little stronger than 17 or 18. The gauge has reference to the thickness of the wire.

320. *The Chairman.*] And away from the walls? We used 3 ft. 6 in. netting, placed 9 in. in the ground, of the same mesh.

321. Have you altered either the height of the netting—especially that used in the open—or the width of the mesh since that time? No.

322. *Mr. Lascelles.*] Have you kept to the 3 ft. 6 in. netting all through? Yes.

323. *The Chairman.*] Is your land leasehold or freehold? Freehold. The value is approximately about £5 per acre.

324. Have you ever found rabbits go through wire of 1½-in. mesh? Never.

325. If it were possible for very young rabbits to get through 1½-in. mesh, could they live and establish themselves in their new home? No; I do not think so.

326. What height of netting have you found rabbits to jump or climb over? I have never known them to climb or jump over netting. Around our garden we have netting no more than 2 ft. in height, and we never found any rabbits inside that, although they were there before. That fence is 2 ft. out of the ground.

327. If you were at present called upon to erect rabbit-proof netting fences around a large run of, say, 100,000 or 500,000 acres, what height of netting and what mesh would you use? In my opinion it should be about 2 ft. or 2ft. 6 in. out of the ground, with 1½-in. mesh—this would be ample.

328. Supposing you were using 3 ft. netting, how many inches would you recommend that it should be sunk in the ground? From 6 to 9 inches.

329. Would you vary the mode of erection of the netting according to the nature of the ground, or would you sink the netting perpendicularly to a certain depth? In stony ground it would be almost impossible to do this. Where we have walls we dig trenches and fill them up with loose stones, and the rabbits are never able to burrow under the stones. These trenches are about one foot wide.

330. Do you use any netting whatever? There we have close walls, and the netting is on the top. I would bury the netting in sandy soil. We curve ours a little.

331. Do you use netting only as a boundary fence over the whole estate, or do you subdivide? As an experiment, we netted in a section of 4,000 acres. Two of the boundaries are enclosed by walls—the other two by wire netting sunk in the ground. We turn the flange end of the netting outwards from the paddock to that part very much infested with rabbits. After it was enclosed, we cleared the rabbits that were inside, and it has been free from rabbits ever since.

332. Would a flange erected like that prevent rabbits from passing from the enclosed area into the open ground? Yes.

333. Then you do not think the direction of the flange has very much to do with the power of the rabbit to pass through in one direction or the other? I do not think so. When rabbits burrow, they go close to the object, and when they meet with the netting they go back. I think, however, that netting is absolutely a bar, if sunk 6 inches in the ground.

334. If you were controlling a very large run of very poor land, do you think it would be possible, as a matter of practical expense, to deal with the whole run at once, without assistance from Government, so as to successfully extirpate the rabbits? I can only tell you what we have done. We have 48,000 acres of land. It was covered with rabbits when we purchased it. In three years over 760,000 rabbits were destroyed, and the place is now practically free from them.

335. And the only subdivision which you made was in connection with these small trial experiments? Yes.

336. Do you think the same thing would be possible if you were dealing with 500,000 acres of very poor land? If you spent enough money to clear it, I think it would.

337. In dealing with leasehold, could it be possibly expected that the lessee will spend enough money to clear a very large run, say, of 500,000 acres, apart from subdivisional fences at all? It would be much better to erect subdivisional fences; but still I think that, on a large area, rabbits could be easily kept down if the whole of the boundaries were fenced in.

338. Could the rabbits be extirpated, in the first instance, without a cost that would be ruinous to the lessee without Government assistance? No. I think the Government should assist in fencing; and, if so, the lessee could keep down the rabbits.

339. *Dr. Wilkinson.*] Have you purchased any of this particular class of netting lately? No; not within the last three and a-half years. Three ft. 6 in. netting cost us £48 per mile—this was the first cost. The netting is now about one-half the price that we paid for it. I think you could now purchase and erect the netting at £50 per mile. I am not quite positive about it.

340. *Mr. Pearson.*] How long is it since you cleared the 4,000 acres? About four years. Only three rabbits were found there since. This was caused through the gates being allowed to remain open.

341. How many sheep will your land carry to the acre? We shear about 60,000 sheep, and keep besides a number of cattle and horses. We have altogether 47,350 acres.

342. *Mr. Tabart.*] You consider that a fence 2 ft. 6 in. in height and 1½-in. mesh is absolutely proof against rabbits? I do; and I have never known rabbits to get over that.

Joseph McGaw called in and examined:—

343. *The Chairman.*] You are a landowner in New South Wales? Yes; my land is situated on the Murrumbidgee.

344. Have you erected any wire-netting fences? No; we are putting up the first now, but it is not yet completed. We are preparing for it. We propose to erect 80 miles of fencing, the height of which is to be about 3 ft., and 1½-in. mesh. My land is freehold, principally—that is the portion which I am about to fence.

345. What is the value, approximately, per acre, of your freehold land? From 30s. to 35s. per acre. Some land in the neighbourhood has been sold up to 38s. per acre, improvements included.

346. Have you had any personal experience in the use of rabbit-proof fencing? During a lengthened residence in England I had the opportunity of seeing a great deal of it. I made it my business to see what they were doing there.

347. Can you say whether rabbits will get through a fence of 1½-in. mesh? No; I have never known a case, but I do not say that they could not.

348. If a young rabbit did get through such a fence, would it, in your opinion, be able to establish itself in a new country? I think not; I think it would be too young to live.

349. What height of netting do you think would be an absolute bar to rabbits getting across by jumping or climbing? I do not know that they either jump or climb; but I consider the 3 ft. netting we are putting up, with six inches in the ground, would be quite sufficient to bar their progress.

350. What kind of netting would you use in enclosing very large areas of, say, 100,000 or 500,000 acres? The same kind as I am now about to use.

351. How many inches do you intend to sink it into the ground? Six inches. I would put the netting in straight. I think this is the best manner for general use, so far as I have seen. They do it so in England.

352. Would you vary the depth according to the nature of the soil? Yes; it would cost a little less, where the ground is hard, to put it in 3 or 4 inches, and I would do so, to save expense.

353. Is there other any evidence which you would like to give to this Commission touching the use of rabbit-proof netting? I do not know of anything else which would be of service. I have no object in giving evidence in this matter, except to help my fellow-pastoralists. I have spent more money on that kind of experimenting than I can afford.

354. Is it a fact that before adopting this kind of fence on your own land you visited Mr. Lascelles' station, to satisfy yourself as to the value of this fencing? I obtained permission from Mr. Lascelles to look at the Lake Cooroug property, I went down and spent a considerable time there, and I was so satisfied with what he had done that I adopted his system.

355. *Dr. Wilkinson.*] Did you say that you had purchased netting of this description lately—what is the cost per mile? It cost £21 per mile on board the ship in London, but I could hardly tell you the cost of putting it up. Roughly, I think we put it up at a cost of £3 per mile, as we erect it on existing fences. We had a plough made for shaping the groove, which will lessen the cost considerably. The cost would alter if the fence were erected in timber country, because in the timber country the plough could not be used. The freight out here is 27s. 6d. per ton, which must be added to the cost already stated.

356. *Mr. Quin.*] Now in large areas would you recommend subdivisional fencing, or do you think it sufficient to fence in the boundary? I think subdivision would assist very much. In my own case I intend to divide, although the property to be enclosed is only about 100,000 acres.

John Bertram called in and examined.

357. *The Chairman.*] Where do you reside? On Euston Station in New South Wales, and the property I hold is situated there. I erected about three or four years ago 6 miles of wire netting fence as a trial. I am now erecting a great deal more—about 30 miles.

358. What is the height and mesh? We use 3 feet, and 1½-inch mesh. I have not altered either the height or mesh.

359. What is approximately the value of your land? About £2 per acre. We have about 20,000 acres of freehold which we have wire netted; the rest is leasehold and this is what we are now enclosing. I have never found rabbits get over or through wire 3 feet high, and 1½-inch mesh.

360. If a very small rabbit got through such a mesh, do you think it could possibly establish itself in its new home? No; I do not think so. A rabbit that would go through a mesh 1½ inch would not live. I have never known rabbits to jump or climb over fences.

361. How many inches are your fences sunk in the ground? About 6 inches. If the ground is soft the fence might go a little deeper especially if there were some special attraction on the other side in the way of

of food to draw the rabbits over. If the ground were very hard, I would only put in the fence about 3 inches. I have only found two holes, and these were old burrows that the rabbits had gone through; when they came against the netting they merely scratched.

362. How do you put in the netting? Perpendicularly. I think that is the most simple method. There is nothing more concerning fencing I would care to say. Of course fences require a great deal of care in putting up; a rabbit-proof fence in my opinion wants well looking after.

363. In dealing with large areas would you erect subdivisional fences? It would depend on the size of the run. In dealing with a large block it would save expense to subdivide for future dealing with rabbits. I think that constant supervision over the fences is necessary.

364. Are you actually at present subdividing your runs? Yes; we divide into 200 square miles. I do not think a larger block than that could be worked to advantage. We think this is large enough to make a trial on. Of course, if it can be done better we will subdivide into larger areas. Seven or 8 acres of this land will keep a sheep.

365. What is the cost of the fencing? It will cost about £31 per mile to put the netting on the fences; the cost is from £16 10s. to £18 per mile in London, and the Government of New South Wales charges us £3 per ton as duty. We pay £5 per mile for erection. This run is 145 miles from the River Murray, and we have railway and water carriage to pay.

366. *Mr. Tabart.*] What description of fences do you put this wire netting on? Six-wire boundary fences.

Andrew Anderson called in and examined:—

367. *The Chairman.*] You are a landowner in the mallee district of Victoria? Yes.

368. You have erected rabbit-proof wire netting fences? Yes; about 32 miles. We commenced this line of fence about two and a-half years ago. We used netting 3 feet high, 1½-in. mesh, and 17 gauge. We have not altered the netting in any respect since. My land is partly leasehold and freehold. Some of it we are leasing at 2s. 6d. per square mile.

369. Are you enclosing both good and very poor land? Yes.

370. Have you ever known rabbits to get through a fence of 1½-in. mesh? I have seen very young rabbits get through, but not after they have left their home. Before I began netting at all, I visited a place in the midst of the good country which was swarming with rabbits. This was fenced in with 3 feet netting and 1½-inch mesh, and the rabbits inside that place starved. Within 12 or 18 inches of this fence there was splendid feed, while inside there was no more grass than is on this table. The person who kept the rabbits there put some poisoned chaff inside to put them out of their misery.

371. It is your belief that even if they got through this netting they could not establish themselves in the new country? It might be possible, but the chances against them would be so great that they are not worth considering. A greater risk would be persons throwing them over.

372. What was the character of fence around the land on which the grass had been eaten away? It was simply a few sticks put down, with good posts at each corner for straining posts. It was only put up as a temporary fence. I have known a wire-netting fence to last for seventeen years. The lawn was being constantly watered, yet the netting was as sound to all appearance as when erected. I have seen it in Hawthorn, where wire netting has been used for thirty-five years in an aviary. It is as sound now as when put up.

373. Have you ever known from your own observation, or from trustworthy evidence from others, of any rabbit jumping over fences 2 feet 8 inches out of the ground? No; but I have known them to get over at the corners where posts have been put up as strainers. I have known one fence 1 foot 9 inches out of the ground where the rabbits were in thousands, and I have known only one rabbit to get over.

374. In erecting rabbit-proof fencing around a very large run of poor land, what kind of fence would you adopt? Three feet high and 1½-inch mesh and 17 gauge. We sink the wire from 3 to 4 inches in the ground. Where there are sand hills or pine ridges I would be disposed to put the wire a little deeper, say 6 inches. In dealing with holes near fences, I would have a special piece of netting to go right down into the ground and fasten on to the bottom of the other fences; and also a piece to go right across the depression. I went along a fence that has been erected for over two years, at Waitehie, in the mallee country, and to which nothing has been done for over six months, and yet in the 12 miles I saw not one place where rabbits could get through.

375. Do you put the wire into the ground perpendicularly? Yes; and I think that method is the best for general use. When the rabbit meets the fence and wishes to pass he scratches close to the fence. He does not in the first instance see it, but his toes become entangled with it in burrowing. The toes are thus hurt, and the rabbit tries to pass on to a spot a few inches away. He cannot do so; he hurts himself and relinquishes his endeavour. If a portion of the fence were flanged outward away from the paddock out of which the rabbit was trying to pass, his feet would not get entangled in this manner, and ultimately the rabbit would make his way in. A flanged netting is a protection in one direction but not in the other.

376. In dealing with a very large run of poor country would you recommend the use of subdivisional netting fences. There is a limit of course in this matter. I think we could treat 200,000 or 300,000 acres in that way. If the land were my own I would deal with it just as well as if it were subdivided; but if I had a neighbour who would not begin at the same place and time, the plan could not be worked. Therefore, I think it necessary that each owner should have his own land ring-fenced, but not necessarily into small blocks.

377. Then could you state what area would be outside the limit which could be worked in one block? If the land were my own, and I were not afraid of the negligence of my neighbours, I could deal with 500,000 acres in one block.

378. Do you think that a large leaseholder with very poor land could possibly ring-fence in one block the whole of his estate, and so cope with the rabbits? I have 260,000 acres of leasehold which carries only about 30,000 sheep. If that were not ring-fenced and fenced with rabbit-proof netting, the run must be abandoned. On the better country we have 32 miles of rabbit-proof fencing. The other is wire-fenced for wild dogs with 4-inch mesh.

379.

379. Is there any other evidence that you would like to give? I have been in the mallee during the last few months, and I have noticed a large number of rabbits dying where there is no poison and no disease that I am aware of. In fact the country is as bare as this floor, while inside the netting there is fair grass. We had laid poisoned grain where there is grass, and the rabbits have been thinned out. On the outside we find the rabbits dead in thousands as well. Having made a *post-mortem* examination on some of these rabbits, I have found that they died from a stoppage in the bowels, due to eating bark. I attribute the great numbers that have died this year to the heavy rains that we have had in Victoria, in January, which caused a great growth of scrubs and bushes. Since January and February we have had continued dry weather, and the feed has got dry. The dryness of the grass, and the sappiness of the bark have had much to do with the mortality. The bark is very astringent and fibre indigestible.

380. *Mr. Tabart.*] What was the nature of the country where the wire netting was so durable? It was loamy soil. I may mention that a farmer near St. Arnaud—Mr. Willoughby, of Gree Gree village—told me that several of his fowls had died from disease. Cases have occurred 6 and 7 miles apart. He promised to obtain the intestines of the fowls for me, but I did not yet receive them. I mention this, as I understand you are anxious to find out if chicken cholera exists in the colony.

George Henry Greene called in and examined:—

381. *The Chairman.*] Where do you reside? At Iandra, in the Young district, New South Wales. That is where my property is situated. I had begun to erect wire netting, but discontinued the work until I saw whether the Government of New South Wales would make a more liberal arrangement with regard to the work.

382. When did you commence the work of fencing? About four months ago, and have erected between 6 and 7 miles of it. I originally intended to put up about 30 miles. I use netting 42 inches height, 1½-inch mesh and 16 gauge. I have not used any other kind of fencing except that.

383. Do you purpose, from your personal experience of other kinds of netting, to alter the character of any fence to be put up by you in the future? If the Government of New South Wales give the privileges proposed I would prefer to use 36-inch netting, 1½-inch mesh, and 17 gauge.

384. Have you satisfied yourself by personal inquiry that rabbits cannot pass through such a fence? So far as I have been able to ascertain, rabbits have not gone through 1½-in. mesh. I have been in the neighbourhood of Bacchus Marsh, where the fences are only 3 feet high, 4 inches of which are in the ground, and 1½-inch mesh. There seems, however, to be a difference of opinion as to whether the mesh was 1½-inch or 1¾-inch. I took a rule with me, and in the most careful manner measured the fences in many places. On one portion of the flats I found that the netting was 1½-inch, while on the other I am prepared to say it was 1¾-inch. These fences have been up for eight or nine years, and have been impervious to the rabbits.

Edmund Hayes called in and examined:—

385. *The Chairman.*] Where do you reside? At Ingleby, Winchelsea, in the western district of Victoria; and my property is situated there. I have erected wire netting fences during the last three or four years. I have put up about 20 miles of it; the height of the netting is 36 inches, 1½-inch mesh, and 18 gauge. More recently, we have used 1¾-inch mesh, 17 gauge, and 36-inch high. It is stronger and better than the other. My land is mostly freehold; the value of some of it would be from £20 to £30 per acre. The wire netting encloses some of the worst portions.

386. Have you found rabbits get through 1½-inch mesh? No; I have never seen anything of the kind. It would be difficult to say whether a rabbit could get through or not, but if so I think he would go back again to the burrow. I have never known a rabbit to get over one of these 3 feet fences, 2 feet 8 inches out of the ground. Years ago we proved on the plains that rabbits would not get over such a fence; we erected a mile of it temporarily. I would recommend that fences should be put from 4 to 6 inches in the ground. In sand I should recommend that trenches be piled in with timber. Stone would be better if you could get it; I put netting in perpendicularly. I believe in rabbit-proof fencing as the only reasonable mode of coping with the rabbit difficulty. This applies to country of whatever character.

James Finlay called in and examined:—

387. *The Chairman.*] Where do you reside? At 61, Williams Road, Windsor. I was managing proprietor for my brother in the Wimmera from 1863 to 1888. I have erected some 5 miles of rabbit-proof fencing. The best kind of fence is the 3 feet high, though higher would be better.

388. Do you think there is any risk of rabbits getting over if the fence is sunk 4 inches in the ground? If closely confined they might jump, but in a large paddock I do not think they would.

389. Have you known from personal observation that rabbits have jumped over wire netting 2 feet 8 inches out of ground? Yes; I have seen it myself.

390. Is it not a very rare occurrence? Yes; very rare.

391. Do you think it is worth while to add to the cost of netting in order to meet these very rare occurrences? Yes; I should say it would.

392. You think, then, the netting does not fulfil its purposes unless it proves an absolute bar to the rabbits? I think the additional height would be an advantage.

393. Even to meet the case of a few rabbits that might jump over? Yes; but at the same time a 3 feet fence is very good.

394. Have you known rabbits to get through 1¾-inch mesh? The mesh that I referred to was 1½-inch. I have often seen young rabbits with their heads in the mesh and they could not get them back again. I have known rabbits to get under a fence buried 4 inches in the ground. The fence wants watching. Even if a hole be made it is not likely that many will go through if the fence is watched by a careful man. I still think a fence 4 inches in the ground is sufficient.

395. *Mr. Lascelles.*] Was not the fence at Townaninnie 3 feet high? Yes; and it was fairly effective.

396. If so would it be necessary to have the fence 6 inches higher in poorer country? I don't think it would be necessary.

Alexander M'Edwards called in and examined :—

397. *The Chairman.*] Where do you reside? At Hawthorn Road, Caulfield. I have an estate on the Lower Murray, adjoining Mildura. I am erecting a rabbit-proof fence for about 60 miles; I am using two different kinds of fencing; I use the 36-inch netting, 1½-inch mesh; I had been putting the fence 6 inches in the ground, but at present only 4 inches, as I find it quite sufficient; I put it in almost perpendicularly, but slightly bending out.

398. Have you ever known a rabbit to get through 1½-inch mesh? No; I do not think a very young rabbit would be able to go through and establish himself on the other side. I think he would die if he got through. I have known a rabbit to get over a fence 2 feet 8 inches out of the ground; still I do not think that would be any reason for putting up a more expensive fence. Rabbits could not get under a fence sunk 4 inches in the ground.

399. If a rabbit were to succeed occasionally would this be a reason for burying the fence deeper, or should it be made a matter of extra supervision? I think there should be constant supervision; a boundary rider after a few months would do all the work.

William Cumming called in and examined :—

400. *The Chairman.*] Where do you reside? At Marlbed, Wurrumbirchip, in the mallee district. I have employed rabbit-proof fencing on the southern boundary of my property, on two blocks—about 28 miles. My land is leasehold; the netting I have adopted is 3 feet high, 2 feet 8 inches out of the ground, mesh, 1½-inch, and No. 17 gauge.

401. Have you found rabbits to get through a fence of 1½-inch mesh? No; and if a young rabbit did get through I do not think it would be able to establish itself on the other side.

402. Have you ever known rabbits to go over a properly constructed netting 2 feet 8 inches high? I cannot answer that question directly. I have never known of any case where a rabbit has got over a netting fence 2 feet 8 inches out of the ground. I have occasionally known a rabbit to pass under a fence 4 inches in the ground. I think supervision the right thing, and putting a fence deeper into the ground. Certainly 6 inches would be very effective, but 4 inches is practically sufficient if properly supervised. I think no mode of dealing with the pest is thoroughly effective, unless accompanied by the use of wire netting.

Hugh M'Cann called in and examined :—

403. *The Chairman.*] Where do you reside? I live at Horsham. I am one of the Government rabbit inspectors and Crown land bailiffs. I have personally had some experience of rabbit-proof fencing. I think that a wire fence 3 ft. high, of 1½ in. mesh sunk 4 in. in the ground is a good and effective barrier. I think there is no real practical good to be obtained by increasing the height of the fence, or by limiting the mesh, or sinking it deeper in the ground. It depends on the country, of course. If you have a loose country you will have to sink deeper—to a depth of 9 in. We have a good deal of that class of country—of loose, sandy soil, where the rabbits go down deep into the burrows. I think there should be about 2 ft. 6 in. of wire above the ground. The 1½-in. mesh is thoroughly satisfactory; 1¼-in. I know is not. If there had been any real failure with the 1½-in. mesh I must have known of it. I think it is quite possible that 2 ft. of wire above the ground would be sufficient if there was a barbed or plain wire about 3 inches above the netting on top. Then the expense would be about as much as the other.

404. *Mr. Pearson.*] Do you think that in sandy ground 4 in. is sufficient to sink the fence? No. I have known rabbits to get down and get under. I have seen a case of that kind.

405. *Mr. Lascelles.*] Could the difficulty with regard to loose ground be met by special precautions without modifying the depth which the fence is sunk in the ground? Yes.

Robert Blyth Kerr called in and examined :—

406. *The Chairman.*] Where do you reside? At Bacchus Marsh. I am one of the rabbit inspectors of the Colony, and have had some experience in connection with rabbit-proof fencing. I have seen a great deal of it, and know the results that have been obtained from its use.

407. What kind of fence would be economical and effective as a rabbit-proof fence? The best that I have seen is 3 ft. high, 1½-in. mesh. I think 1½-in. mesh is necessary. I do not think 1¼-in. mesh is quite satisfactory; but that it would be dangerous to adopt it, because the rabbits might get through it. I think, however, this danger could be met by supervision. I do not think the 1¼-in. mesh would be more advantageous than 1½-in. I think the 1½-in. mesh the best that could be adopted. Fences should be sunk in the ground, but not at an equal depth in all kinds of soil. In very hard soil, 3 or 4 in. would be enough.

408. *Mr. Lascelles.*] I understood you to say that you have seen rabbits getting through 1¼-in. mesh? No; I did not see any get through, but I have seen them inside such a fence in a crop of lucerne.

409. *Mr. Pearson.*] Do you know of rabbits getting over such a fence? I have seen rabbits get over a fence 2 ft. high. I have seen it done often. They partly climb and partly jump or fall over. I have also seen a rabbit get up a netting 3 ft. 6 in. high. This occurred at Bacchus Marsh. The enclosure was a small one of about 6 ft. square.

The Commission adjourned.

WEDNESDAY,

WEDNESDAY, 23 MAY, 1888.

The Commission met at 10 a.m., at the office of the Commissioner of Crown Lands, Adelaide.

Present:—

*New South Wales*: WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.  
EDWARD QUIN, Esq.  
*Victoria*: HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq., F.R. Met. Soc., &c.  
EDWARD HAREWOOD LASCELLES, Esq.  
*New Zealand*: ALFRED DILLON BELL, Esq.  
*South Australia*: EDWARD CHARLES STIRLING, Esq., M.D.  
*Queensland*: JOSEPH BANCROFT, Esq., M.D.  
*Tasmania*: THOMAS ALFRED TABART, Esq.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Dr. STIRLING.

Allan M'Farlane called in and examined:—

410. *The Chairman.*] Where do you reside? At Wellington Lodge, East Wellington, South Australia.
411. I believe you hold considerable freehold property? Yes; 40,000 acres.
412. I believe a large portion of this has been infested with rabbits? I never allowed it to be absolutely infested. I met them at the very first, and told the other people what was coming. In 1884 I paid for scalps of 80,000 rabbits, besides what my men killed. I sometimes killed as many as fifty per day myself.
413. Now tell the Commission what you did? I found that the country surrounding me was unoccupied, which was the first difficulty I had to contend with. The first thing I did was to telegraph to England for wire-netting. I bought all I could get in Adelaide at once. I was compelled to take the 2-inch mesh because I could not get anything else; it was 3 feet wide, and 6 inches in the ground; the bottom part sloped outwards in the direction in which the rabbits were coming.
414. *Mr. Lascelles.*] How much lower in height did that make the fence? It lowered it about an inch—not more.
415. *The Chairman.*] Did you fence in the whole run? No; only the northern boundary towards which the rabbits were coming. I fenced in just about 5 or 6 miles; this was in the beginning of 1884. My experience is that large rabbits can get through the 2-in. mesh. I then got 1½-in. mesh from England, having in the meantime had iron fences ready for it. I then removed a large portion of the 2-in. mesh, and substituted 1½-in. mesh for it. I also tried to utilize the 2-in. mesh by doubling it, but that was no good. The meshes now and again came perfectly straight. I took all this up and replaced it by 1½-in. mesh. My experience was that 95 per cent. or more rabbits were kept out by it because the grass inside was good while outside the country was perfectly desolate. Still I do not think that 1½-in. mesh will keep all rabbits out. My object was absolute extermination, and my fences included about 60,000 acres of scrub and open country—all shades of country. I carried on all sorts of experiments with rabbits inside the woolshed. My men told me many times that the rabbits got over the netting, but I would not credit it. Some blackfellows told me that they saw the rabbits walk up the netting in one place. I had twenty or thirty rabbits taken out of the burrows and put in the woolshed, and tried all sorts of experiments with various meshes and slopes of netting. I made the netting fully 3-ft. high in front, and also put it across the middle of the bin, and put food on one side,—cabbages and lettuces, and kept the rabbits starving on the other side. They went over the netting from the sloping side with the greatest ease—they went over it as if it were a ladder. From the other side they could not climb up the netting, but the small rabbits darted right through it. These were good large rabbits, and could get along independently of their mothers. Ten or twelve of them would go through the fence in a moment. Outside this I put up one piece of netting 36-in. high, and one rabbit got over that, and, on another occasion, I found a young rabbit hanging by the head in it, and several others on the floor going about. After searching, I found that the doe had climbed over the netting, and in climbing over it had dropped her young one. I could see plainly enough where she had gone over, because she left some fur on the top of the netting; she must have leaped or climbed some 3½ ft. because the bins are that height above the ground. I put her in again, and next morning she was out over the netting again. Rabbits are perfectly capable of getting over a low netting, and I was told by a farmer near me, that he had most conclusively proved that rabbits had got over the netting. He put a lot of snares on the top of the netting, and next morning three rabbits were in the snares.
416. *Mr. Lascelles.*] Was that a properly erected fence? No, it was not; it was a slovenly fence. It was fairly well put up, however, and the mesh was 1½ inch. The fence was fairly perpendicular, but it was not like mine. This proves that a fence 2 ft. 6 in. high is altogether too low.
417. *The Chairman.*] You have never had any experience of this netting in the open country, and seen rabbits get through it? No, not in the open country; but I have heard of them going over it there. I should have said that subsequently I added another width of netting, making my fence 5 ft. 6 in. high, to keep out the wild dogs. I would not say that it would be necessary to make it so high for rabbits. It was the only width of netting that I could get quickly at that time. I telegraphed to England when fairly convinced that the rabbits could get through this fence, and I got 20 miles of netting, 19 gauge, 1½ mesh, and 1 foot wide. This ribbon I put along the surface of the ground on the inside of my netting, and lashed it to the other. This was to prevent the small rabbits from getting through.
418. *Mr. Bell.*] So that you really had a double netting fence? Yes; and I would rather have anything than have the rabbits.
419. *The Chairman.*] What was your experience of this fence? It was ridiculously costly, but it was absolutely perfect against rabbits and dogs. Strangely enough, I found the rabbits more inclined to climb, and the dogs to go under. This is very contradictory, but still it is true. Sometimes a dog will manage to get under.
420. *Professor Allen.*] Is it your opinion that the ordinary fence sunk 6 in. in the ground is a fairly complete protection against rabbits, or not? Well, it depends something upon the nature of the soil. If you trench the ground, or make sufficient soil, the rabbits will tackle it, but not hard virgin ground. If the ground is sandy, they will scrape and get under.

421. Then the danger of getting under is a thing you would deal with by a more strict supervision? Yes I think you might as well put the netting straight down as sloping outwards, if the soil is suitable. In one place where I first put my netting up I had a little trouble: I took some 2-in. mesh and split it, fixed it to the 6-in., and buried the whole thing so that it was out about 2 ft. from the fence. No rabbits came through after that.

422. *The Chairman.*] Did you find, after these fences were put up, that much had to be done in the way of looking after them? Yes; a rabbit fence is no good unless it is constantly looked after. My men patrol the fence nearly every day.

423. *Mr. Tabart.*] I suppose you keep boundary riders for the purpose? Yes.

424. *Mr. Lascelles.*] You have stated to us that you first erected 36-in. netting and 2-in. mesh. How long was it before you discarded that? It remained up for 5 or 6 months.

425. During that time did you ever hear that rabbits jumped over that fence? There was no need of them to jump over, because they could get through.

426. Did you order an exact height? I had no experience when I ordered the 36-in. netting. I wanted to get it quickly and cheaply.

427. *The Chairman.*] Then so far as you can say now, you are satisfied that wire netting protects your run? Yes; and the rabbits have died out since. Before that we could not tell where they were coming from. I never ceased during the whole time to tackle the rabbits in every way except by poisoning.

428. *Mr. Tabart.*] The whole of your land is not enclosed with this 5-ft. netting? No, only along the dense mallee scrub. I put it on the railway fence also.

429. Then the balance of your fences would be 2 ft. 6 in. out of the ground? No; they are the ordinary height of cattle fences.

430. Do you consider that 2 ft. 6 in. out of the ground is an ample height to prevent rabbits getting over? I consider 2 ft. 6 in. out of the ground to be no good whatever.

431. *Mr. Lascelles.*] Then what is the ordinary height of your fence? It is about 4 ft. high, where I bound my neighbours. I cannot put down the netting with a slope, but I put it up to the top of the fences.

432. *Dr. Wilkinson.*] What is the area of land you have enclosed? 60,000 acres. My neighbours at Pottaloch have had rabbit netting, but still they have had ten times the trouble that I have had.

433. *The Chairman.*] Why have they not been so successful as you? I am bound to say that some of them are most successful in the way of destroying the rabbits. Some of them put up netting the same as mine, 3 ft. high, 1½-in. mesh. They were fairly successful, but only by great labour—double the labour that I have had. It was much more than was necessary to kill the few rabbits that they had to deal with.

434. Did that labour induce them to take any other steps to do away with the pest? They have now ordered netting 48 inches wide and 1½-in. mesh and are about to put up other fences just inside the present ones, putting 18 inches, at the bottom and 3 feet above ground.

435. Then the inference you draw is that the first fence did not keep the rabbits out? I am as sure of it as I am of sitting here, because they have now reduced the mesh and have given orders for new netting which they intend to carry down to Lake Albert.

436. *Mr. Lascelles.*] Is the country belonging to your neighbours at Pottaloch more or less difficult to deal with than yours? No, it is not as bad as mine.

437. *Mr. Tabart.*] You say you have 60,000 acres enclosed. Have you any subdivision fences, or is the land in one block? Merely one or two lines by which I have prevented the rabbits from shifting.

438. Then you consider that you can deal with the rabbits much more easily within a small area? Most decidedly, if it were not for the cost I would put netting on the other fences.

439. *Mr. Lascelles.*] If you owned a large run in the interior that was capable of carrying 50,000 to 100,000 sheep would you consider it necessary to put such a fence round that country? No; because you do not go in for extermination. You have to do the best you can to reduce them, but my object was to absolutely destroy them. In that case I do not think there is much difference between 1½-inch and 1¼-inch mesh. The extra cost is nothing approaching £12 per mile. Of course on a large run it would be impossible to put up such fences as I have done.

440. *The Chairman.*] You think, then, that for a large run in the interior a fence with a netting 3 feet high and 1½-in. mesh would afford very great protection? Yes; but why not make it better when you are about it? I would prefer 1½-in. mesh and think it a great deal safer. Here is an estimate of the price of wire netting:—Price in Adelaide, from a wholesale house: 3' x 1½" mesh x 18G, £21 10s. per mile; 3' 6" x 1½" mesh x 18G, £25 per mile; 3' x 1½" mesh x 17G, £27 per mile; 3' 6" x 1½" mesh x 17G, £32 10s. per mile. If I were putting up fences again, I would put up a fence like my own.

441. Give us in a few words an account of what you would do if you had to do the work over again? I would certainly not erect less than 42-in. netting, and then I would put a barbed wire within 4½ inches of the top. The mesh would be 1½ inch, and I would use a uniform gauge. I have suggested to several people that they should get a 2-in. mesh for that which goes into the ground; then 1¼-in. mesh for the next 14 inches, and the balance of the 42 inches should be 1½-in. mesh.

442. *Professor Allen.*] This is what you would put up for the extermination of the rabbits? Yes.

443. Now, in dealing with large areas of very poor land, have you sufficient experience to make any recommendation? No; I cannot really say; but I should be inclined to modify my opinion in a case like that. When rabbits are really shy and you do not expect to exterminate them entirely, a rabbit or two would of course be of no consequence.

444. Then you are clearly of opinion that with any land, such as yours, it is better to have a dear and complicated fence for extermination purposes than to have a cheaper and smaller fence for protective purposes, together with supervision by boundary riders? Yes. The amount expended on rabbits would soon pay for the difference in the fencing. In the one case you make a job; in the other case you make a botch. At the same time I know that poor country will not afford it.

445. *Mr. Bell.*] Then the sole reason for not erecting such a fence as you describe is that the country is poor and will not afford it? Yes. The Government are wasting money as usual upon boundary fences, and I think it is extremely unwise not to put up a proper fence at once. A few pounds difference in price would not be felt. Much of my netting has been put on fences that I have had up already. I would also add that I had about 10,000 acres of mallee scrub, and we found that we could not cope with the rabbits there, but since I rolled it the rabbits are done. Rolling the scrub down is the best plan of all to get rid of the rabbits.

Archibald

Archibald Watson called in and examined:—

446. *The Chairman.*] What are you? Professor of Anatomy in the University of Adelaide and Fellow of the Royal College of Surgeons, England.

447. When did you first think of the idea of disease in connection with the extermination of rabbits, and what did you do? I saw diseased rabbits in the physical laboratory of Prof. Krause, and found that the rabbits always died. Years afterwards I read in the papers of the ravages of rabbits here. Last March I imported some rabbits from Germany, and they arrived in the beginning of winter or about the end of summer. On previous occasions I had failed to get them in alive, owing to accidents on the voyage. Eventually I managed to get in six live rabbits diseased. I bought some Australian rabbits, placed them with the others and they took the disease and died within three months. This was in a very rainy season. I put these rabbits into a small enclosure of about 50 feet square, and noticed that they developed the same disease as I had seen in former years in Germany; and that they died, some in two, some in three, and some in six months. The older and stronger rabbits lived longer than the younger ones.

448. What happened to the original stock? They died during the winter, having previously communicated the disease.

449. *Dr. Bancroft.*] How were the rabbits fed? We gave them plenty of bran, oats, &c.; they were very well fed. They had two years' growth of rye grass there. The rabbits did not burrow at first, because I had wire-netting in the ground. I took them away in about three or four months and allowed them to burrow, which they did after putting in a fresh batch of Australian rabbits. They have burrowed freely ever since.

450. *Professor Allen.*] Did you satisfy yourself at the death of the other rabbits that death was due to *sarcoptes cuniculi*? Yes; I satisfied myself of that—that is beyond any dispute. I made an examination of the internal organs and found that nothing else could account for their death except, perhaps, cysts. These cysts were in both the imported and the Australian rabbits. These cysts were like the *cysticercus cellulose* in the peritoneal cavity in the great omentum.

451. Did they present abundant evidence of scab? Yes.

452. What was the subsequent course? The older rabbits were, to a certain extent, refractory to the disease. They finally succumbed—one of them in seven months. The younger ones took it more quickly and died. They all died in rainy weather. After wet nights some two or three rabbits would perhaps die the next day. Then having kept them for six or seven or eight months, and being satisfied myself that the disease was fatal in wet weather, I handed it over to my assistant, since which time I have had nothing further to say to the matter.

453. *The Chairman.*] During that period how many rabbits do you think died altogether? About sixty, and odd ones that I had given to me. They all died, but all did not show scab. Some of those that die now show no scab.

454. Then you gave up all interest in the concern when you handed the rabbits over to your assistant? Yes. I was away in Turkey for about four months, and when I came back I found the rabbits all well, looking healthy, and in splendid condition. I was absent during the summer months.

455. Did the rabbits seem to get well in summer? Yes; they do get well in summer. There were only three that I could swear to; I had ear-marked them. When I left I ear-marked all my rabbits.

456. *Mr. Iascelles.*] Were they all showing symptoms of disease when you left? No; there were only four showing signs of disease when I left them. Over 100 rabbits were sent down and thrown in with the others, and they began to burrow. This was after I had parted with the disease.

457. *The Chairman.*] Before you parted with the disease I believe you made some experiments to ascertain its communicability to animals and to man? Yes. My man put some of the fur into his hair, and kept it there for days. He also inoculated his dogs, and I inoculated my cat. I tried it very often on myself, and it never affected me; I have also placed the fur on part of my arm, and attempts have been made to communicate the disease from one creature to another through contact and through inoculation. I am not aware of any case in which real inoculation was practised.

458. *Mr. Bell.*] What was the result on the dog and cat that were inoculated? A tram ran over the dog, and the cat was found on the doorstep in tetanic convulsions. I do not ascribe the tetanus to inoculation; I believe it occurred through poisoning with strychnine.

459. *The Chairman.*] Were the dog and cat sufficiently long under observation to enable you to detect any signs of disease? Yes. The cat showed signs of disease. It used to scratch itself, but I examined the fur, and found no scab. My assistant had the dog in his charge. I found hen's lice in the cat, but no trace of the *sarcoptes*.

460. Were there any other experiments with cats? No; not that I have any knowledge of.

461. Nor with any other animals? No.

462. Will you tell us whether this disease affects sheep? I do not know anything about them. I have not seen any of the sheep since I have inoculated them. Three sheep were bought—two young ones, and one old one—to which scab was applied by Mr. W. J. M'Gary, and we separated the wool on the back in three places, then on the belly in three places. We brought a living rabbit down there and placed the fur in the wool. The sheep were unshorn sheep. I did not subsequently apply the disease to shorn sheep, but I have heard that some sheep were shorn and the same thing done. It was applied to sheep three times to my own knowledge, with unshorn wool twice, and shorn sheep once.

463. Have you yourself seen sheep since the scab was applied? Yes; I went there on purpose the other day to see them.

464. Did they show any trace of scab? No; the wool had grown again, and it was about as long as when I saw them before. They had been shorn in the interim.

465. *Mr. Bell.*] Before placing the fur where you state you placed it, did you examine the fur with a view of ascertaining whether it contained any of the insects in question? Yes; and it contained insects in large numbers. I did not examine a large piece, but I got a rabbit that was badly infected; I examined the fur, and every piece that I examined contained several insects.

466. But you did not examine the particular piece of fur which you placed on the sheep? No; I did not consider it necessary; every piece of fur that I did examine contained the insect.

467. *Dr. Bancroft.*] Is this insect as large as sheep scab? No; it is much smaller, you could just see it with the naked eye. It is about one-fourth the size of sheep scab.

468. *The Chairman.*] This insect, then, is the *sarcoptes cuniculi*? Yes; or *sarcoptes minor*.

469. *Professor Allen.*] Have infected rabbits been sent to other places for the purpose of spreading the disease? Yes; I think some were sent to Glenelg, and other rabbits were sent up to the north and north-east.
470. Are you personally aware, or by any sure account, of the results of such tests? Yes; I have heard that the *sarcoptes* were dead and the rabbits alive.
471. *Mr. Bell.*] Reviewing, then, all the circumstances within your knowledge, are you willing to give this Commission an opinion of your own as to whether the disease with which you have been dealing is or is not of probable practical benefit in dealing with the rabbit question? That is a good question. I am quite certain this disease will never do in this dry part of Australia.
472. Either in summer or in winter? No; not in South Australia. Last winter was a particularly wet one.
473. *Professor Allen.*] Is there any probability of the disease being useful in moister climates or in the south-east of South Australia? I do not know; I am in doubt now. I should have said most decidedly yes six months ago, but at present I am in doubt.
474. *The Chairman.*] Give us the course of the disease in fatal cases? In Germany the *post mortem* showed suppuration of the lymphatic glands, but in Adelaide the rabbits seemed to have died of general exhaustion, with a great deal of wasting. There is generally an enlargement of the lymphatic glands, but not so pronounced as in Germany.
475. *Mr. Bell.*] So far as you have examined, this pathological appearance has been general? Yes. The animals lost appetite and were feverish. When a shower of rain came they would scratch themselves, and I have seen a rabbit scratch all the scab off its face during a shower of rain. The moisture seemed to increase the itch.
476. *Professor Allen.*] Is it your opinion from what you have seen in Germany that the suppuration of the glands was due to a distinct septic disease? I am certain of it.
477. Is it your opinion that such septic disease arose from the crusts on the surface becoming septic, and the absorption of septic matter from the surface? I think so. They died from septicæmia.
478. *Mr. Bell.*] Do you think that was the course of the disease in this country? No, not quite.
479. *Professor Allen.*] What, then, was the cause of death in the rabbits under your experiments? Suppuration was wanting in most cases here. There was nothing but general emaciation and loss of fat.
480. Can you state the cause of that emaciation? Only to the unrest of the animals and loss of appetite from external irritation.
481. What do you think was the cause of the enlargement of the glands? Absorption from the lymphatic area drained by the glands. Those in Germany died from septicæmia—that I am certain; and the glandular symptoms were not so pronounced.
482. Was the glandular enlargement absent in some of the cases observed by you in Adelaide? Yes.
483. Could you satisfy yourself with rabbits that died without marked enlargement of the glands that death was really due to *sarcoptes*, and not to some other cause or causes? Only that they died after rain, and that they scratched themselves with the wetting. They died without any suppuration; the glands may have been a little enlarged, but nothing specially. I noticed also that the rabbits that had not scab did not die. We had three scabby rabbits of different ages die in one night.
484. Are you aware of the disease having been tested at all under natural conditions? Only from hearsay; I have no personal knowledge of these experiments.
485. You believe that the specimens sent Mr. W. J. Reid were true *sarcoptes*? Yes; the first specimen was really a louse, but the subsequent ones were the shells true *sarcoptes*. The specimens were smashed, and were too dry.
486. *The Chairman.*] Besides the *sarcoptes minor*, had you seen any other *acarus* obtained from rabbits? My attention was called by Dr. Stirling to a larger animal than the *sarcoptes minor*.
487. You are not aware whether that is *psoroptes* or not? I am now aware of it, because you have told me of it; I understand now it is *psoroptes*.
488. *Mr. Bell.*] Was the rabbit from which the second *acarus* was taken suffering from the disease as well? Yes.
489. *Dr. Wilkinson.*] Is this larger species much like what was sent to Dr. Branson? It seemed to me about the same size, but I did not think of comparing. The shells sent to Mr. Reid appeared to be about the same size as the *psoroptes* shown me by Dr. Stirling, but I did not closely compare the two.
490. *Mr. Tabart.*] Is this rabbit-scab identical with sheep-scab? No.
491. *Dr. Bancroft.*] Do they ever use in Germany this disease known as nasal catarrh, which is considered very destructive to rabbits? I do not remember it; I was a student there, but I do not recollect it.\*
492. Are there any other important diseases of rabbits mentioned in anatomy? No, not that I know of.

James Francis Cudmore called in and examined:—

493. *The Chairman.*] Where do you reside? At Paringa Hall, Glenelg.
494. You are a station owner? Yes; I have stations in South Australia, Victoria, and Queensland.
495. Both freehold and leasehold? No; we have no freehold in Queensland or in New South Wales.
496. Have you suffered much from rabbits? Yes; some of my runs have been very much infested indeed. I should say there must have been millions on my Victorian and South Australian properties. The first rabbit that I saw came, I think, from one of the steamers on the Murray, and I think this was about eight years ago, at Paringa. I first thought the rabbit had been wilfully let loose, but since then I have had reason to change my mind. This rabbit evidently came from the scrub from Victoria and was the forerunner of the wave of rabbits that followed. It was fully a year after this when the rabbits were seen in any quantity; they came gradually down upon us, at first their natural enemies kept them in check. I thought that it was a hopeless idea to take up the matter of fencing, as I was under the impression that wire must be put some 2 feet in the ground. I came down to Adelaide and had an interview with Mr. Goyder, the Surveyor-General, and with Mr. Catt, who was then Commissioner of Crown Lands, and waited on them with a deputation to ask that Government should move in the matter. I spoke about this fencing and I found that it would come to something like £200 per mile. Mr. Goyder said he had an idea of fencing the border of the Colony at the time. Having found the cost of fencing my own run to be too great

\* In a letter to the Secretary of the Commission, dated April 19th, 1888, Professor Watson stated that the effects of the *sarcoptes* on marsupials, dogs, cats, horses, goats, and oxen, had not to his knowledge been tried in South Australia.

great, I commenced the use of phosphorized wheat and grain, and killed the rabbits off in millions, I might say. The dead rabbits were lying so thickly in the bends of the island that it was impossible to ride through. Even on the verandah of my house the stench was very great; but all I had done seemed to have no effect, and I saw it was hopeless to attempt to resist them. Mr. Catt himself came up and saw what was done and then went to Victoria to invite that Government to do something. We then gave up doing anything there. I had on that run something like 29,000 sheep the year before; and they died off in hundreds for the want of grass. The rabbits destroyed every bush that a four-legged animal could eat. The Commissioners might go through and not see anything but dead scrub so far as the eye could reach. The sheep were reduced from 29,000 to 3,200 on Ned's Corner, the next station to Paringa. On these two stations 147,000 sheep were shorn in one year, which was afterwards reduced to 20,000. I could not now tell from memory the amount of money we spent in poisoning and resisting the rabbits.

497. *Professor Allen.*] What is the area of Paringa and Ned's Corner? About 1,700 square miles. During these two years we worked principally with poisoned grain, but we did not then fence.

498. What do you think would be the cost per year of your operations when you were in full work? I think something like £3,000 on the two stations; that is in poisoning and in labour. It is about three years since we commenced wire-netting, and we have carried it steadily on to completion. The best of the country facing the river was enclosed in a ring-fence and included about 1,100 miles of country.

499. *The Chairman.*] What kind of fencing? Wire-netting about 4 feet wide, 16 gauge, and 1½-in. mesh, 6 inches in the ground. The wire was put into the ground vertically. The result of this was very good indeed. If I had only known that so much could be done by putting the netting 6 inches in the ground, I would have done it years ago. I then knew what Mr. McFarlane had done, but it was too late. This fence is effective in checking rabbits, but then all the useful shrubs had been killed. We finished our fencing in March, 1886; in 12 months after that time I rode through Paringa all one day and I saw but one rabbit. We had been finding out that the rabbits would not use the poisoned grain well. We then knocked that off and started trapping, thinking of keeping the remainder of the rabbits down by this means. Last winter was a good one and the rabbits increased, although they certainly were not coming through the fence. But it is a big area of country, and very scrubby. Now, in six months, there are quite as many rabbits there as before—quite enough to destroy the country. I went up last September, and saw the effect of trapping. We put men on, and at one particular place a man and his family, who were not worth 6s. per week, made £50 per month; yet there were as many rabbits there at the time as when he started. I therefore came to the conclusion that the thing should be knocked off. I could see that the trappers were killing the natural enemies of the rabbit—the iguanas, wild cats, crows, hawks, and others. They killed the crows because they destroyed the ears of the rabbits, so that the trapper lost the scalp for which he was paid. So long as we give a premium for trapping my conclusion is that the trapper will continue to farm rabbits, as I know they are doing now. I think the best method of destroying rabbits (trapping I think should be done away with except where the land is fenced) is with poisoned grain. You can then destroy the rabbit itself. All efforts should be made to destroy the rabbit, but not the rabbit's natural enemy.

500. *Professor Allen.*] Have you any clear idea as to the best method to go to work? We have found that poisoned wheat, distributed by Messrs. Lascelles and Anderson's machine, is a great success. It stirs the ground up, and the rabbit always runs to fresh turned-up ground. I have also found that since we have fenced, our rabbits have colonized. There are certain parts of the country which they like, and there they settle down. This makes their destruction much easier. Where rabbits are concentrated you can deal with them, colony by colony, with much greater facility than otherwise. Rabbits are always on the move—they seem to be constantly travelling. What makes them so bad in our part of the country is this—they came up into an elbow of the Murray and could not get away. They have come through from the scrub and they stopped there. They actually ruined our country, and have done more harm than where they could get away. If you fence in the rabbits they settle down and colonize, and you can then get at them by poisoning. This is the effect at Ned's Corner and Paringa. As I have said, rabbits do colonize when they get a fancy bit of country, but otherwise they are always on the move. If you fence them within a couple of hundred square miles of country they will settle down on a certain spot and give up travelling.

501. How large a block do you think you could deal with effectually without subdivision? It depends on the nature of the country. In scrubby country I think the subdivision should be made on all blocks. But this will not pay the cost—the country is not good enough for it. It is hopeless in scrubby mallee country to look for the extermination of rabbits. If you had good open country it would be different.

502. But yet even in that mallee country a fence would still be of great value in checking fresh inroads? No doubt about it. I would not attempt poisoning, and would give up all hopes of attempting to kill them off without fencing.

503. *The Chairman.*] Are you satisfied with the mesh of netting that you are using? I am satisfied with 1½-inch mesh, but anything larger would not do.

504. *Mr. Lascelles.*] You have only put up this one sort of fence—48 inches wide, 1½-inch mesh? Yes, but we have nearly 200 miles fenced in that country. I have put up also 3 feet netting, 1½-inch mesh, at the same place as a partition fence. I found that fence a good barrier equally with the other, so far as the rabbits going through it; but I really believe if the rabbit gets close up or is frightened he will jump it. If it is to be a ring fence I would put up nothing under 3 feet high.

505. Have you ever had personal knowledge of rabbits jumping over a 2 feet 6 inch fence? Yes; and I could show you where it was done. Of course I never saw a rabbit jump that height under natural conditions. Still, I think such a fence is too low—too low for a ring fence; but it would be useful for subdivisional purposes to bring the rabbits together.

506. *Professor Allen.*] Have you had any experience in dealing with mesh of 1½ inches? Yes, I have; and we found some of the rabbits get through it. Some of my fences ordered are 1½ inches, and some of them 1¼ inches; and I have known many rabbits that would easily get through that mesh.

507. In dealing with large areas of poor land, surrounded by thickly infested country, do you think the Government of any colony should insist on the use of a 4-foot fence and 1½-inch mesh? No; I think it would be rather hard. I do not see why the fence should be 4 feet high.

508. Do you think the Government should insist on any fence at all being used in such lands? Well, perhaps it would be a hardship to do that; but I look at the matter in this light: A man who takes

takes country up must fence it; and if he cannot afford to do that he had better leave the country alone. It is the business of the Government to see that the land is fenced, if they want it to be of any use to the State; and I am sure you can do nothing with a rabbit-infested country unless you have it properly fenced. I can see that the rabbits are largely increasing with us and getting worse—they are becoming a greater danger every day.

509. *Mr. Quin.*] Do you think, from your own knowledge of the country, that the tenants could fence the land, with advantage to themselves, under the present tenures? I do not know about New South Wales, but we could not do it here under our present tenures. Most of our leases are now running out.

510. *Mr. Pearson.*] Can you say at what height from the ground rabbits will go through a fence? Just close to the ground; they do not climb.

511. So that if there were a narrow mesh about a foot out of the ground, a larger mesh might do above that height? There is no doubt about that. My idea was to make a dog and rabbit-proof fence. For the first 2 feet the netting should be  $1\frac{1}{2}$  inch, and for the remainder the mesh ought to be 2 inches. You could have a wire on top, and then the fence would be dog and rabbit proof.

512. *The Chairman.*] Have you had some of Professor Watson's diseased rabbits? Yes. I got them last November. They were infected with scab. I took them down and put them in a small enclosure about four times the size of this room, about 50 feet square. It was paved on the bottom. I put other rabbits with them, making at the first start about twelve. I also put in a sheep with them. The original rabbits all died within six or seven weeks after my getting them. None of the fresh ones died; but some of them were very young, and most of the young ones died. Some two of the young ones lived till they were about six weeks old. I cannot say whether or not the others were born dead.

513. *Mr. Lascelles.*] Do you think the conditions of that enclosure were suitable for rabbits that were in young? Well, in one corner I had placed a lot of earth, and a portion of the place was covered as a shed, so that they could go in out of the cold. I sent away two of the diseased rabbits with two fresh ones I had put in with them. I had another enclosure made 100 yards square, with sand hills and bushes, and put in fifty wild rabbits with them. They were all turned out about the 15th December, and one of the original ones died a few days after; another one died very shortly afterwards, but as to the other two I cannot say that they died. It appears that the wild rabbits that were put in bred a little at first; there was no doubt that some of them were in young. There has been no breeding since the first crop, and in April my boy wrote me to say that the rabbits were infected with the disease. He had taken ten out and turned them into an island containing about 10,000 acres of land. He sent on four to Ned's Corner in the steamer, but one died almost before the steamer left the place. I have not heard anything further about them. Then, curious to relate, I am told in the same letter that they intended to turn out ten more on to another island, and that these recovered, not having contracted the disease at all. Thus it would appear that the disease has died out, but I doubt it. Last April we had another batch of twenty rabbits, and they died off down to twelve. On examining the rabbits I could see no signs of disease, though a lot of them were wretchedly poor and miserable. There seemed to be a little scurf here and there, but I do not know whether it is a disease. One of the rabbits showed all along his nose what was evidently scab, and was wretchedly poor like ours.

514. *The Chairman.*] You have not taken any of these rabbits to be examined? No. I have now seven, and out of the seven two are as healthy as can be. The other five are miserably poor, although they get good grass and feed. I cannot explain the reason for this difference in condition. Sheep are running there with them, and have not caught the disease. There is no breeding in this enclosure of 50 feet at Glenelg. I have not much faith in the disease; I do not think it is fatal enough.

515. *Mr. Quin.*] Could it not be applied again and again? I doubt it. I think that in Tasmania, Victoria, and New Zealand the disease would be very useful, but I do not think it will be any value in our north country. I think Riverina also is too dry for it.

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Andrew Smith called in and examined:—

516. *Professor Allen.*] Where do you reside? At Netley, Paratoo.

517. What is your position? I am manager for Elder, Waite & Co.

518. Will you state shortly what you know of the rabbit plague on the Paratoo? It is as bad as it can well be. The rabbits first appeared on the Paratoo run, at Netley, about five years ago; but at Paratoo proper they were found eight years since.

519. Have the rabbits been spreading very widely during recent years? Yes. They have decreased the carrying capacity of the country by about one-half during the last two years. They have eaten every vestige of feed off during the last twelve months, and also damaged the bushes, which are dying. The cause is the ringbarking of the bushes by the rabbits.

520. Can you say what has been the expenditure per year in dealing with the rabbits in your district? I cannot give any idea on that head. Nothing is being done just now because the leases fall in this year, and we can do nothing except experiment with the rabbits.

521. What measures were first applied? We put men on and paid them so much per scalp. That system was discontinued about eighteen months ago. It was no good, because as soon as the rabbits got scarce in one place the rabbiters shifted to another part; and while they were away the remaining rabbits multiplied again until the pest was as bad as ever.

522. Do you think there has been any other evil attendant on the operations of the rabbiters, beyond the fact that they became inefficient through their shifting from one place to another? I am not aware of any other.

523. Were the rabbiters responsible for killing any large numbers of the natural enemies of the rabbit? Yes; they killed eaglehawks, cats, iguanas, and crows. The Government paid them for killing eaglehawks and wild dogs.

524. Do you think the rabbiters really attempted to exterminate the rabbits? No, I do not.

525. What next was tried when the system of rabbiters was abandoned? We put men on to send the skins to Adelaide for a time, but that turned out a failure; because it did not pay the men, and we could not keep them.

526. Were any other measures tried? There were no other measures tried except experimenting with different kinds of poisons. This was done on a small scale, and simply as an experiment.
527. Have you any evidence which you would like to give regarding these experiments? Yes. The first thing I tried was in an orchard of 3 acres. I put some strychnine on peaches, and killed 500 rabbits in two nights. Then we extended the experiment to apples; from apples to peaches, and then to olives and sandalwood bushes. We tried the latter with arsenic, and it was very effective.
528. What general result did you get with these experiments—which poison was the best to use? Strychnine. It was the quickest and the best. We also tried it on peaches and apples, and found it good. Peaches are the best for strychnine. We merely ground it up as fine as flour and spread it over the fruit.
529. Have you tried this poison with the natural food of the rabbits? No; only with the sandalwood. I have tried poisoned wheat as well, but not sufficiently to ascertain whether the rabbits liked the change of diet.
530. With regard to rabbit-proof fencing, have you used that largely? Not largely. We have enclosed only 3 acres at present on that part of the run with which I deal. It was commenced in November of last year. I have three acres of garden completely enclosed. The fence we have used is 30 in. wide, 1½ in. mesh, and 17 gauge. It is 30 inches in all with 6 inches in the ground. This fence was put up to keep the rabbits out of the garden. The land around was very thickly infested. No rabbits have got over or under that fence.
531. *Mr. Lascelles*] Were there any means by which the rabbits could get in to that garden? No; except by a flood. About four months after the fence was put up we had a flood and twenty trees were destroyed. On another occasion some rabbits jumped across the fence through getting on a log that was close to it. There is an ordinary wire fence, 6 feet high, and the netting is attached to this. The first wire is 10 inches above the top of the netting. I have had no experience of rabbit-proof netting apart from this.
532. From your experience of this particular case, what kind of fence do you think would be satisfactory as a boundary fence? The same mesh, perhaps 6 inches higher; and the same fence exactly for subdivisions. I mean 3 feet for boundary-fences with same mesh, and 2 feet 6 inches for subdivisional fences. A larger mesh might let rabbits out, but I am confident this will keep them in.
533. *Mr. Pearson*] What is your reason for making the boundary fences higher? I would recommend it for extra safety. I have seen them go over fences such as I speak of, and they might do so again; I think the fence should have also two barbed wires on top, so as to constitute a dog-proof fence.
534. *Professor Allen*] Have you had any experience with rabbit scab? Yes; I obtained some rabbits from Professor Watson on the 28th November. The first rabbit I got showed a little scab on the head, but not on other portions of the body. I put it in a box with three others and took it to the station and allowed the four to go into a yard 30 yards square, where twenty-five other rabbits were confined, and we are keeping them together still. I got another diseased rabbit from Adelaide on the 26th January, and allowed it to go with the others. On the 26th February one rabbit died from injuries caused by our catching them to make an examination. On the 1st March another died, and on the 5th still another. These rabbits did not show any signs of the disease at all. The condition of the other rabbits in the enclosure is very good. Their skins are sleek, and they look well. The rabbits thus retained have not been breeding. Until this last two months they have had no chance to burrow, because I had the burrows dug out. I put bushes in the yard to shelter them. From December to May, while there is no green food, wild rabbits do not breed, as is proved when they are captured and placed in small enclosures. I have not had experience on this point myself, but I have heard it as a fact on what I consider good evidence. The fence around this enclosure was 1½-in. mesh, 30 inches wide, double width, sunk 6 in. in the ground. The extra width was employed to prevent the dogs from jumping in.
535. *Mr. Pearson*] You say you got several rabbits supposed to be diseased. What became of them? They are all alive in the enclosure. They show no signs of disease now. After the second rabbit came the whole twenty-five showed that something was wrong with them; their fur stood up, and the animals looked very miserable. The second rabbit appeared to be very much diseased. It showed spots on every part of the body, and was much worse than the first one I took up.
536. *Mr. Lascelles*] Was it rainy weather when these rabbits looked bad? Yes, it was cold weather.
537. *Professor Allen*] You spoke of having obtained the rabbits from Professor Watson? I obtained the first rabbit direct from M. Marceau, and the others from Elder, Smith, & Co.

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Herbert Bristow Hughes called in and examined:—

538. *Professor Allen*] Where do you reside? At Pirie-street, Adelaide. I have station property at Menindie, on the Darling, in New South Wales. In South Australia I have property at Booyoolie Gladstone post town. This is freehold land. I have also station property at Neckatunga, near Thargomindah, in Queensland—a cattle station which is not yet rabbit infested. One half of my property at Menindie is leasehold, and the other is what is called a resumed area; my South Australian property is freehold. In this Colony we have not been troubled very much with rabbits. My property in South Australia is so situated, as regards water, that the cats can travel from the one river to the other.
539. You then attribute your protection against rabbits to the favourable circumstances under which the natural enemies of the rabbits are placed? Yes.
540. How far off is your property in South Australia from any thickly infested district? I suppose about 50 miles. There is thickly infested country to the eastwards of us. I have not adopted any special protection against rabbits in that district—I never had occasion to. At one time, a place about 30 miles distant from us, at Booborowie, was badly infested and men had to be employed to kill the rabbits, and since then I have never heard of any trouble from rabbits there. This was about seven or eight years ago. I was speaking to Mr. Drew, of the Burra, and he said that they were then so thick that you could sit in a bush all day and shoot them until your ammunition was expended, and now they can go out without seeing a rabbit. My Menindie property is very thickly infested from one end to the other; the effect on the carrying capacity of the station has not been very much. About five years ago we noticed some rabbits in a bend of the river, and were quite satisfied that they had been put there by one of the steamers. We did our best to destroy them and we thought we had done so. Two years ago they

they came on the Darling and have since increased like magic. I think this was by the invasion from other districts—they came up from the south. I am satisfied that the original importation was by wilfully placing them on the runs. During October, November, and December of last year, we killed 342,000 rabbits, as this document will show:—

MENINDIE STATIONS.  
RABBIT Report for Quarter ended 31st December, 1887.

Month.	Number of men employed.	Number of skins delivered.	Rate of bonus paid.	Amount paid.	Amount expended for quarter.	Rate of subsidy claimed.	Amount claimed as subsidy.
1887.			each.	£ s. d.	£ s. d.		
October .....	95	102,671	3d.	1,283 7 9	} 4,278 13 9	13s. 4d. in the £, equal to ¾d.	
November .....	108	133,342	3d.	1,666 15 6			
December .....	107	106,282	3d.	1,328 10 6			

We had really no serious trouble with rabbits until two years ago, and practically during that time we have expended £10,206, in addition to the amount voted by the Government.

541. What remedies did you first try? We first tried shooting and trapping. It was first insisted on that we should trap the rabbits. We had then 107 rabbiters, each man with fifty to twenty traps; and you can imagine the state the sheep on the run were in at that time.

542. Was there any other way of obtaining help from Government except by claiming on account of the number of rabbits trapped? No; no other would be recognized. The Government would give no assistance except in regard to trapping operations. The skins were always brought in, counted by the Inspector, and then burned.

543. What is your opinion of the real value of the work done by the rabbiters? It is of no value whatever. I am well satisfied of that. The number of rabbits did not sensibly decrease by their operations. We have been always under that opinion.

544. Do you think from what you have seen that the rabbiters had no intention of causing the pest to decrease? No; none whatever. It was nothing unusual for these men to say: "We must leave this paddock, we will come back in a month or two when there are plenty more rabbits there."

545. Do you think that those rabbiters were responsible for any large destruction of the natural enemies of the rabbits? Yes, and if they could get hold of a good sized tom-cat and kill it, it was a great feature to them. It was the same way with crows and hawks—if they could kill them they would do so.

546. Then the rabbiters did not intend to produce any diminution in the rabbits, but caused the destruction of a number of their natural enemies? Yes; this is my impression. Some time since I went to Sydney to claim the subsidy, and I told the Government that the best thing they could do was to shelve the Rabbit Act and to leave us alone.

547. Have you adopted poisoning on any large scale? No; but we have tried it at various times. We applied the system of throwing out phosphorized wheat. Mr. Riddoch is doing it on a better system, and we will adopt his plan in future. I have not adopted rabbit fencing at all. I did not know what to do. The Government got hold of us, and we were asked to pay a rent more than four times what we had a right to pay. We are now in charge of Inspectors; and, in fact, we do not know what to do. Our money is going to pay for fences I do not need.

548. What is the carrying capacity of your run? It will take a sheep to about 10 acres. At present I am not adopting any means of destruction, because I cannot see any way. The only means we have to adopt is the phosphorus.

549. What has been your experience with the rabbit scab introduced by Prof. Watson? My experience, so far, has been most unsatisfactory. I paid my money like other people to get the diseased rabbits. I got them, and put them with others, but all of them died. They were placed on a large barge on the river, and every one of them died. I found no spread of the disease, and I think it is an utter failure. I obtained two rabbits directly from Prof. Watson, and placed them in a wooden hutch, but the experiment was an utter failure there also. The real *sarcoptes* is so small that I could not see it without a microscope. There is no doubt that when first brought from Prof. Watson's the rabbits were diseased. Mr. Stanley, the Government Veterinarian from Sydney, examined them and said so. I can only say in conclusion that I am in doubt how to deal with this frightful pest. The men on the station are utterly demoralized owing to the large sums made by the rabbiters. We have had as many as 107 rabbiters with traps, with about sixty to each man, besides the men employed to look after the sheep. I may add that the summer weather has had a frightful effect on the rabbits. They have been dying out by hundreds of thousands—some say from Butcher's disease, and others from some disease that has appeared before on the Murray.

550. *Mr. Quin.*] Could you have carried on the system of trapping and scalping, such as has been done for the last two years, and make your run pay at the rent insisted on by the Government of New South Wales? No; decidedly not.

George Riddoch called in and examined:—

551. *The Chairman.*] Where do you reside? I live in Adelaide, but I have property at Weinterriga, in New South Wales; and at Glencoe, and Mount Gambier, in South Australia. The latter is freehold, but Weinterriga land is leasehold. My experience with rabbits commenced about thirteen years ago, on property in the Swan Hill district of Victoria. There was a small number in the first instance, but they increased in about two years after that time in such an extraordinary way that they devastated the country. I poisoned them with phosphorized grain with great success. I got the receipt for making up this stuff from an American paper. I used 1lb. of phosphorus to 100 lb. of wheat. The phosphorus was put in water and allowed to stand at night, and in the morning a quantity of flour was put in. It was then eaten by the rabbits, and I found that they died in great numbers from it. In that particular

particular place it reduced the number to such an extent that when I scoured the place afterwards there was, comparatively speaking, only a few rabbits on it. The value of the run was, however, depreciated from about £30,000 to £8,000. I succeeded in killing the rabbits, but the country was so injured that it did not recover for some time. My next serious experience with rabbits was at Weinterriga. Five years ago—I think I am safe in saying—there was not a rabbit on my place. It is a sheep station, and I heard at that time that there were rabbits within about 100 miles of me. I gave instructions that patrollers were to be put on and the rabbits to be watched for. The men were told off simply to watch for the rabbits and discover them as soon as they appeared on the place. After a time traces of them were found. I paid the men thus employed £1 per week, and 2s. 6d. per head for every rabbit. I continued from that time to use every effort to discover the rabbits and kill them. From time to time we had to reduce the rate which we paid for killing. Our really serious trouble began last year (1887). In the month of January of that year we had 100 men employed; they trapped 29,000 in that month alone. We kept 100 to 125 men constantly employed during the whole year doing everything we could to keep the rabbits down, but in spite of this they had increased by December, 1887, to something like an average of 140,000 per month. Judging by the numbers which we got on the run the rabbits must have increased five fold. We killed altogether on Weinterriga something like 1,250,000 of rabbits, costing £12,500 inclusive of the Government subsidy; our share, of course, being quarter of that sum, together with the cost of supervision. I represented to the Minister for Mines in August last that this method of destroying the rabbits was a very costly and ineffective one. I asked to be allowed to use other methods, and I understood that the Minister for Mines gave his sanction to my doing so. I sent up an experienced man with the necessary appliances to use bi-sulphide of carbon. By this method I reduced the cost of killing the rabbits to about a quarter of what it had been before. But when I made application for the subsidy of three-quarters of the cost, I was told that I would only be allowed three-quarters of the cost of the material without any compensation for the cost of application. I may say that the Government have since then refused to give me even that. Since that time I have been using phosphorized grain produced by Raymond's machine for mixing the grain and phosphorus, and Lascelles and Anderson's machine for depositing it. The results have been satisfactory in most cases, but in other cases it has not been so, and I blame the quality of the phosphorus for the want of success. The rabbits eat phosphorized grain invariably, scarcely any of it being left after the first day. I have tried arsenic and other poisons and found that the rabbits did not eat them so readily. I am now trying an experiment of putting arsenic in with the phosphorus, and thus making good the deficiency in the killing power of the phosphorus.

552. Have you had any experience in connection with rabbit-proof fencing? Not very much. I have 50 miles on my place ready to put up, and 150 miles ordered from England. The first 50 miles was 17 gauge, 1½-in. mesh, and 42 in. wide. After the regulation issued by the Government in February, declaring that nothing larger than 1½-in. mesh would be allowed, I ordered another 100 miles of 1½-in. mesh with the same gauge and width, and for the remaining 30 miles I ordered 30 in. wide, 17 gauge, and 1½-in. mesh for subdivision fences—temporary fences to shift about from place to place.

553. *Mr. Lascelles.*] Supposing you erect these fences and find that at the end of twelve months 1½-in. mesh is as good as 1½-in. mesh, will you complain of the action of the Government? I should have very good reason for doing so. I would have been satisfied with the 1½-in. mesh if I had been left to my own judgment. I only ordered the 1½-in. mesh to comply with the conditions imposed by Government. I did this to entitle me to compensation, and in order that I might obtain certain advantages under the proposed legislation.

554. Now, as to the difference of cost? The 1½-in. mesh costs me, delivered in Adelaide, £22 per mile. The 1½-in. mesh of which I have ordered 100 miles, and 10 miles of which have been delivered, costs me £26 10s. per mile in Adelaide. I may state that I ordered this early for the sake of getting it at a low price, and with quick despatch. The difference in the cost of freight may increase the price of the balance of the 1½-in. mesh ordered. I am now in a difficulty as to the erection of the netting that I have already obtained. I have appealed to each of my neighbours in turn to join with me in the erection of the netting along the boundary-fences, and they have all refused, some giving one reason and some another. The chief excuse is, that if the netting is put up on my boundary-fence it will prevent the rabbits travelling on to my run and away from them. Another difficulty is the want of security of tenure for that portion of my run where the rabbits are worst. I refer to the resumed area, which is the southern part of my run and adjoining runs.

555. Do you think a law should be passed compelling owners to join in erecting netting fences in rabbit country? Certainly; I think if wire netting is to be put down at all it should be made compulsory on each man to pay his share. It is absolutely necessary to do this, no matter what other means may be adopted.

556. *Mr. Pearson.*] Have you had any experience with wire netting of 1½-in. mesh? No; except with the few miles I have put up lately. On both sides of the wire-netting there were traps which the rabbits had to pass in getting through the fences. The men who are going backwards and forwards with the dogs found numbers in the traps and the dogs killed them. They were lying about in all directions.

557. *Professor Allen.*] Have you had any experience with Professor Watson's disease? Yes. I have seen the diseased rabbits, and I was present when the attempt was made to communicate the disease to sheep, which I afterwards examined very carefully. On one occasion I found a small fistula and slight discoloration in the skin, as if there were some foreign matter there. On examining the same sheep a second time I could find no signs of the disease. The conclusion I came to was that the insect had caused some irritation, but that it was not able to live on a foreign body and had died. I again examined the same sheep and found no symptom of disease.

558. Have you any experience with regard to the spread of disease from one rabbit to another? Not more than what I gained on infested ground. I have had no part in any subsequent trials with the disease since Professor Watson parted with the rabbits. But I have just returned from Tintinallogy, and also saw the diseased rabbits in Dr. Ellis' charge in Sydney. It was afterwards that I saw other diseased rabbits with Dr. Butcher at Tintinallogy. So far as I could see, the disease affecting the rabbits in Sydney and at Tintinallogy was the same. I found also that rabbits were dying in considerable numbers at Weinterriga, which is on the opposite side of the river to Tintinallogy. Other rabbits were in a very weak state—so weak that numbers of them could be easily caught by a man on foot. I caught several of these rabbits and they presented the outward appearances or symptoms shown by the rabbits in charge of

Drs.

Drs. Butcher and Ellis. On examination I found that the only organ showing signs of disease was the liver. In all cases thus examined by me the liver had white spots or streaks upon it, and was more tender than in rabbits in a healthy state. The only other sign of disease was the emaciation. I saw no scabs on the surface of the body, though there was a slight scurf on the skin. I opened some of the rabbits and examined the intestines, and the heart, and lungs, and liver. There was nothing to indicate the presence of any cheesy matter.

559. Could you satisfy yourself that this disease was really killing off the rabbits effectually? Yes; I found a very large number of rabbits dead on my place. I did not introduce the disease, though I have done a little towards spreading it. We found it on our place and to a certain extent we utilized it. The disease first appeared on Weinterriga at a point some distance away from the river boundary opposite Pintinallogy. A large number of the rabbits that were weakly on my first visit were dead when I went back again. The first appearance of the disease on Weinterriga was about two months ago. I have seen no disease in sheep or other animals to correspond with this disease. It is now scattered all over a large area of country.

560. *Mr. Lascelles.*] Did you notice any results from the spread of the disease that you had? I could hardly say. I was not there to watch experiments. We had the disease with the hope that it would spread, but I cannot possibly say that it has spread. I feel so satisfied that this disease will be a very great boon to us, and such an aid to get rid of the rabbits that I would be very sorry to see it run out. I was afraid it was an epidemic that would run out, and I think that the Government should take steps to keep it alive in the meantime. Of course we cannot ask Drs. Butcher and Ellis to keep it alive at their own expense. I do not think that it was eating the bark which killed the rabbits on Weinterriga. I found the rabbits dead in great numbers on open country where there is no bark, and I found them alive and well in country where the bark had been stripped.

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Peter Waite called in and examined:—

561. *Professor Allen.*] Where chiefly is your property situated? I am a member of the firm of Elder, Smith, & Co., and we hold Momba, in New South Wales, and Paratoo, in South Australia. These are leasehold properties.

562. When did you first become personally acquainted with the rabbit plague? About eight or nine years ago, on Paratoo. As long as I have been acquainted with Paratoo rabbits have appeared from time to time; but they never increased, having been kept in check by other animals. About ten years ago a strip of freehold country, from Kapunda to Canowie, became infested with rabbits, and the Government passed a Bill compelling owners to destroy the rabbits. The rabbits were destroyed on those runs, being hunted by dogs, destroyed by bisulphide of carbon, and shot. The result was that the rabbits at once came upon us like a wave. They kept moving ahead, and over-ran our country to such an extent that I was compelled to begin to kill them in 1882. The measures we first adopted were phosphorized grain and bisulphide of carbon. I obtained very good success with these. The country was then resumed; we were given only a yearly annual lease, and we refused to do anything. This resumption took place in 1880, and the land was taken away or selected immediately after we had destroyed the rabbits at great expense. Then after that a scalping Bill was passed, the Government giving 2d. per scalp, and the country was rated at so much per 1,000 sheep, so much per 100 head of cattle, and so much per square mile. A small army of rabbiters thus came into existence. That went on for two or three years, but no satisfactory results were obtained. Independent of the amounts levied on the different districts, it cost the Government of South Australia last year for scalping from £90,000 to £100,000. Then they stopped dead and refused to go on any longer. In some places the rabbits were down pretty low, and in others, the trappers stuck to the thickest spots, and sent rabbits all over the country. The Government then spent some £35,000 on rabbit parties, and with dogs, and bisulphide of carbon. In about six months this money was spent, and nothing has been done since.

563. What results were obtained by these parties? So far as I know there has been no result. Large numbers of rabbits were killed, but some were left behind to multiply. It was the rabbit parties that first drove out the wave of rabbits on us. In all probability if the rabbits had been killed some other way than by dogs this wave would not have come out. At all events had there been rabbit-proof fencing the rabbits would never have come out on us. The wave reached us first in 1880, and kept on coming. Since the trapping and the Government parties in 1884-5, we have done nothing except to experiment, as our manager told you. One of our experiments was a netting around a tank that was nearly dry, by which we caught 6,000 rabbits in a week. At another tank, which we netted, we got 1,100 rabbits in two days.

564. Practically your tenure was lost, and you abandoned operations with the exception of certain experiments which would be continued on a large scale if a more certain tenure was obtained? Quite so.

565. *Mr. Quin.*] Do you now hold that country? We hold it but we do not occupy it; we have had no stock on it for years, we hold it simply in order that we may obtain payment for our improvements at the end of this year. But for the rabbits and dogs this country ought to have had 140,000 sheep upon it.

566. *Mr. Lascelles.*] Have you had any experience with rabbit-proof fencing? No; excepting a small piece mentioned by our manager to-day. We put a 30-in. fence 1½-in. mesh around our garden; we did not find that many rabbits got over this fence. Only two got over; we found that they got over because of a large log that lay against the fence. I have had no practical experience with wire-netting on other runs. 567. In the event of leasing any of that country have you decided what height and mesh you would use? If I were left to myself I would use the 36-in. width, 1½-in. mesh, and I would make the fence dog proof by one or two barbed wires. This would be for the boundary fence. As to the subdivision fences I think a fence like that we have around our garden is quite enough; the extra 6 inches is more as a protection against dogs than rabbits.

568. Is there any Act compelling lessees to join with you in fencing in with rabbit-proof netting? Yes; there is the Act of last year—it has reference to leasehold land. There is no such clause in the new Act, that I am aware of.

569. *Mr. Quin.*] Would you feel inclined to fence in your property in New South Wales on your present term of occupation? No; I will wait for legislation. On the Momba property we have used the trap system until recently, and we have held that country or been interested in it since 1880. The rabbits first

came on to Momba many years ago, but their natural enemies kept them in check until about two years since. We found that trapping was the very reverse of a success. We are now using the wire-netting around the tanks and taking poisoned water out to dry spots that are thickly infested. We are also using arsenic dissolved with potash, phosphorized wheat and wheat steeped in arsenic dissolved in potash, and distributed by Lascelles & Anderson's machine. On Momba we chiefly use phosphorized wheat which so far has been successful.

570. What has been the maximum cost per year of dealing with the rabbits on Momba? I cannot say at this moment. I think last year the cost must have been about £13,000. In October I know we were spending at the rate of £3,000 per month. The pest kept increasing, the best proof of which is that when we reduced the scalp money from 4d. to 2d. the payments were greater than before.

571. What mileage of wire-netting have you ordered? About 150 miles. The width is 42 inches, mesh 1½ inches, and gauge 17. This was ordered before the regulation regarding 1½-mesh came out in the *Gazette*. I do not intend ordering any more—not until something definite is done. The netting which we have ordered will cost £27 10s. per mile at Wilcannia, to which we must add £3 per mile for duty, and £7 for cartage, making in all £37 10s. per mile.

572. *Professor Allen.*] Have you had any experience with disease? I can only confirm what my overseer has said about Professor Watson's disease; we have had no results from it.

573. *Mr. Lascelles.*] You think the tenure of your land is incompatible with rabbit destruction? Yes. I do not see how we can kill rabbits on the resumed area under our present tenure.

SATURDAY, 26 MAY, 1888.

The Commission met at 10 a.m., at Silverton.

*Present :*

*New South Wales :* EDWARD QUIN, Esq.

*Victoria :* HARRY BROOKES ALLEN, Esq., M.D.  
EDWARD HAREWOOD LASCELLES, Esq.

*South Australia :* ALEXANDER STUART PATERSON, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

William Hogarth called in and examined:—

574. *The Chairman.*] Where do you reside? At Momba, Wilcannia. I am the general manager of the Momba Pastoral Company.

575. What runs are under your general management? Momba, Mount Murchison, and Purnanga. They include about two million acres of land. The property is generally leasehold, but there are some portions of purchased land; we have altogether about 7,000 acres of freehold. I have been in charge of this property about nine years.

576. Can you state when rabbits first appeared on this property? Yes; about 1883.

577. When did they first become a serious cause of mischief? About 1884.

578. What remedies did you first adopt? We first paid men wages per week and gave them a bonus for scalps. The method adopted was trapping and dogs.

579. Can you give us any information with regard to the number of men thus employed from year to year? They varied so that I could hardly give you anything definite. Sometimes we had 120, and then we reduced the number to perhaps 50 or 60.

580. How long was that system continued? From 1883 to the end of 1887.

581. Was any good result obtained from this system, in your opinion? None whatever.

582. Did the rabbits decrease or increase? They increased.

583. Is it a fact that the rabbits increased notwithstanding that vast numbers of them were killed, and large sums of money expended? Yes.

584. Do you think that the trappers employed in that way had any real intention to eradicate the rabbits? Some of them had; but others had not.

585. Do you think the operations of the trappers, in trapping and hunting, produced evil by spreading the plague? I do.

586. Are you perfectly clear on that point—that serious evil resulted? Yes. After I had knocked off trapping I found that the rabbits had accumulated in colonies and were much more easily dealt with.

587. The operations of the trappers, then, continued to scatter the rabbits, and prevented them from accumulating in colonies where they could be more easily dealt with? Yes.

588. Can you furnish us with any figures showing the extent and cost of operations thus conducted? I can do so for the year 1887 as regards Momba and Mount Murchison. Here are the particulars—

MOMBA AND MOUNT MURCHISON.

Rabbit Expenditure from January, 1887, to 31st December, 1887.

	No. of Rabbit Scalps.	Approximate rate of Payment.	Cost		
			£	s.	d.
January to March 31 .....	51,762.....	5½ .....	1,172	9	5
April to June 30 .....	112,720.....	4 .....	1,879	11	7
July to Sept. 30 .....	300,291.....	3¼ .....	4,449	15	0
October to Dec. 31 .....	317,737 .....	2½ .....	3,287	13	4
	782,510		£10,789	9	4

589. Have you erected any wire-netting fences? Yes; a little—in all 3 or 4 miles. It is 3-ft. netting 1½-in. mesh, from 4 to 6 in. sunk in the ground.

590. Have you erected such fences around the warrens? Yes.

591. Have you had such experience in this way as would warrant you in pronouncing an opinion as to the sufficiency of such a fence? Yes. What caused me to try the experiment more than anything else was that I visited Tintinallogy station, and saw the rabbits running over the netting there, into small enclosures. This was 3-ft. netting and 1½-in. mesh also—though as to the size of the mesh I will not be positive. It was placed perpendicularly, and there was no incline. I saw half-a-dozen rabbits run over it; these rabbits were not being chased by dogs. It was a small enclosure and the rabbits were frightened at my approach, and climbed over the fence. They jumped at the fence and climbed up the mesh.

592. *Mr. Lascelles.*] Was the fence a perfectly straight fence, or was it roughly put up? Well, I should not say that it was the best fence that could possibly be put up; the wire was a little bagged. There was no wire on top to pull it up tight; so that I cannot say it was a first-class wire-netting fence.

593. *The Chairman.*] What experiments did you perform after using this? I was under the impression that netting would be of little use; and I took some of the worst warrens that I had, and put a netting-fence 3 ft. high, 1½-in. mesh around them; it was put 6 inches in the ground, and railed around to strain the netting upwards and keep it quite erect.

594. In this way you enclosed some thickly infested warrens? Yes.

595. What was the result? The rabbits all died of starvation.

596. So far as you are aware, did any rabbits escape from these warrens? I enclosed from twenty to thirty, and in only one case did the rabbits escape. They burrowed underneath in one place. This was the only burrow by which the rabbits could escape, and the reason of the escape was the bad method of erection of the fence.

597. Then in any ordinary case if that had happened the boundary rider would have closed up the burrow? Yes.

598. What general conclusions did you arrive at from these experiments? I have come to the conclusion that netting for boundary fences 3 ft. high, 1½-in. mesh, 6 in. in the ground, and properly put up, is sufficient to stop the influx of rabbits from any other part.

599. Was there good feed round this enclosure? Yes.

600. If a small rabbit could get through 1½-in. mesh, do you think it would be able to live and establish itself in its new home? I do not think so. I do not think there need be any fear of one or two small rabbits going through; not as regards the mesh. I think small rabbits would probably die or go back.

601. Allowing that a few rabbits could possibly get through, or under, or over such a fence, do you think that such occasional occurrences would be any justification for seriously increasing the cost of netting? No; I think it would not, because there are other sorts of danger—of rabbits coming through owing to floods washing the netting down.

602. This risk would be especially great in hilly country? Yes; where the flood waters come together.

603. How do you propose to meet that risk? I have never been able to solve that matter.

604. Do you think that any good result could be obtained by erecting fences, not necessarily along the borders of distinct properties, but following the contour of the country as far as possible, and settling difficulties that might arise about the properties so affected by arbitration? I am afraid that if a line were run along in that way a great many obligations would arise about killing our neighbours' rabbits.

605. Have you visited Tintinallogy to inspect the disease prevailing there? Yes; I went to Tintinallogy for the express purpose of seeing the results of the disease, and I took particular notice on my way down. I started in March last, and on my way saw nothing to speak of more than the ordinary death-rate until I got near the Tintinallogy boundary. After entering the run, and following down to the station itself, the dead rabbits increased.

606. Were rabbits lying about dead in great numbers? Yes; after I passed the head station I was taken to the enclosure where the experiments were being conducted, and I saw the precise method they were adopting. I saw rabbits there diseased; and, from all the appearances of their condition, they were in different stages of disease. While I was there several of them died. A non-professional man could see that they were diseased to a certain extent, but whether death was the result of disease or not I cannot say.

607. What did you notice for yourself? There seemed to be a lot of fluid around the cavity of the belly of one, and on another I was pointed out marks which I would not have noticed had they not been pointed out. I also noticed some little white specks on the liver. The general condition of the rabbits in that enclosure varied from the fat rabbit down to the rabbit that was merely a skeleton. There were no outward appearances in the live rabbit by which I could tell that they were diseased.

608. You noticed that a large number of the rabbits were merely wasting away? Yes; but I could not state whether the emaciation was due to disease or what it was. I did not take any part in the scientific part of the business, but went merely to see the results of the disease.

609. Did you see any experiments performed which satisfied you that the animals could be treated in the way recommended by Dr. Butcher, and would then waste away? I saw animals that had been treated, but I did not see any operation performed. I looked for the seton mark and found that they had been treated with something.

610. But did those rabbits appear to be wasting like the others? Yes.

611. Did you see any in which setons had been applied, but which were not wasting? I saw a few that had been treated a day or two before, but I could not detect much on them.

612. You then passed on beyond the main station? Yes; I instructed the driver to take me to where I pointed out. I did not allow him to choose the place where I was to be taken to. I then went into the bend and saw thousands of dead rabbits. I drove around for about three hours.

613. Were those dead rabbits in very poor condition? Yes. I may state that there were very fat rabbits and very poor ones living in the same bend. I caught a dozen of these poor rabbits while going around on foot. There was a fair amount of feed in this bend, but I would not call it plentiful. The feed was not, however, so scanty as to account for the emaciation and death of so many rabbits.

614. Did you notice in this bend or on adjacent parts of the run whether the rabbits had fed on bark or not? Yes; they had been feeding on bark.

615. Did you see any other parts of the country where the rabbits had fed on bark, but where no remarkable mortality was prevailing? Yes.

616. Does any remarkable mortality prevail amongst the rabbits on Momba? Yes; in one paddock there is. That paddock is about 120 miles from Tintinallogy.
617. What have you noticed in connection with this occurrence? From all outward appearances I should say that the rabbits were dying from the same disease as at Tintinallogy. There was the same marked emaciation, and the condition of the skin of the rabbits was the same.
618. What did you notice about the skin? There was nothing peculiar on the skin of the rabbits that died at Tintinallogy. I was referring to those that died in the White Cliff paddock.
619. How long has this disease been prevalent on Momba? About a month.
620. Could you give any idea of the number of rabbits that died from it, approximately? I should say there were thousands, but it is very difficult to give an estimate merely from riding through the saltbush country. They have so decreased that you can hardly see a live one, although the paddock was thickly infested before. This occurred over an area of about 35 square miles of country. That area is not shut off from the country around in any way.
621. Are you able to give any reason why the rabbits are dying on that part of the run, and not on others? None whatever.
622. Are you aware whether any rabbits with the Tintinallogy disease were imported into that district? I have no knowledge of it.
623. Do you think it possible? I think it possible, but I do not think it is very probable.
624. Is there anything else that you would like to tell concerning the mortality prevalent amongst the rabbits on that area? Nothing further.
625. Do you know by your own observation or from trustworthy evidence that mortality occurs amongst rabbits in other districts of New South Wales? Yes. I have heard from good authority that rabbits on Murtie Station, just across the river from Mount Murchison, are dying in hundreds, and that one of these rabbits was caught and taken to Dr. Butcher, who said it was the same disease which existed at Tintinallogy.
626. Have you any reason to disagree with that opinion? No, I have not.
627. *Mr. Quin.*] Did you open any of the rabbits that you found diseased on Momba? Yes, I opened some of the rabbits, and I should say that the appearances were, in my opinion, substantially the same as those which I saw opened at Tintinallogy.
628. *The Chairman.*] How far is Murtie from Tintinallogy? Between 50 and 60 miles.
629. Have you noticed some kind of scab on the rabbits on the Momba property? Yes? I noticed that in January and February. It prevailed over an area of about 40 to 50 miles. Rabbits with this scab have been found that distance apart.
630. Was it at all unusually prevalent in any part? It was at Purnanga Station, and over an area of a couple of hundred square miles.
631. What were the characteristics of this disease as you noticed it? A scab and a running out of the eyes and nose. The eyes used to appear to be running out of the head and making the rabbits blind.
632. Was it a quick or slow-killing disease? It was very difficult to tell. You might catch one of the rabbits diseased, but you could have no idea of the time of infection. It destroyed some of the rabbits very quickly; therefore I should imagine it was a quick-killing disease.
633. Do you think it killed in days or in weeks? I should say it killed in a few weeks.
634. *Mr. Quin.*] Did you notice any of the diseased rabbits breeding? No.
635. *The Chairman.*] Are you satisfied that breeding was checked in those scabby rabbits? No; I am not.
636. Did you send the skin of one of these rabbits to Dr. Stirling? I sent it to Mr. Waite, and I believe it was forwarded by him to Dr. Stirling. I believe that was the skin of a rabbit that had recovered from this scab disease.
637. Have you noticed any other disease amongst rabbits? No; I have not, nor have I heard of it.
638. *Dr. Paterson.*] Did the fur of rabbits affected with this disease fall off? Yes; the fur all came off on the patches where the scab existed. It came off principally all along the sides and belly, leaving entire bare patches without any fur at all.
639. *The Chairman.*] Did that disease kill off any great number of rabbits? Yes; it killed them out of Purnanga run very largely. The disease is not now in existence, to my knowledge.
640. *Mr. Lascelles.*] Are you allowed to keep any rabbits for experimental purposes, such as poisoning, &c., or using disease in enclosed areas? No.
641. If licenses for that purpose were given, would you avail yourself of them to make experiments? Yes; and I would have done so in this case if I could. I think it would possibly have been of some use.
642. What means have you adopted for destroying the rabbits since trapping was knocked off? I have been using phosphorized wheat, distributed by one of Lascelles and Anderson's machines. I have also used phosphorized oats, carbon, and arsenic solution, with potash for poisoning water. With the phosphorized wheat you do not see the result in dead rabbits, but you can thin them down and practically clear the country. With poisoned water I have poisoned 500 in a night, having had two small burrows opened two miles from where the poison was laid. The poison was put at the entrance to a well. I also put carbon in the burrows.
643. *The Chairman.*] What methods do you propose to adopt now? Well, I am in favour of the phosphorized wheat, and in dry seasons poisoned water, with the use of the carbon in the burrows in winter time.
644. Do you intend to proceed with wire-netting? I intend to go to work and fence in all my horse paddocks with netting and clear them of rabbits. I do not intend netting larger areas unless something is definitely settled about the Land Bill. At present I do not see why we should do anything on the larger areas. My reason for saying this is that our boundary is the leasehold portion, and as it is a zigzag line the cost of fencing would be very great.
645. Then without some secure tenure you regard the erection of any complete system of fencing as a thing impracticable because of the excessive cost? Yes; considering the present value of the country up here. It is not the same as country that would carry a sheep to 1 acre or a sheep to 2 acres.
646. Do you think you can hope to get the rabbit plague thoroughly in hand without the erection of wire-netting fences? No; I do not.

Arthur Torrens called in and examined :—

647. *The Chairman.*] You are a rabbit inspector? Yes, for district No. 36. I reside at Yandarlo, Wilcannia, and the stations in my district are Yancannia, Salisbury Downs, Monolon No. 5, Boota, Yantara, and Tarella. I have been on duty there for about two years. The south portion of my district is heavily infested with rabbits, and the north portion lightly. The district generally is known as a lightly infested district.

648. What methods of rabbit destruction have been chiefly adopted in your district? The chief method has been trapping, but of course that has been done away with now.

649. How many men were employed on an average per hundred miles as trappers when you were in full work? Taking the district from end to end I think I might say the average has been about forty-eight men to 700,000 acres.

650. In your opinion, what was the general result of the system adopted by the trappers? I think it was useless. A number of rabbits might be killed, but all the work had to be done over again. They worked from patch to patch, and when the first patch which they had left was filled up again by rabbits they went back.

651. With regard to the dispersion of the rabbits, do you think that trapping and hunting had evil results in that direction? Undoubtedly; you by this means disperse them into other districts.

652. So your general conclusion would be that although trappers killed vast numbers of rabbits, and although they received very large sums as capitation allowances, yet the rabbits were practically as numerous as ever; while the trapping and hunting tended to spread them over a wide tract of country? Certainly.

653. Have you had any special experience with respect to the poisoning of rabbits? No; I cannot say that I have. I have seen the work done at Tarella within the last few months with phosphorized wheat. I have had no special experience, either, with regard to rabbit-proof netting.

654. Did you watch the system of poisoning at Tarella, and form any opinion as to its efficiency? Yes; the grain is scattered through the largely-infested districts by Lascelles and Anderson's machine, and following its trail I noticed large numbers of dead rabbits. From what I saw there is no doubt that rabbits have decreased very considerably.

655. Do you think this is the best means of distributing poison? Yes; certainly the best method that I know of.

656. Have you visited Tintinallong? No, I have not. I have seen some poisoning at Terawcynia. They poisoned the branches of trees with arsenic dissolved in ammonia.

657. With what results? I did not see much result, having been there but a short time; but I believe the results to have been satisfactory. It seems to me to be an admirable idea. I think if this plan has not been successful the character of the poison used has something to do with the want of success.

658. *Mr. Lascelles.*] Does poisoning with twigs involve much labour? No. The twigs are broken off, stripped of their leaves, and then dipped in the mixture. The rabbits eat the bark and die.

659. *The Chairman.*] Have you noticed any special mortality occurring as if from disease in any part of your district? Yes; I think there are two diseases existing amongst the rabbits—natural diseases. One of them seems to me to be a sort of irritating disease; it is external. There is a scab under the eye and at the nostril, and around the back of the ears. The fur stands erect and in patches is gone. There seems to be a kind of dandruff or scurf, and also an irritation about the crutch; but of this I have not seen many cases.

660. Do you know of its existence at present? No; I cannot declare that it exists at present. I have no notion whether it prevailed over a large area or not; I have only seen a few cases in different parts—three cases were pretty close together and one was many miles away.

661. *Dr. Paterson.*] How long ago is it since you noticed this? The first case I noticed was between four and five months ago, and the last one is within two months.

662. *Mr. Quin.*] Have you seen the disease known as Watson's rabbit scab? No.

663. You say you have seen other diseases amongst rabbits? Yes. I refer to the disease which is so prevalent now. It was supposed by us to be a disease due to the eating of bark and to the absence of moisture. The rabbit gets miserably poor, seems to lose its strength, and cannot go any distance. You can get off your horse and catch them easily. That disease is very widely spread. I think where any rabbits are suffering in this way all the rabbits in that district are more or less affected.

664. Have you noticed the bark eaten away and the shrubs destroyed in any of the districts, and yet that the rabbits remain quite healthy? Yes; I have seen many healthy rabbits where the bark has been eaten down.

665. Can you then explain why in one district the rabbits are suffering from eating bark and in another district where the bark has also been eaten they do not suffer? No; but I consider that it depends a good deal upon the time which the bark has been eaten. It does not seem to affect them at once, but in my opinion it gradually kills them.

666. Then it depends upon whether the rabbit has other food or moisture besides the bark? Yes.

667. In what part of your district have you noticed this disease? I have seen it from time to time all through my district, extending in a direct line about 90 miles.

668. *The Chairman.*] In dry periods is it specially prevalent in one part more than in another. Does it prevail in some parts and not in others? Yes. I fancy it does upon the whole. In some parts you do not see it so marked, but my idea is that it depends upon how long the rabbits have been eating this particular class of food. I fancy the disease varies with the astringency of the bark and I think the rabbits suffer from a sort of constipation.

669. Have you made any experiments at all by feeding with bark? No; but I have opened hundreds of rabbits suffering from this disease and everything inside seems to be dried up.

670. Is there any accumulation of bark in the inside? Yes; a quantity. I cannot say that I have seen any obstruction in the bowels or alimentary passage except this, that the passage is very much shrunk. So shrunk is it that I thought scarcely anything could pass.

671. *Mr. Quin.*] So far have you seen any better mode of dealing with the rabbits than that hitherto adopted? No; I think not. I think what has been done at Tarella is very satisfactory, and if disease is not successful nothing will be successful except fencing.

The Commission adjourned.

MONDAY, 28 MAY, 1888.

The Commission met at 10 a.m., at Silverton.

*Present:—*

*New South Wales:* EDWARD QUIN, Esq.  
*Victoria:* HARRY BROOKES ALLEN, Esq., M.D.  
 EDWARD HAREWOOD LASCELLES, Esq.  
*South Australia:* ALEXANDER STUART PATERSON, Esq., M.D.

In absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Herbert Pickering Butcher called in and examined:—

672. *The Chairman.*] You reside at Tintinallogy, Wilcannia? Yes; I am a legally qualified medical practitioner.
673. What are your qualifications? I am a member of the Royal College of Surgeons of England, and licentiate of the Apothecaries' Society of London. The date of my qualification is 1879.
674. How long have you been in the colonies? About five years.
675. Have you had any special training in connection with diseases in animals? No.
676. Had you any special experience in connection with animal diseases prior to coming to the colonies? No; but I was brought up on a farm, and knew all the diseases common to stock at home, as far as a young fellow could know them, but nothing specially.
677. After your arrival in the colonies, when did you first commence to pay attention to rabbit diseases, or to methods for dealing with rabbits? Directly I came out to the colonies I went up to the Darling district, where the rabbits were just arriving. I saw the first rabbit caught at Tintinallogy.
678. Did you conduct any experiments with poisons? We started at that time poisoning with arsenic and grain, according to the Government regulations. I saw that done at the time; we used arsenic and sugar on wheat. That resulted in nothing, and trapping was then conducted for about two years; yet the rabbits were increasing in numbers. From conversation with Dr. Ellis I came to the conclusion that, sooner or later, a disease must spring up amongst the rabbits. This was in 1885, and we then agreed to watch for it; but I could not obtain leave to keep rabbits for purposes of experiment.
679. Did you formally apply for such leave? Yes, in 1886.
680. What kind of country is it in which you watched for this disease? There are all sorts of country on Tintinallogy—lignum, sand-hills, &c.—a very mixed country throughout—the usual squatting country of the Darling. I got permission from the Minister for Mines to keep rabbits for poisoning experiments on the 15th August, 1887, there being no idea of any disease. Three days after I obtained this permission I heard of a skin disease which was reported by Mr. Clarke, the rabbit inspector, on the back country of Billilla, which is the adjoining station to Tintinallogy on the north. I did not avail myself of this offer of the Inspector, because I could only obtain the skins of diseased rabbits, and not the rabbits themselves. He asked me if I wanted the green skins of the rabbits, and not the rabbits themselves. I went on with the poisoning experiments, and the result has been published in the Board of Health papers presented to you. The experiments were practically of very little importance, and on the 3rd September, 1887, I got the first rabbit affected with the disease of which we are now speaking.
681. When did you first perform experiments with this disease? Well, I watched the rabbit about a week before I tried to pass the disease on to other rabbits.
682. Were you aware of many rabbits being affected with this disease at the time, or was this an isolated case? This rabbit which I found diseased was caught for the purpose of poisoning experiments. It looked diseased to me, and I made an examination of it. It must have been very early in the disease, because this rabbit then presented what we now believe to be the early symptoms of the disease.
683. What was the general line of the experiments which you then conducted? Contact experiments.
684. For how long did these extend in the first instance? For twenty-five days. I had then orders to destroy the rabbits. A week after I got the diseased rabbit I reported the existence of the disease to the Minister for Mines; and it was in consequence of this report that the rabbits were all destroyed on 28th September.
685. What occurred subsequent to that? I went down to Sydney and interviewed the Minister for Mines, and again got permission to go on. The date of that permission is 4th October. It was granted on the 4th, but not written at that time.
686. Where did you conduct your subsequent experiments? In the bend of the river that we have been working in since.
687. Will you give a short description of that bend? This bend of the river is supposed to contain 500 acres. It is a narrow neck of land, fenced in with an ordinary wire fence, on which wire netting was placed.
688. Did you have that netting erected specially? Permission was granted by the Minister to fence off an area of country with rabbit proof netting, and to continue the work inside the fence.
689. *Mr. Lascelles.*] Did you ever find the rabbits swimming from that enclosure? Never; because they were never disturbed. I believe they do swim sometimes, when dogs disturb them. There had been no stock in this bend for four years when we started experiments.
690. *The Chairman.*] Have you kept stock in it since your experiments have begun? Yes; all the way through.
691. Why was this bend not used for stock before? The bend had never been required for actual use. It was intended as a spell paddock for horses. It was originally used for that purpose, and the fence had been up for fourteen or fifteen years. The feed there was in first-class order. There are lignum creeks in this bend, and box flats, but no red sand, which the rabbits are fond of.
692. At the time of your experiments was it infested naturally? It was the thickest portion of infested country in Mr. Clarke's district, according to his report.
693. Did the rabbits burrow there? There were not many burrows. At that time, the river being low, the rabbits lived in the water cracks in the banks.
694. Have your experiments gone on continuously since the date of that permission? When I obtained permission, I telegraphed up to Mr. Reid, my assistant, telling him to get more rabbits to work with. He got them, and they were, on the 13th October, put into a crate that I had used with the first experiments.

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The crate had been previously used on the 28th September. For fifteen days the crate had been empty. These rabbits were ordinary rabbits, got from off the run. By the time I arrived home I had the disease going almost as it was when I was directed to destroy the rabbits. The experiments went on from that time up to the 14th May.

695. What persons have been associated with you in the conduct of your experiments? My partner, Dr. Ellis, principally; and Mr. Charles Reid, assisting in the camp; the Government Veterinarian, Mr. Stanley, Stock Inspector Tully, and Rabbit Inspector Clarke. The three Government officers have made formal reports on the subject of the disease.

696. Have official reports been made by any other persons in connection with the disease? I believe no one has any right to make an official report on the subject except those officers.

697. That is not quite an answer to my question. Has anybody else made an official report? I forgot—I believe Mr. Vindin was sent to Tintinallong to make a special report, and I think he has done so. I did not see him when he was there.

698. Have many persons examined your method? Forty-one persons altogether have examined it.

699. Do you desire that evidence should be taken from any of them? I believe you have already heard Dr. Hudson and Mr. Ridlock. I believe that several persons who have witnessed my experiments and the results obtained in connection therewith, will volunteer evidence at Tintinallong. Having received permission to try the experiments on the whole bend, we released the rabbits on the 8th November, after having inoculated and ear-marked them. We released six first of all, but it turned out to be a failure releasing them, because the rabbits did not belong to the bend, and would not remain there. They worked their way on to the wire-netting fence and not being able to get over or through it, they died under it.

700. What was the character of that fence? It was an ordinary six-wire fence or 4 feet netting, 1½ inch mesh, 6 inches in the ground, and stapled to the posts.

701. Now, will you describe the symptoms of the disease? The first thing noticeable about rabbits affected with the disease is the appearance about the head, the discharge from the eyes, and a slight discharge from the nose, but very slight.

702. What was the appearance about the head? The fur seemed to stand upright and the eyes prominent. Whether that prominence is due to wasting or what, I do not know, nor have I been able to find out. But this is one of the early symptoms, occurring at a time when the general wasting is not well marked.

703. Are there any other early symptoms? At present none which I am certain are distinctly associated with the disease.

704. How long does this running at the nose last? Not more than from three to four days.

705. So that in three or four days these symptoms about the head are no longer noticeable? No.

706. What is the subsequent course of the disease? The rabbit's fur stands up all over him, and he wastes away, losing the power of his hind legs.

707. Is that loss of power in the hind legs marked before the wasting is very advanced? The rabbit tries to sit up on his hind legs very often. The first thing we notice is that when he tries to sit up he cannot do it and falls over. This is noticed about the ninth or tenth day.

708. How soon in the disease is the emaciation clearly perceptible? Certainly by the end of the first week.

709. Have you noticed any further definite symptoms clearly connected with the disease? No; except that when the rabbits die they expire with a scream, which you can hear a couple of hundred yards away. This occurs about ten minutes before death. They die in a sort of convulsions, but it is with a straight movement of the legs inward. They lie on their side; the fore and hind legs come together, and separate again in a kicking motion, the animals dying with their heads arched backwards. It is nothing like ordinary convulsions.

710. At what period does this usually occur? About the seventeenth day.

711. Does that apply to the natural disease as seen at Tintinallong? That applies to the inoculated disease. The natural disease, we reckon, takes from twenty to twenty-one days.

712. What are the principal circumstances which influence the length of life of any rabbit affected with the disease? We found, in the case of inoculated rabbits, that a sudden change either to heat, cold, or rain, makes a difference of two days—it kills them two days sooner than they would die otherwise. We generally have more deaths after a cold night than at any other time.

713. With regard to the food available, does that make any difference? Not the least, so far as we can find out.

714. Does the original condition of the rabbit affect in any marked degree the result of disease with regard to death or duration of life? We have always picked out the best cases for our experiments—the fattest rabbits we could find—so that I can hardly tell you.

715. Do you think it is possible for rabbits to breed, having once got the disease? There have been no rabbits breeding since we started experimenting—after the first three weeks at least—that is on the whole run. We have never been able to get but one doe with young, and she was destroyed by Mr. Clarke, by orders of the Government, on the 28th September. This doe was fully diseased. We have found aborted young in different portions of the bend.

716. Have you found such abortions in great numbers? Well, they might exist on the run in ordinary seasons. I do not know whether it is a habit of rabbits in their wild state to slip their young, but I should think not; I cannot therefore say whether these abortions were caused by disease. We found them in the bend, but not elsewhere on the run.

717. Did you find several broods of aborted rabbits? Yes; and I found litters of dead rabbits, very young, that were dug out of nest burrows; but I cannot say whether they died from the disease or not.

718. *Mr. Lascelles.*] Up to what time of the year do rabbits breed on the Darling? They have never stopped altogether before. This year they stopped breeding entirely about November. We found no more nests after this.

719. *The Chairman.*] Have you found that any large proportion of rabbits recover from this disease? No.

720. In those that do recover, is convalescence a tedious process? Yes; it extends over months. Two rabbits that appeared to be getting over the disease were given to Mr. Reid's little daughter, and she was told she would get a reward if she made them fat. She gave them all sorts of feed from the garden, but was never able to fatten them; and I have them at the camp now. They are still alive; and I re-inoculated one of them just for the sake of experiment.

721. Will you now describe the *post-mortem* appearances, commencing with the external appearances, and then proceeding to the internal appearances? The first thing to be noticed is the harshness of the hair and  
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the extreme poverty of the rabbit. The head is drawn backward, and is very rigid. The whole rabbit, indeed, is extremely rigid, and on skinning it there is a peculiar mucous, glairy fluid, and we have called it sub-mucous, and used it for inoculation; but it is like as if the flesh were painted with gelatine. This is found between the skin and the carcase.

722. How with regard to the fat and muscle? There is no appearance of fat anywhere. The muscles individually are wasted away.

723. In one part more than another? No; not noticeably so. There is naturally very little muscle on the fore part of the rabbit.

724. And on opening the rabbit? On opening the rabbit there is generally found a fluid in the peritoneum.

725. In what quantity? As high as three drachms, and then varying to a few drops.

726. Is that fluid clear serum? Perfectly clear.

727. It is not, apparently, an inflammatory fluid? No.

728. What is the next appearance? The intestines and stomach were well supplied with food, showing that the rabbit was supplied up to the last; the coats are healthy.

729. Have you ever noticed an unhealthy condition of these coats? I have seen two cases of strangulation in the intestines, but that is all. In one case it was by intussusception, and in the other by a complete twist. This is out of some 4,000 *post-mortems*. Some of these *post-mortems* were, of course, made before I became acquainted with the disease. The liver was blackish-looking, very friable, but not increased in size. In some cases there were these white patches, of which I have never been able to get any history, varying in size from the head of a pin to the size of a pea.

730. Are there patches found on the surface and in the substance of the liver? Yes; both on the surface and in the substance, but generally on the under side of the lobes of the liver.

731. Have you cut across these little deposits? Many times; they contain a white, cheesy mass, so far as I can see.

732. Are you clear that such deposits are not found in all fatal cases? I am sure they are not.

733. Have you made a close enough examination to be certain that they are absent in any large proportion of the cases? For about two months—during February and March—I do not believe we had a single case with a marked liver, that is, a liver marked with whitish spots.

734. How many rabbits do you think you examined during these months? Roughly speaking, about four per day?

735. Have you noticed any marked alteration in the bile or gall bladder? The gall bladder is generally enlarged.

736. Have you been able to distinguish these specks clearly from any possible confusion with tubercle or with some septic mischief due to blood-poisoning? I can distinguish them clearly from septic mischief, but further than that I cannot say. I do not think they are tubercle, but I am not prepared to speak absolutely on that point. On the septic question I am, as I have made experiments to prove it.

737. Is the capsule of the liver inflamed? The capsule is not inflamed or involved in any way, even when these patches abut upon the surface.

738. What is the next organ of importance? There is very little to say about the kidneys. I have never been able to find out anything wrong with them. Just above the kidney there are two small white patches which we have called supra-renal capsules for convenience of name. I am not certain of their exact nature. These are enlarged, discoloured, and caseous in the disease.

739. What is the nature of the discoloration? From blood red to black. They are of a dull white colour—we call it opal—in a healthy state.

740. What is the condition of the mesenteric glands? They are much enlarged, and full of a jelly-like substance—a very clear fluid.

741. That is, they contain cysts? They are not exactly cysts, but the gland seems to have become degenerated and bunched up in a peculiar way. On cutting into that the fluid runs away. There are two fluids irregularly mixed together.

742. Have you found that in the mesenteric glands in all cases? It has been much more marked these last two months, but the glands were enlarged in all cases.

743. Is the change that you have described in the supra-renal bodies a constant one? Yes.

744. Have you noticed any change of importance in any other organ of the abdomen? No; the spleen is very variable both in health and in this disease, so that we have not been able to attach any importance to it.

745. Then turning to the chest—what is the condition of the heart? There is excessive fluid in the pericardium or heart bag, and that is all I can say about it. The heart itself seems to be healthy. I should not think it had wasted much, but then it is a difficult thing to judge of.

746. What is the state of the lungs? Apparently healthy; no engorgement.

747. Then in your opinion death is not due to suffocation or asphyxia? No; and I am familiar with the appearance of rabbits which have died from suffocation.

748. Is there any hæmorrhage on the surface of the lungs? No; I have looked for that very closely, and there is no hæmorrhage on the surface of any of the organs of the body. The rabbit has glands apparently at the root of the neck, which in this disease become enlarged; you get at them from inside the thorax. In skinning the rabbit—lately more particularly—we noticed enlarged glands under the fore and hind limbs. They were very noticeably enlarged—as large as peas—but there was nothing else remarkable in connection with them.

749. Have you examined the nervous centres repeatedly? No; and I am not sufficiently qualified to form an opinion on them.

750. What is the general condition of the blood—is it fluid, or does it tend to clot? It is fluid. It is very black notwithstanding that the lungs are not engorged, and it varies very much in quantity in diseased rabbits. Sometimes there is a large quantity, and sometimes there is hardly any. The fluid is very thin and watery.

751. Have you made any microscopic examinations at all? No; I have left them to Dr. Ellis.

752. *Mr. Lascelles.*] Could you prepare coloured drawings showing the organs in healthy rabbits and the organs of diseased rabbits? No; I could not undertake that.

753. *The Chairman.*] Reference was made by Dr. Ellis to affections of the skin and the superficial parts of the body which were noticed in rabbits in connection with this disease. Will you state the nature of your observations

observations concerning this skin affection? I first heard of this disease on the 18th August, 1887, from Mr. Clarke, the rabbit inspector. Rabbits with this disease were being caught with scabs on them, as he called it. We have found these rabbits on the run as well as where they were first reported. From the history of rabbits dying elsewhere, it appears that this scabby skin seems to come before the breaking out of the disease which is killing them. I am now referring to Glenlyon and Weinterriga, and places on this side of the river where rabbits have since disappeared.

754. I understand that you have learned this not from your own observation, but that it occurred on adjacent stations where some disease had broken out amongst rabbits, and that the scab appeared as far as you can learn before the manifestation of the disease which killed the rabbits? Yes.

755. Now will you state your experience in connection with this scab? I believe, myself, that it has been caused by the food.

756. But what is this scab? It is an eruption of the skin, varying from a branny condition of the skin up to extremely severe forms of scabbing, with scabs an inch thick on them.

757. Does that inch thick of scab project from the skin? Yes, and covers the whole body of this rabbit that I am speaking of.

758. Is that scab disease prevailing at all extensively amongst the rabbits at Tintinallogy in connection with your experiments? No.

759. I understand, then, that the great majority of the rabbits which died from your disease had perfectly healthy skin? Yes; perfectly healthy skin.

760. Do these scabs fall off, leaving ulcers behind them, or are they persistent during the life of the rabbit? I have seen both events occurring. In the very bad case which I have mentioned the scab remained to the end. In other cases the scabs fall off, leaving ulcers with clean-cut edges.

761. Do these ulcers heal? Yes; but not in many cases. The hair never grows again, and a scar remains.

762. Do you think that this skin disease has any relation to the deadly disease to rabbits which you have been describing as in existence at Tintinallogy? No; not the least; but I did think so at first.

763. Have you been able to form any idea of the nature of this scab disease? No.

764. Have you made any experiments with it as to its transmissibility from animal to animal? Yes, I have tried them and got no satisfactory results. Some cases seem to get it, and others with the same experiments do not get it; no two results agreed. The experiments were in all cases intended to transmit the disease by contact from unhealthy animals to healthy animals, and the results were very unsatisfactory.

765. But still in some cases the disease did seem to spread in that way? Yes; but I am under the impression that the animals had it before I put them together, because I believe it to be a matter of feed.

766. Is your belief that the scab disease is due to feed a matter of conjecture, or have you any real evidence which you can adduce in favour of that belief? I have evidence that this skin disease broke out at Billilla, 3 miles off the river, two years ago. Around Willincarie the disease is always more or less prevalent, and the rabbits have been diminishing in numbers; but it never spread from that particular place.

767. Then it appeared also amongst your rabbits in experiments at Tintinallogy? Yes.

768. Are you able to give any explanation of its appearance there? No; none at all.

769. Was it a new disease in the district? It has been there for some years.

770. Is it still in existence? Well, I believe not, because I understand the rabbits are all dead there from something else. They have been largely poisoned with phosphorus and I have heard there are now no rabbits there.

771. Dr. Ellis spoke of a cheesy deposit at the base of these scabs from which a lot of matter comes away, and also of a cheesy deposit in the muscles—will you give us your experience in relation to such appearances? Well, I cannot say that there was a lot of it; you could scrape it up on the point of a knife to inoculate another animal with. With regard to the cheesy masses in the muscles, they were very distinct and were found in rabbits which had had the scab disease, but were not directly connected in position with the superficial eruptions or scabs.

772. You at first took these cheesy deposits to be enlarged glands? Yes; I thought they might be lymphatic glands from the irritation of the skin. I did not find them in rabbits which had not the scab disease.

773. Do you believe the cheesy deposit in the muscles to be a part of this scab disease, whatever it is? There were many cases of skin disease in which there were no muscular deposits.

774. Will you now furnish the Commission with such accounts of your experiments in connection with the Tintinallogy disease as you desire to place on record? Yes; this book contains a record of the experiments conducted, the history of the lymph, the variety of methods of inoculation, and places of inoculation, together with inoculations of stock by Mr. Stanley and others done in my presence, and other various experiments:—

COMPILED RECORDS OF INOCULATIONS AT TINTINALLOGY.

1887.

November 28.

Lymph from natural disease crate E. (See question 694).

Mark 5.	Mode of inoculation:—Scarification.			Hypodermic injection.			
	Virus employed:—Gland solution.			Serum.			
	1	2	3	1	2	3	4

All killed for various experiments.

November 28.

Lymph from 3x.

Mark 6.	Mode of inoculation:—Scarify.*								Hypodermic.†			
	Virus employed:—Liver substance.				Liver infusion.		Liver infusion.		Liver infusion.		Abdominal fluid.	
	1	2	3	4	1	2	3	4	1	2	3	4
Result, in days till death ...	18	18	18	19	16	18	18	‡	3rd day.	16	17	All 17 days.

6 controls kept 26 days.

\* Scarify on face.

† Hypodermic in crupper.

‡ Refused food.

ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE

December 3.

Lymph from rabbit inoculated November 19 (14th day).

Mode of inoculation :—Hypodermic injection.

Mark 15.	Virus employed :—Gland solution.
	1 2 3 4 5 6
Result in days till death ... ..	13 14 16 16 17 23*

3 controls.

\* Difference in time ; no apparent cause.

December 4.

Lymph from rabbit inoculated November 19 (15th day of disease).

Mark.	Temp.	Virus.	Locality.	Result, giving date of death.
10	101°	Transfusion of blood..	Vein ear ..	Killed for lymph 18th December.
9	101.4°	Abdominal fluid ...	Crupper ...	Failure—reinoculated 22nd (see 22nd Dec).
3	101°	" ..	Vein of ear...	" ..
4	100.4°	" ..	Conjunctiva	" ..
7	100.4°	" ..	Face ..	" .. (lingered till 17th January).
8	100.6°	Liver infusion ..	Crupper ...	14th day.
11	100.6°	" ..	" ..	15th "
12	101°	" ..	Face ...	15th "
13	100.6°	" ..	" ..	15th "
14	101°	Gland infusion ...	" ..	15th "
15	101.2°	" ..	" ..	16th "

7 died after 44 days. 3 and 4 killed for *p-m.* after time expired.

NOTE.—Failure of abdominal fluid.

4 controls.

December 4.

Lymph from old rabbit marked with punch-hole inoculated November 17 (17th day of disease).

Mark.	Temp.	Virus.	Locality.	Result, giving date of death.
16	101.8°	Liver cyst solution ...	Crupper ...	15th day.
1	101.6°	" ..	" ..	16th "
2	101.4°	" ..	" ..	14th "
5	101.6°	" ..	Face ...	15th "
6	101.4°	Liver cyst substance	" ..	29th **
Punch-hole.	101.4°	" ..	" ..	15th "

With liver cyst solution and serum, as above.

1 horse ... } Inspected by Government Veterinarian 4 weeks afterwards ; and by local Stock Inspector on various occasions.  
 2 sheep ... }  
 3 guinea-pigs }

\* Difference in time ; no apparent cause.

4 controls.

December 8.

Remarks on temperature of rabbits.

A healthy rabbit temperature, 101.4° (normal) ; after being harassed in yard 5 minutes temperature rose to 106.6°.  
 A rabbit 20 hours in box travelling had a temperature 110° ; immersed in water bath 5 minutes, temperature 104.6° ; further 5 minutes in water, temperature 98° ; in hutch 15 minutes, temperature 96.4° ; further 15 minutes, temperature 94° ; following morning, temperature 101.6°.

December 12.

Intravenous injections.

Lymph from rabbit with natural disease by contagion (in yard A).

1. Vein near ear ... .. died on 15th day.
2. " off ear ... .. 15th "
3. " near thigh ... .. 16th "
4. " off thigh ... .. killed 16th " for observation.

Lymph from femoral artery (mark 5), Nov. 28th (15th day).

1. Vein off ear ... .. died on 16th day.

Lymph from femoral artery (mark 5), Nov. 28th (15th day). Scarify.

1. Vein off ear ... .. died on 22nd day.\*

\* Difference in date.

6 controls.

December 14.

Lymph from crate E—yellow rabbit (infected crate).

Mark 16.	Inoculation :—Scarify.		Hypodermic injection.				
	Virus :—Subscurous fluid.		Direct blood from vein of ear.				
	1 2		Intravenous.	Hypodermic.	Thigh muscle.	Arm muscle.	Abdominal cavity.
Result in day of death ...	20 18		Killed 17	16	Paralysed.	16.	3 days.
			for Stanley.				
			2 controls.				

December 15.

Inoculations from half-grown rabbit—(crate E)—infected crate.

Mode of inoculation :—Hypodermic injection.

Mark 1.	Virus :—Liver infusion.
	1 2 3*
Result in day of death ... ..	9 10 12

\* This rabbit weighed on day of inoculation 5½ lb.

1 control.

EXTERMINATION OF RABBITS IN AUSTRALASIA—MINUTES OF EVIDENCE. 75

December 18.

Lymph from December 4 (14th day of disease).

Mark 7.	Mode of Inoculation :—	Hypodermic injection.					
	Virus employed :—	Liver infusion.					
		1	2	3	4	5	6
Result in day of death ...		3	14	16	16	16	17

With same virus—  
 1 cow } Passed by Stanley and Tully.  
 1 calf }

3 controls.

December 22.

Lymph from yellow rabbit, from Podger's Paddock.

Mark 11.	Mode of Inoculation :—	Liver solution.				Hypodermic injection.		Direct blood.
	Virus :—	Blood serum.				Blood serum.		
		1	2	3	4	1	1	
Result in day of death ...		7*	13	17	17	16	Failed †	

\* Rupture psoas muscle. † Failure of December 4th, see January 6th.

3 controls.

December 31.

Stanley's inoculation.

Lymph from December 14 (17th day of disease).

Mark 4.	Mode of Inoculation :—	Scarify.	Hypodermic injection.			Intravenous.	
	Virus :—	Liver substance.	Liver infusion.	Blood.	Blood.	Blood.	Blood.
		1	1	2	3	1	1
Result in day of death...	next day	...	16	16	18	17	16

With virus from above (mark 16) Mr. Stanley inoculated 6 sheep as under :—  
 1. Wether—Hypodermic of liver infusion, near flank and brisket.  
 2. Stag—Hypodermic of blood serum  
 3. Ewe—Hypodermic of liver infusion off " " "  
 4. Ewe—Hypodermic of blood serum, off arm and flank.  
 5. Ewe—Scarify face and arm, blood serum.  
 6. Ewe—Scarify face and near brisket, liver substance.

All these examined and passed by Inspector Tully.

4 controls.

1888.

January 3.

Lymph from natural disease. Yard A.

Mark 13.	Mode of Inoculation :—	Scarify	Hypodermic.		
	Virus :—	blood clot.	Blood serum.	Liver infusion.	
		1	2	1	2
Result in day of death ...		18	18	16	17

With lymph from above rabbit Mr. Stanley inoculated—  
 1 saddle horse—Hypodermic of liver solution, and scarify neck blood clot.  
 1 white calf—Scarify off ear, liver substance; hypodermic of blood serum, brisket; hypodermic of gland solution, fore-arm.

Both these watched by Inspector Tully.

2 controls.

January 4.

To show spread of disease on run at this date.  
 Of 62 post-mortems made by Mr. Stanley on rabbits caught by dogs in "Receiving Paddock," 6 were found diseased.  
 4 inches rain fell during latter part November and December.

January 6.

Inoculations from cystic tumours in caught rabbit.

Mark 9.	Mode of Inoculation :—	Scarify.	Hypodermic.				
	Virus :—	Cyst matter.	Filtered solution.				
		1	2	1	2	3	4
Result in day of death ...		1	4	5	7	10	13

NOTE.—These did not show typical signs of disease. Blood poisoning (?).

2 controls.

January 6, P.M.

Lymph from same rabbit as morning.

Mark 10.	Mode of Inoculation :—	Liver solution.		Hypodermic.		
	Virus :—	Blood serum.		Blood serum.		
		1	2	3	1	2
Result in day of death ...		16	17	broke leg.*	16	16

\* This rabbit was failure of December 4th and 22nd, but was killed 10 days after this inoculation; no signs.

January 7.

Sheep blood inoculations.

Lymph—Blood serum.

Mark 2.	Mode of Inoculation :—	Hypodermic.			
	Virus :—	Blood serum.			
		1	2	3	4
Result ...		All rabbits remained healthy 28 days. (See February 4th.)			

4 controls.

January

January 8.

Lymph—Natural disease. Yard A.

Mark 5.	Mode of Inoculation :—				
	Virus :—	Mesenteric gland substance.		Scarify.	
		Face.	Back.		
		1 2	1 2		
Result in day of death	...	15	17	4*	17

\* Killed for observation.

2 controls in Control Yard.

January 9.

Lymph as yesterday. Yard A.

Mark 1.	Mode of Inoculation :—	Intravenous.	Hypodermic.
	Virus :—	Direct blood.	Direct blood.
		1 2	1 2
Result in day of death	...	16 sent Ellis.	15 killed for specimens

January 11.

To show contagion of disease.

In yard D (10 ft. x 12 ft.): 1 natural disease crate E, 3 guinea-pigs (inoculated), 16 rabbits.

Result: All rabbits dead by 3rd February; first death 18 days.

In locked crate: 1 inoculated rabbit (5th day) with 6 clean rabbits. Inoculated rabbit removed in 24 hours

Result: All died 19th and 20th day.

NOTE.—1 (yard D) killed for lymph, successful. (See January 19.)

Controls.

6 in yard; 1 died strangulation of intestines.  
2 in hutch.

January 15.

Lymph from Mark 5 (January 8th).

Mark 15.	Mode of Inoculation :—	Scarify.	Hypoderm		
	Virus :—	Blood serum.	1	2	3
		1 2	17	16	19
Result in day of death	...	2			

2 controls.

January 19.

Setons.

Lymph natural disease. Yard D. (See January 11th.)

Mark 3.	Mode of Inoculation :—	Scarify.	Setons.			
	Virus :—	Blood serum.	1	2	3	4
		1 2	1*	15	17	17
Result in day of death	...	16 18				

4 controls.

\* Seton went through lumbar muscle (tetanus).

January 21.

Lymph: Natural disease, trapped in bend at camp.

Mark 4.	Mode of Inoculation :—	Hypodermis				
	Virus :—	Blood serum.				
		1	2	3	4	5
					Killed for Ellis	
Result in day of death	...	5	15	16	16	17

Condition of rabbits in bend.

Of 23 caught in drive 10 actually diseased.

2 controls.

January 23.

Contagion from caught bend rabbit (driven).

In yard A, 20 feet x 24 feet.

1 bend rabbit as above, with 38 clean rabbits (tested).

Bend rabbit died in 9 days. Others as follows :—

5	died on February 11th	...	19th day
8	" " 12th	...	20th "
7	" " 13th	...	21st "
9	" " 14th	...	22nd "
7	" " 15th	...	23rd "
1	" " 16th	...	24th "
		10 controls; all lived.	

January 25.

Glazed thread setons.

Lymph: Natural disease (camp bend).

Mark 13.	Mode of Inoculation :—	Setons.			
	Virus :—	Blood serum.			
		1	2	3	4

Result: Glazed thread a failure. (See February 3rd.)

Control.

## EXTERMINATION OF RABBITS IN AUSTRALASIA—MINUTES OF EVIDENCE. 77

*January 27.*

Lymph from natural disease. Crate A.

Mark : Full ear.

These were inoculated to watch local irritation caused by seton, and were killed on the 2nd, 3rd, 4th, 5th, 16th day.

*February 3.*

Lymph from natural disease, yard A experiment.

(Glazed seton failures, January 25th.)

Mark 13.	Mode of Inoculation :—		Sterilized worsted setons			
	Virus :—		Blood serum.			
			1	2	3	4
Result in day of death	...	...	17	17	17	25
		2 controls.				

*February 4.*

Lymph. Setons prepared yesterday (sterilized silk).

(Rabbits surviving from Sheep blood inoculations of January 7th.)

Mark 2	Mode of Inoculation :—		Seton.			
	Virus :—		Blood serum.			
			1	2	3	4
Result in day of death	...	...	16	16	17	17
		2 controls (same as January 7th).				

Inoculations by C. W. Reid.

*February 7.*

Lymph from natural disease (Gums Paddock), south half of run.

Mark 12.	Mode of Inoculation :—		Hypodermic.			
	Virus :—		Blood serum.			
			1	2	3	4
Result in day of death	...	...	14	17*	17	18
		* to Wilcannia, sent for experiment.				
		1 control.				

*February 7.*

Nursing naturally diseased rabbits.

4 rabbits run down in camp bend put in crate ; fed on lucerne, lettuce, and hay.  
Result : No improvement in condition ; died with usual *p.m.* appearances.*February 9.*

Mesenteric glands.

Lymph from trapped Gums paddock rabbit.

Mark 5.	Mode of Inoculation :—		Hypodermic.			
	Virus :—		Mesenteric gland infusion.			
			1	2	3	4
Result in day of death	...	...	16	17	19*	killed 9th day for lymph.
		2 controls.				
		* See February 20th.				

*February 18.*

Setons and lymph for Sydney.

Lymph from mark 5, February 9th (9th day of disease).

Mode of Inoculation :—	Hypodermic.		Setons.	
	Blood serum.		Blood serum.	
Virus :—	1	2	1	2
Result in day of death	...	...	17	18

NOTE.— This lymph was successful in Sydney.

2 controls.

*February 20.*

Lymph : Trapped rabbit, camp bend.

Mark 14.	Mode of Inoculation :—		Hypodermic.			
	Virus :—		Blood serum.			
			1	2	3	4
Result in day of death...	...	...	1	15	18	17 (escaped.)
		3 controls.				

*February 24.*

Lymph—Natural disease. Crate E.

Mark 11	Mode of Inoculation :—		Seton (silk).			
	Virus :—		Blood serum.			
			1	2	3	4
Result in day of death	...	...	1	15	16	18
		2 controls.				

*February 27.*

Lymph : Setons prepared on 24th.

Mark 15.	Mode of Inoculation :—		Setons (as on 24th).		
	Virus :—				
			1	2	3
Result in day of death	...	...	7*	16	17
		1 control.			

\**P.M.* Hydatids leosc on mesentery.*February*

*February 29.*

Lymph—Silk setons, as on 24th and 27th.

Mark 1.	Mode of Inoculation :—	Setons.		
Result in day of death ...	...	1	2	3
		15	15	failed.
	Controlled.			

*February 29.*

Lymph from Mark 5, February 9th (19th day).

Mark 6.	Mode of Inoculation :—	Hypodermic.			
	Virus :—	Direct blood.			
Result in day of death ...	...	1	2	3	4
		2	15	17	killed for lymph (see March 13.)
	2 controls.				

*March 6.*

Experiment for Weinteriga.

In tree yard (10 ft. x 12 ft.) 1 rabbit brought by Affleck (Weinteriga back country) placed with 14 rabbits. Of these 4 died in 5 days, 2 on 7th day, and remainder 21st and 23rd days.

Weinteriga rabbit died 8th day after yarding.

Of station rabbits that died on 5th and 7th days everyone must have already been diseased when put in yard, as *p.m.* showed characteristic signs.

6 controls.

(Of these 2 died 6th and 9th day.)

*March 6.*

Weinteriga experiment, No. 2.

In crate : 1 Weinteriga rabbit, with 6 strong rabbits.

Result : Weinteriga died 7th day ; others—2 died 21st day, 4 died 22nd day.

*March 9.*

Lymph from natural disease (cattle paddock).

Mark 8.	Mode of Inoculation :—	Hypodermic.			
	Virus :—	Blood serum.			
Result in day of death ...	...	1	2	3	4
		13	16	17	20
	2 controls.				

*March 13.*

Lymph from mark 6, February 29th (13th day).

Mark 11.	Mode of Inoculation :—	Setons.			
	Virus :—	Blood serum.			
Result in day of death ..	...	1	2	3	4
		7	16	18	18
	4 controls.				
	(1 died.)				

775. *The Chairman.*] That statement was prepared by you? Yes; it was prepared for the purpose of this examination from the camp records.

776. Does it contain an account of all experiments that have been performed? Yes; of all that have been performed accurately.

777. Have these experiments all been performed with proper precautions against septic contamination? Yes, all of them.

778. What was the nature of the precautions thus taken? From the start a bichloride of mercury solution for washing the hands was used, and for disinfecting infected crates.

779. Did you take any precautions to see that the instruments and crates were in a thoroughly disinfected state? Well we had control experiments conducted in all cases to test the accuracy of the other experiments.

780. I understand that you performed a number of experiments at earlier dates without employing the septic precautions which you adopted in connection with these experiments? Yes.

781. Did you meet with any difficulties in these earlier experiments from septic contamination? Yes. The rabbit is an animal that gets contaminated very quickly, and a large proportion died in ways not connected with the disease with which I was working. You will find in that record experiments performed with certain septic precautions where rabbits died—at periods earlier than could be explained by the Tintinology disease—with septic symptoms. These experiments have been marked off as unsatisfactory on account of the septic contamination.

782. The book which you have put in gives a general account of all experiments which have been performed under satisfactory precautions? Yes.

783. No experiments have been excluded in which a definite result was obtained? No.

784. Putting the matter shortly for the immediate information of Commission, what methods of inoculation or transmission of the disease did you adopt? There were three—injections beneath the skin with a hypodermic syringe, intravenous inoculation, and the introduction of infected setons.

785. Did you find that all these produced the disease? Yes.

786. Did any one do so more surely than another? Intravenous inoculation was the greatest success, but setons were good enough for all practical purposes.

787. Will you describe the method you adopted in intravenous inoculation? A vein of the ear was dissected down upon, and the needle of a hypodermic syringe introduced into this vein. The blood was drawn from this and transferred to similar veins in another rabbit.

788. Is it not a very difficult matter to introduce a needle into a vein without puncturing both walls of it? Yes.

789. What substance have you introduced from diseased rabbits into healthy rabbits with the effect of producing this disease? Blood clot and blood serum; the so-called supra-renal bodies mashed up with water,

water, and liver substance mashed up with water. Such fluid being called an infusion in that experiment, though really only a suspension in water. The fluid from the abdominal cavity, and what is called the sub-mucous fluid under the skin, were also used. We used the mesenteric gland substance braised up with water. Then, in addition to that, I tried blood.

790. And with these substances you obtained successful results? Well, with regard to the abdominal fluid, I am not sure about it. I would say that the abdominal fluid was not to be depended upon.

791. These were all used in inoculation as distinguished from the use of setons? Yes; but the setons were prepared in the same fluids.

792. Did you use fluid from the pericardium at all? Never.

793. Dr. Ellis, then, has made a mistake? Yes; if he has said so. I left all those fine experiments to him.

794. In your experiments at Tintinallogy what rabbits did you use for infection with disease? The only case of importation was from Weinterriga, and all the rabbits for inoculation experiments were obtained from our own run.

795. Did any rabbits prove refractory or indisposed to take the disease? Out of 282 rabbits the number of failures to inoculate amounted to only one. He was inoculated three times and ultimately broke his leg, and had to be destroyed; but three inoculations were made on him without result.

796. Was reinoculation necessary in many cases? I have only had one—the one I refer to. In all other cases the disease was taken after one inoculation, or the rabbits died without recovering condition. In no case but this one did I resort to re-inoculation. In almost all cases the rabbits took the disease and died in the ordinary way. In a few cases the rabbits lingered on longer than the ordinary period, but in very few cases so long that I was doubtful what they died of.

797. Have you ever made experiments with a rabbit recovering from the disease to see if it still could communicate this disease to other rabbits? No; I never tried that.

798. Will you now give us some short account of what experiments you have performed to test the transmission of the disease by contact of diseased rabbits with healthy rabbits, or by placing healthy rabbits in hutches in which diseased rabbits had been previously kept? We have one crate—that known as crate E—in which rabbits were placed when I telegraphed to Mr. Reid from Sydney. That was empty fifteen days and it gave the rabbits the disease. Only one rabbit since put in that crate has failed to take the disease. I have put in a wire netting yard, 10 × 12 feet, sixteen rabbits and one rabbit from crate E. The result is they all died by the 3rd February, within twenty-three days.

799. Were these rabbits properly fed? Yes; and with every precaution. They had ample shelter in a canvas tent filled in with green boughs. I satisfied myself that death occurred from this disease by *post mortems* made every morning. In another experiment one rabbit on the fifth day after inoculation was placed for twenty-four hours with six clean rabbits—the result was they all died on the 19th and 20th day. In both these experiments control experiments were carried out under exactly similar circumstances, and the rabbits under control remained healthy, except the one that I spoke of as having died of strangulation of the intestines. It did not present the disease in the slightest.

800. *Mr. Lascelles.*] What are we to understand by control experiments? Control experiments mean simply this, that animals are kept under similar conditions without inoculation. In another experiment with contagion, in a yard 20 × 24, one rabbit from the bend of the river was placed with thirty-eight clean rabbits; the result was that the rabbit from the bend died in nine days, and all of the thirty-eight rabbits placed in the yard with it died except one, which was lost sight of. All the others died between the nineteenth and twenty-fourth days; and ten animals were kept under control in a similar yard under exactly similar conditions, and all these lived.

801. *The Chairman.*] Will you now give a short *résumé* of your experiments on stock, with regard to the possibility of this disease being transmitted to them? Yes. On the 4th December two sheep and three guinea-pigs were inoculated with serum and blood of infected rabbits, together with pulp from the white patches in the liver, mixed up with water. These animals were inspected by the Government veterinarian four weeks afterwards, and by the local stock inspector on various occasions.

802. Was any result whatever noticed? No, not in the least; not even at the seat of inoculation. On December 18, a cow and calf were inoculated with liver-substance braised up in water. These animals were subsequently passed as healthy by Messrs. Stanley and Tully. On December 31st and January 3rd, six sheep, a horse, and a calf were inoculated by Mr. Stanley; liver-substance braised up in water being used for the sheep, and with the horse the liver-substance braised up in water was injected beneath the skin, and blood-clot was introduced into the neck by scarification. In the calf the liver-substance braised up in water was introduced by scarification in the ear; blood serum was introduced by hypodermic syringe in the brisket, and the so called supra-renal glands braised up in water were introduced beneath the skin in the forearm by hypodermic syringe. All these animals were watched by Inspector Tully.

803. Did these animals all remain thoroughly healthy? Yes; in every way.

804. Was anything noticed at the place where the poison was introduced? Not the least.

805. What stock were introduced into the enclosure at the bend? Four horses, one cow, two calves, twenty-two sheep, and four goats. These animals were kept over three months in the bend.

806. Was the disease then very prevalent amongst the rabbits in the enclosure? Yes.

807. Did any of the stock die? No.

808. Did any become ill? No. The cow was milked every day, and kept her condition. We used the milk for the camp, and when the stock were taken out we ate some of the sheep.

809. Will you now describe the spread of the disease at Tintinallogy? There are two parts; there is the distinct spread in the bend and from the centres of inoculation. In the bend, the first results obtained were bad on the 8th November, 1887, and were with six rabbits obtained from the outside country. This was apparently a failure, because the rabbits did not mix with the rabbits in the bend, and died against the fence in trying to get out from the area enclosed in the bend. The rabbits being ear-marked we were able to prove this. We then put up a little wire, making a drive in the bend; we got six rabbits, inoculated them with the disease, and the disease spread; we turned them loose at once. The inoculation was all hypodermic injection with blood serum. From that time out rabbits died in the bend.

810. Did you introduce any more? No. One or two got out from the crates, but we do not count them, because we do not know what became of them. Some three rabbits escaped altogether. From that time out the rabbits commenced to die. The last report of the inspector says that he saw only five rabbits after a thorough inspection of the bend, which was very heavily infested before. The number of dead rabbits can be spoken to by the visitors who went down there.

811. Was any poison whatever laid at this time in the bend? There was poison laid just around our experimental wire-netting yards to catch certain rabbits that hung about outside the yard. Some twenty or thirty rabbits had escaped from the yard, and they kept coming back, so we decided to get rid of them by poisoning. We were then using strychnine on cabbage-leaves. This was done to catch these particular rabbits, because we thought they would interfere with our experiments.

812. Was the food for the rabbits abundant in the bend at the time? Yes, as at present, and all through.

813. *Mr. Lascelles.*] Do you think that any of the rabbits got out of the bend? I do not think any got out by water as the river was then very high and running swiftly; and unless worried by dogs rabbits will not cross a river.

814. Would it be a hard matter for any rabbits in that bend to be caught by digging out or by getting at hollow logs? I believe Mr. Reid could go down there now and clear the bend within half-an-hour. Of course there is an immense number of cracks in the river bank, and men could not possibly dig them out.

815. *The Chairman.*] Will you now state what has been done towards putting the disease on other parts of Tintinallogy? From the centre where it originally started,  $1\frac{1}{2}$  miles above the home station, it spread in all directions, and in all cases with great fatality.

816. Is there any evidence with regard to that fatality beyond what you have already stated? Messrs. Clarke's and Tully's reports will give the results.

817. Now, have the rabbits been substantially thinned out in this way? So far as Tintinallogy is concerned, I think we might call it extermination. This has been done all over an area of 236,030 acres. On one side the disease has spread only three-quarters of a mile from the point of origin; but on the north side I do not know that there is any limit to its spread. Within this area, then, there has been practically extermination.

818. And within what area, approximately, has the disease spread so as to cause extermination? I should think it had cleared about 10,000 acres without any assistance at all. It is difficult to say, because of the river bends, and I do not know how far back it has gone.

819. Passing now to what you have done yourself, will you give us particulars? If you take the Lignum Creek south of the woolshed, where the natural disease appeared to stop—we infected that first by allowing diseased rabbits from the camp to go on to it. That was a failure, so far as we could see; we then caught the rabbits on the creek itself, inoculated them on the spot and let them go. We used the setons at that place. The seton was steeped in one of the organs of the diseased rabbit, braised up in water, and was then dried and placed in a glass tube for convenience of carrying about. The result of that infection was seen at once. The rabbits started to die on the creek, and from the creek they carried the disease a long way—I should say 3 miles. The creek makes a big turn coming out from the river, and we reckon it 3 miles.

820. What did you do next? We next started to infect the sand hills. As the rabbits were not trapped they congregated together more in colonies, and the colonies being infected in a similar way, the result was seen at once.

821. In the area so dealt with, was anything like practical extermination secured, or were the rabbits simply thinned out? Yes, speaking roughly. The best way for me to answer that question is to show what rabbits were killed up to a certain time.

822. Did you proceed to infect any other parts of the run? We infected all over. Wherever there were large colonies we infected the rabbits, using the same method by seton. We have occasionally done it by hypodermic injection, but it is more complicated. The carcasses of these animals have been lying about all over the run, and have been eaten by dogs, cats, pigs, fowls, crows, and hawks.

823. Have any of these animals been dying? None, except cats, that have died, from what, I am not able to say. They started to die only very lately. I believe them to be suffering from some form of distemper, but there will be evidence as to that.

824. *Mr. Lascelles.*] Have you made any *post-mortem* examination on the cats? No; I have never seen one of them dead, and I am speaking now only from report.

825. Can you furnish any statistics showing the number of rabbits that have been destroyed at Tintinallogy by this disease? No; but I can furnish some showing the number of rabbits that we caught, before the disease started, by the trapping method, showing how thickly the country was infested. During last year there were in all 291,000 rabbits killed on the run. I was at work from October to December. These are the figures:—

*Extract from Tintinallogy Rabbit Journal.*

1885.—5,061 rabbits killed, at a cost of £231 17s.

1886.—32,163 rabbits killed, at a cost of £804 1s. 6d.

1887.

Month.	No of men.	Rabbits killed.	Bonus.	Cost.
January.....	19	12,685	d. 4	£ 213 17 0
February.....	12	6,128	4	102 2 8
March.....	25	15,757	4	262 12 4
April.....	18	10,012	4	166 17 4
May.....	22	20,333	3	254 3 3
June.....	21	26,623	3	323 15 9
July.....	29	50,246	3	623 1 6
August.....	17	26,346	2	219 11 0
September.....	22	56,510	2	470 18 4
October.....	25	41,599	2	346 13 2
November.....	7	10,000	1½	62 10 0
December.....	11	14,936	1½	93 7 0
Totals.....	.....	291,175	.....	£3,153 9 4

1888.—Half of January, nine men killed 7,597; cost, £47 9s. 7d. Since then, cost nil.  
Total cost, 1885 to 15th January, 1898, = £4,236 17s 5d.

826.

826. Were the same number of men employed? Well, I cannot tell you that.

827. *The Chairman.*] In all the area of Tintinallogy have the rabbits now been practically exterminated? Well, I sent out four men to the places where rabbits were supposed to be thick—at places 18 miles from the station—and they were actually on the ground for five hours and only got ten rabbits.

828. Can you give any evidence to prove that starvation had nothing to do with this mortality? The run has been stocked at the rate of one sheep to every 4½ acres. I may say that the run is appraised at one sheep to 7 acres. All the sheep are now in good condition and 13,700 were sold in March last fat.

829. *Mr. Quin.*] Has not this been an extraordinary season in Tintinallogy? Yes. The rainfall has been considerably above the average, 19 in. 19 points, but from the 25th October (when I started the camp) to the end of the year there were 5 in. 29 points of rain, and from January 1st to 14th May, 2 in. 26 points fell.

830. Do you know what is the average rainfall for the series of years? No; but I know that this is far above the average. Further, with regard to starvation, I may say that when the rabbits came to Tintinallogy the feed was something awful. They came on to the run during the worst drought we have had.

831. *The Chairman.*] At the time this disease existed amongst rabbits, was there any mortality amongst sheep on the run that could possibly be attributed, even by way of suspicion, to the disease? No.

832. Then can the death of the rabbits at Tintinallogy be possibly attributable to their having eaten bark? Well, no; because Tintinallogy is not a scrubby run. The plains are miles in length where the rabbits are dying just the same, and the scrub on the run is not much barked. The feed for rabbits, apart from the bark, has been abundant. Rabbits have died miles away from the scrub, where the bark was not eaten.

833. Is there any evidence whatever, even the slightest, to indicate that man may be injured by the prevalence of this disease amongst rabbits? No; not the slightest. There was a report that a man from Balranald had caught the disease, but it was proved that he had never been within 50 miles of the boundary, and that his injuries were due to his having got his fingers cut in a rabbit trap. He did not die, and he went down to Melbourne and saw several doctors there who made a great fuss about it, but Dr. Lawson, of Balranald, explained the case.

834. Were rabbits brought from Murtie station to you suffering from a disease which was thought by others to be possibly identical with the Tintinallogy disease? Rabbits were brought to me, said to be from Murtie. From the general symptoms, I thought the disease was identical with the Tintinallogy disease, but I never said so. I was under the impression at the time that it was a trap being set for me, so I did not give a very decided opinion.

835. Do you know anything from personal observation or personal knowledge of a disease prevailing amongst the rabbits on Momba? No; I have never been on Momba run in my life.

836. Have rabbits been transferred from Tintinallogy to Momba? No; and I do not believe it would be possible to do it without my knowledge, unless a man got the rabbits in the bush. I have had one rabbit sent down to me for examination from far above Momba, and I said that it was suffering from the scab that I have already spoken of.

837. *Mr. Quin.*] Have you infected any other country, apart from Tintinallogy? No; I have not done anything of the sort, although I have had very many requests to do it.

838. *The Chairman.*] In any part of the Tintinallogy run which you infected, did the disease die out of itself, without killing the rabbits off? There is one place where the disease did not spread as fast as it did in others, and when I visited it I was surprised to see so many rabbits alive. On a second inspection, about eight days after, I found the rabbits had disappeared there also.

839. And supposing that you receive no authority to spread this disease more widely, do you think it will die out? I do. I can see that it is very easy to lose control of the disease, even in an experimental enclosure.

840. What do you mean by control of the disease? Being sure that certain lymph or inoculable material will produce certain results.

841. Is it essential, in order to be sure of keeping up a supply of inoculable material, that development of the disease should be going on at several centres, and not in one small area? I can answer that now by saying that we are thinking of shifting our camp to more thickly infested country, as we are not quite certain of being able to keep it going where we are at Tintinallogy.

842. *Mr. Lascelles.*] Have you taken any steps to obtain permission from the Government to take this disease elsewhere? We have made application, but that application has been met by a statement that the matter should be referred to the Commission.

843. *The Chairman.*] In watching the progress of the disease at Tintinallogy have you noticed any variations in its fatality according to the special kind of country in which the disease was prevalent? Yes; I have noticed that on the sand hills it spreads much quicker. On the lignum creeks it requires help from man by mixing the rabbits up together.

844. How would that mixture be affected? I was going to explain that in these creeks we send men and dogs to the head of the creek to drive the body of the rabbits towards the river. We did this when we first saw the rabbits dying in one batch, and the rest making back to their natural run spread the disease better. The difference between the lignum creeks and the sand hills is that in the sand hills the rabbits burrow and associate more closely, and thus the disease spreads more freely than it does amongst the rabbits lying out in the lignum.

845. *Mr. Quin.*] Are the rabbits fond of lignum? Yes; very fond of it.

846. Do you think that lignum acts as an antidote to the disease? No; I do not think so.

847. *The Chairman.*] Have you found the spread of the disease modified at all by the wetness or dryness of the country? We have no moisture at all except in the water-holes, but the large majority of the rabbits seem to die around the water-holes, or near the creeks.

848. Do you think that those who live near water are more apt to die, or that they make for water when about to die? I think they make for the water and are too weak to get back. We have had two falls of rain lately, both of which seemed to kill off the weak rabbits very quickly.

849. Then I gather that you think the amount of food available for rabbits has not very much to do with the disease? No; I do not think so, but I am aware there are many people against me.

850. You do not think there would be a marked difference in the spread of the disease in poor country and in good country, supposing that these districts were equally infested? I do not think so from the way rabbits die when fed with artificial food. My rabbits had grass, lignum, saltbush, lucerne, lettuce, cabbage, carrots, grape-vine leaves, potatoes, apples, turnips, oats, bran, chaff, and bread. The rabbits are very fond of dry chaff; I have seen them leave cabbage and go to chaff.

851. *Mr. Quin.*] Have you ever seen rabbits fed with poisoned chaff? No; but I have heard of it in South Australia where some horses were poisoned with it as well. It has been said that rabbits being sent from Tintinallogy to Dr. Ellis, in Sydney, passed in the coach near a public house at Nelyambo, and that all the domestic fowls died in two days, although they had not previously been ill.

852. Has this matter been looked into at all? No; because I do not regard it as of any importance.

853. Have fowls suffered at Tintinallogy? Not at all; and we have picked up dead rabbits in the fowl-yard.

854. *The Chairman.*] If this disease is to be adopted for general use with a view to the extermination of rabbits, what method do you propose for adoption—how would you deal with a thickly infested run, embracing several hundred thousand acres? We would get to know the most thickly infested portions, catching the rabbits there, infecting by seton say three in each of five places on each block of 64,000 acres, turn these loose on the spot in their own neighbourhood, and in two months go around the same country again in the same way or to every infested centre. I believe that would give the disease a start.

855. Such a method could be pursued on any number of runs by assistants trained by yourselves? Yes; the training required would be to teach them not to kill the rabbits by blood-poisoning instead of by disease.

856. The method in itself is quite simple? Yes. I have found great difficulty in the past in persuading the men of the necessity of cleanliness so as to avoid killing the rabbits by blood-poisoning. Precautions are necessary in the introduction of setons to place them at the right depth, otherwise tetanus may readily be induced. That occurs when the muscle is penetrated by the setons.

857. *Mr. Lascelles.*] In a thickly infested block, where there would be hundreds of large warrens, do you consider that turning out diseased rabbits in five of these warrens would be sufficient? As a start, I do.

858. *The Chairman.*] Do you think that in the end you would have to infect every warren? No, certainly not. I believe there is much more traffic from warren to warren than there is any idea of.

859. And you have satisfied yourself that the disease spreads freely amongst the rabbits that do not warren or that shelter by river side? Yes, in regard to the lignum creek experiment.

860. If your method were to be generally adopted you would I suppose require some central station where you would keep up a stock of infected rabbits and would prepare setons? Yes.

861. Have you thought out the details of the application of your scheme on a very large scale indeed, so that the whole thickly infested portion of the Colony would be brought under it? If we get permission, we intend to send at once to Victoria and South Australia, to try the scheme and make certain places in these colonies centres. We do not yet know what effect climate will have on the disease.

862. How long have you kept setons in preparation and found them effective? Setons prepared on 24th February, were used on the 29th; two killed on the 15th day and one failed. This is the longest we have actually used them.

863. Have you found other setons fail which were kept for some days after preparation? No; I have never tried them over the fifteenth day, and that was the only failure I remember. But blood serum has kept longer than that. On February 18th, the blood serum of infected rabbits was placed in sterilized tubes, and posted to Sydney, to Dr. Ellis, and his inoculations with that, at least a week later, were successful.

864. Now what is your general conclusion with regard to the origin of this disease? Is it some disease that has been prevalent for some time, but which, owing to the peculiar season last year, broke out with great severity; or is it that you have been able to cultivate it with a virulence not known before? I do not think the cultivation has anything to do with that in my case. I have got rabbits down in the bend and used them in inoculations, and the result proved that the virulence was just as great in these rabbits with the natural disease as in those to whom I had artificially communicated it.

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Charles William Reid called in and examined:—

865. *The Chairman.*] Where do you reside? At Tintinallogy, Wilcannia.

866. What is your office at Tintinallogy? I am book-keeper and I had charge of the rabbiters and was rabbit overseer during the time the trappers were on.

867. You have also given assistance to Dr. Butcher during his experiments? Yes.

868. You have personally conducted many of these experiments and preserved the records for him? Yes.

869. How long have you been at Tintinallogy? Three and a half years altogether. The rabbits came before my time.

870. Before Dr. Butcher commenced his experiments, Tintinallogy was, I believe, a very densely infested district? Yes.

871. Can you give any figures to show how thickly it was infested? Yes; I have our rabbit journal here showing the general result for 1885 and 1886, and the detailed result for 1887.

872. These figures, then, relate to the allowances made to the trappers for rabbits caught? Yes.

873. What is the general result as to the efficiency of the work done by the trappers? When they knocked off there were infinitely more rabbits than when they started. The rabbits gained on the trappers considerably.

874. Was the full number of men employed which was recommended by the local rabbit inspector? Yes.

875. During the months of November and December I notice that there was a marked reduction in the number of men employed. How do you explain that? Well, that is the commencement of the hot weather, and they saw that they could do no good during the hot weather—that they could not trap the rabbits so as to pay. I think there was also a deduction in the scalp money in that month which would account for it.

876. What is the present condition of Tintinallogy with regard to the existence of rabbits? There are now very few there.

877. *Mr. Lascelles.*] Are there less rabbits there now than at any time since you have been on the station? Yes; less than in the beginning of 1885.

878. *The Chairman.*] Would you now speak of that district as a densely or a thinly infested district? I would say it was a thinly infested district.

879. In how many months has that change been brought about? Well, in from five to six months.

880. During that time has poison been used on the station? There was a little poison laid in enclosed areas during the month of November.

881. For what purpose was it laid? To try the effect of the different poisons—arsenic and strychnine. We wanted to see which was the best.

882. This was not done generally on the run? No; it was done in very small enclosures.

883. Apart from such small experiments I understand that poison has not been laid at all at Tintinallogy? Not at all.

884. I believe that Tintinallogy is a station comprising land of a very varied character—some open and some heavy bush country? Yes; it is.

885. Have the rabbits died off on all parts of the run whether open or thick? Yes; on all parts.

886. Has the food been so abundant during the time of Dr. Butcher's experiments as to wholly put on one side the possibility of rabbits dying for want of food? Yes; I think so. The stock have been well conditioned throughout. We sent away, in March and the first few days in April, between 13,000 and 14,000 sheep. The agent who inspected them for the buyer reported on them as being fat. The majority of these were old ewes, and it requires very fair feed to keep them in anything like condition in this country. Of course there has been infinitely better feed on the run, but it has been very fair throughout this season.

887. Do the rabbits burrow largely on Tintinallogy? They have done it at times; but I have seen no burrows freshly scraped out since last winter.

888. Have you studied the run sufficiently to know the general history of rabbits upon it during recent times? Yes.

889. Did you watch the experiments in the bend? Yes.

890. How many times were inoculated rabbits turned loose in the bend? That I cannot tell you. When Dr. Butcher went down there first he allowed the rabbits to go, but how many times I cannot say. I mean by this that Dr. Butcher started the camp there at first after he returned from Sydney. I do not know the early history of the camp at the bend.

891. Have you made yourself acquainted with any difficulties that were experienced in spreading the disease on Tintinallogy? No.

892. Is it not a fact that at certain times the spread of the disease was checked owing to the natural condition of the country? Not to my knowledge.

893. Was not the spread of the disease in one particular part of the run limited by a lignum creek so that a fresh introduction was necessitated? It was introduced a second time about the lignum creek, but I did not witness that.

894. Taking any experiments which you conducted, will you tell the Commission what you did from beginning to end. Take any experiment you like, and tell us minutely what you did? I will take the first experiment, dated 9th February. This lymph was taken from a rabbit naturally diseased from the Gun's paddock. This rabbit was dug out. We put it first into one of the yards which are wire-netted. Taking the sterilized test tube I took this rabbit, killed it, and put the blood into a small quantity of saline solution. I cut the animal's throat, holding the tube under the stream of blood. Then I corked this up with sterilized cotton wool, and let it stand for about one and a-half hours. I then filtered the serum through the sterilizer—through the ordinary filter papers. These had been already sterilized before Dr. Butcher went away. These were kept in a jar with a lid that screws on, the same as specimens. As soon as this was filtered I inoculated four rabbits with a hypodermic syringe which also had been sterilized. I washed it out before using with corrosive sublimate solution, then with methylated spirits, and then with the ordinary saline solution. I then filled the syringe with serum and forced the needle through the skin—forcing a portion of this serum through the needle into the first rabbit. I washed my hands in the corrosive sublimate before touching the first rabbit. After that I took a second rabbit and did the same thing, inoculating the four rabbits in the same way. I placed these rabbits in one crate which had been washed and disinfected. The crate had been used for wool washing, and after each experiment it was taken out and sunk in the river. After that we used carbolic acid over the crate, inside it and on the board that covered it. I do not know the strength of this solution. Some hours after this the carbolic acid was again sprinkled over the crate, and then the rabbits were put in. We put in fresh grass for bedding. We did the same with every crate, some of them being sunk as many as three days in the river. Sometimes also we used corrosive sublimate and sometimes the carbolic acid solution. The corrosive sublimate is 1 in 1,000, but I am not certain as to the carbolic acid, as it was already mixed.

895. Do you know anything about the transfer of any rabbits from Tintinallogy to Murtie or Momba? No.

896. Did you witness the experiments that were performed by putting healthy rabbits into a crate that had been infected? Yes.

897. Will you tell us exactly what happened with regard to that experiment? I did not see it right through. Dr. Butcher telegraphed from Sydney asking me to get some rabbits for him and put them into the crate, which had been used for the rabbits that were destroyed before Dr. Butcher went to Sydney. These rabbits—I did not see them—Dr. Butcher told me had caught the disease from the crate. I saw the rabbits some considerable time afterwards, but I cannot say how long.

898. Have you yourself seen any other experiments of that kind ending successfully? Yes; I put rabbits, which, so far as I know, were healthy, into the same crate—Crate E—and, though the bedding had all been changed, the rabbits died.

899. You are certain that no attempt was made to communicate the disease by inoculation to these rabbits? Positively. We had "controls" in the yard from the same batch of rabbits.

900. Have you yourself witnessed in any full way any experiments made with rabbits in enclosed areas by introducing infected rabbits amongst them? Yes. I have seen one diseased rabbit placed in a yard with twelve or fourteen or more rabbits which were healthy, so far as I know. I have seen these rabbits brought out dead.

901. Did the death of these rabbits occur at any regular period, or were their deaths scattered over a considerable time? They did not all die on the same day, but the deaths occurred within four or five days of one another.

902. Is it, then, a fact that by spreading this disease over Tintinallogy in an inexpensive manner the rabbit plague has been practically reduced to very small dimensions on that run, where, for years past, trappers had been employed at great expense without sensibly diminishing the pest; the rabbits, on the contrary, being more numerous at the end of the trappers' operations than at the beginning? Yes.

903. *Mr. Lascelles.*] How does Tintinallogy compare with other runs where other means have been adopted to destroy rabbits? I think other runs are more infested. I have not been much about, of course; but we have seen very few rabbits between this place and the river.

904. *The Chairman.*] Can you make some drawings of the livers of diseased rabbits for the use of the Commission showing the diseased spots? Yes.

905. *Mr. Quin.*] Do you know if there are less rabbits on this side of the river than before? Yes; I know there are less at Weinterriga from personal observation, and other places between this and Tintinallogy, but I do not know the reason. On the 6th of March Mr. Affleck, the manager of Weinterriga, brought two rabbits to the camp. I placed one in the yard and one in the crate with other rabbits that were healthy, so far as I know. The rabbits that were in there died, and the result is shown in these experiments. The crate was disinfected previously in the same way as the other.

906. *The Chairman.*] In any experiment which you performed with rabbits in a crate, how do you conduct your "control" experiments? In some cases the rabbits were put into another crate, and in other cases they were put into what we call the "control" yards, which are wire netted.

907. Then the "control" rabbits were not always kept under the same conditions as the diseased rabbits? No, not always; but the conditions were kept exactly the same as regards feeding, water, and bedding.

908. Have you anything further you would like to say? No; except that at the time I was not in charge of the camp I cannot say that the conditions under which the "control" rabbits were kept were not exactly the same as those under which the inoculated rabbits lived.

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Herbert Pickering Butcher recalled and examined:—

909. *The Chairman.*] Is there anything bearing directly on the rabbit question that you have omitted to refer to? I would like to refer to the Weinterriga experiment, mentioned in the book which I have handed in. The disease that they had had at that time—early in March—is the same as we had; the results proved that they had the same disease as at Tintinallogy. Two experiments were tried with rabbits from Weinterriga, which is on the opposite side of the river from us; the results of these experiments going to prove that the same disease existed there at that time. I would like also to draw attention to the fact that the opossums on the Darling were killed out by some eruptive skin disease. Almost every opossum died, it was supposed, of the same disease which now prevails amongst the opossums at Narromine.

910. *Dr. Paterson.*] Are there any opossums now on the river Darling? Opossums can be found at a distance of 80 miles from the Darling, but not actually on the river, so that the disease did not spread very far out. I have never seen this disease amongst opossums myself, though I have seen dead opossums in hollow trees.

911. *The Chairman.*] From the description of that disease do you think it possible that the disease in opossums is identical or nearly allied to the scab disease you noticed amongst rabbits? I believe it to be so from the description.

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Alexander Bell called in and examined:—

912. *The Chairman.*] What is your occupation? I am manager of Langawirra station, Wilcannia. Langawirra lies about 80 miles east of Silverton, about half-way between Silverton and Wilcannia. The area is about 480,000 acres. I have been seven years in the district, and am acquainted with the whole history of the rabbits here. There were no rabbits when I came here first.

913. When did the rabbits first appear in your locality? About three years ago, or a little more. The country is now very heavily infested. It became heavily infested during the last two years.

914. Has the carrying capacity of the run been affected yet by the pest? Yes; around us and on all sides. It cleaned out our homestead lately, and there is not a blade of grass to be seen.

915. Yet you have had a very favourable season? No; it has been rather dry this season. Last year was a splendid season. I may add that the rabbits are killing the scrub, too, very fast.

916. What methods did you first adopt in dealing with the rabbits? Trapping; we have been trapping for about two years.

917. Did you discontinue trapping at the end of last year? Yes; it was a failure entirely.

918. Have you any idea of the number of rabbits killed on your station by the trappers? I have not got the figures here, but I can say we killed up to 40,000 and over per month.

919. Did the number of rabbits killed and the cost of trapping tend to increase? Yes; it increased continually, in the face of the fact that we reduced the price per scalp.

920. How many trappers did you employ on an average? From about fifty to sixty.

921. What was the general effect of the trappers' work? I could not see any advantage at all. I had the trappers in one camp over four months, and when they left there were just as many rabbits as when they went there.

922. Do you think the trappers killed large numbers of the natural enemies of the rabbit? No, not a great many; they killed a few of them.

923. Do you think the operations of the trappers tended to spread the rabbits more widely and prevented them from forming into colonies? No; I do not think the operations of the rabbiters produced any effects in our country. I am positive they did not.

924. Then, in your opinion, the money spent on the rabbiters was wasted? Simply thrown into the fire.

925. Have you had much experience in the use of poisons? Yes, latterly. I began using them about eight or ten months ago. I used arsenical water, laying it out in troughs. The rabbits drank it freely, and thousands and thousands died. I have also used strychnine and poisoned food. I have also been using the phosphorized grain distributors of Messrs. Lascelles and Anderson with great success. They beat all that I have yet tried.

926. How do you use strychnine? By dipping the bushes into the liquid and throwing them about on the ground. I used to break off the bushes that they are used to, put them in this water, and the rabbits would eat the bark and die almost instantly. We used about one ounce of strychnine to one bucket of water. This is a very expensive method; the grain distributors are less expensive.

927. In using the grain distributors were you not disappointed at not finding dead rabbits at the outset? The first day or two I was; then about the third or fourth day I began to see the rabbits dying in all directions, and now I can hardly find a live rabbit anywhere around the homestead. 928.

928. Have you used wire-netting at all? No, I have not.
929. Have you any personal acquaintance with diseases amongst rabbits? No; I only know what I have heard from others.
930. Do you think you will be able to deal effectually with rabbits all over your run by poisoning and without fencing? I feel confident I would be able to do it if I had eight or nine machines.
931. But will you be secure against any further irruption of rabbits? No; because there is very heavily-infested country all around me that nothing is being done with. I would have no security in this case unless others adopted the same methods, or that I fenced.
932. Do you think there is any chance of getting uniform action by all adjacent proprietors? I am sure I cannot say.
933. But does your experience show you that you can obtain this uniformity of action? It might be done by compulsion and by proper inspection to see that everybody did the same thing. If so, there would be no occasion for fencing at all. I think fencing costs a lot of money which might have been saved; that is, unless you fence in a lot of these barren waste lands that are of no use to anybody.
934. Can you give examples of such waste lands from which it has been necessary to exclude sheep? Well, we have parts ourselves which are largely useless and fit for nothing. This is very heavily-infested land. I would propose to deal with land like that either by poisoning or with disease. Rabbits can be poisoned there as well as anywhere else. It would be a constant expense and no gain to do it, but still it should be done to save the other. One of my neighbours has five miles square of similar waste land fenced off to keep the sheep out, the land being utterly useless and thickly infested with rabbits.

Harry Edmund Vindin called in and examined:—

935. *The Chairman.*] What office do you hold? I am Superintending Inspector of the Rabbit Department.
936. Over what area does your superintendence extend? North and south about 300 miles, and east and west about 280 miles; starting from the south-west corner of Mundi Mundi station, on the South Australian border; thence along the border to the north-west corner of the Colony; thence along the Queensland border to Brenda; thence south from there to Condobolin; and west from Condobolin to point of commencement.
937. How long have you been in charge of this district? Since July, 1885. I was first stationed in the Corowa district, on the Murray, and after remaining there about five months I was appointed to the Balranald district, on the Murrumbidgee. In July, 1885, I was appointed Superintending Inspector for the Western Division.
938. Is the country over which you are Superintending Inspector all infested? Yes.
939. In what degree, or is it uniformly infested? No; some portions are much more thickly infested than others.
940. Can you say what parts are thickly infested? Including all that country within the following boundaries:—Starting from Pooncarie, on the Darling River, east to Mossgiel; thence from Mossgiel north-west to Cultoa station on Darling River.
941. During the time that you have been in charge since 1885 have the rabbits been rapidly increasing in your district? Yes.
942. What effect, if any, has there been on the carrying capacity of the runs? I consider that in the most thickly infested districts the pest has affected the carrying capacity to a great extent. In fact some blocks are nearly eaten out. During my inspection of some blocks on Teraweynia I counted as many as 400 to 500 rabbits on my ride; in fact I might say thousands.
943. Do you think that this evil effect on the carrying capacity of the runs has progressively increased? Yes.
944. Did you notice a decided increase last year? Yes; I noticed a much greater increase during 1887, both in the prevalence of the rabbits and the evil effects on the runs; 1887 was rather a favourable season; there was plenty of feed.
945. Have you watched the trapping operations in your district during the three years passed? Yes; and I have been continually travelling through the district, inspecting the camps and seeing how the work of rabbit destruction has been carried out.
946. Can you give us any rough average of the area that one trapper has been accustomed to deal with, speaking generally? Until last year I always considered that for a 10-mile block of 64,000 acres four or five men were sufficient; but since that, in many cases, as at Teraweynia, on a 10-mile square block we had as many as twelve men; and still the rabbits have rapidly increased.
947. What effect, if any, has been obtained by the operations of the trappers? Well, if anything, I think they have spread the rabbits; they do not appear to have caused them to decrease at all.
948. Has any advantage whatever been got by the operations of the trappers? Yes; I think so—in the very lightly infested districts. The trappers seem to have been able to keep the rabbits down there.
949. What is your opinion about their work in the thickly infested districts? I cannot say that they have made any impression on the rabbits at all. On Teraweynia station, during the quarter ending June, there were 161 men exclusively employed rabbiting, and 500,000 rabbits were destroyed; yet no impression at all seemed to have been made. The rabbits were just as thick as ever.
950. Then in your opinion the operations of the rabbiters did evil by spreading the rabbits more widely? Yes, I think they have. They have driven them into country that was clear of rabbits, and otherwise caused the pest to shift about.
951. Is it a fact that the rabbiters prevented the rabbits from settling down in colonies, and rendered them more difficult to deal with? I considered that the trapping scattered them. In trapping on ridges where the warrens are very numerous I have noticed after the trappers had been at work for a short time that the rabbits have cleared out altogether; and, as a rule, they do not return for two or three weeks afterwards.
952. What, then, is your general opinion with regard to the utility of trapping in the densely infested country? I should do away with trapping, as more effectual work can be done with carbon in the winter, and by poisoning in the dry season when feed is dry.
953. Have you had much experience in the use of poisons? No, I have not.

954. Are you prepared to give any opinion as to what poisons are most useful? I have made an inspection of some of the work that has been done at Tarella station with Lascelles' patent grain distributor, and during my inspection I counted something like 400 rabbits dead along the burrows. We were out riding on that occasion, some seven or eight hours together. Of course there may have been a great number dead in the burrows that I did not see.
955. Have you had any experience with poisons on the natural food of the rabbits—bark, twigs, &c.? Yes; on Teraweynia station the edible shrubs were poisoned with arsenic by Mr. Wynne, but for some time I could not see any result at all. I was inspecting on the run for nine days and I counted something like 140 dead rabbits just around the logs. I did not regard that experiment as satisfactory in its results. I have had no other experience except with carbon. My experience in connection with this is that I have often had the warrens dug out and counted as many as eighty to ninety rabbits that had been suffocated.
956. Are you of opinion that the use of carbon bisulphide should be tried during the winter months? Yes; that is in country which is suitable—where the warrens are very numerous.
957. Have you had any experience with the use of wire-netting? No; but I have seen some in use at Euston, put up by Messrs. Bertram and Taylor. I am uncertain about the height, but it was 1½-in. mesh.
958. Was this netting part of a general enclosure, or was it used for some special purpose? It was a fenced-in paddock that I saw.
959. What success was obtained? I consider it was very successful. Before being fenced in the rabbits were very numerous there, and having inspected the country afterwards I found that they had greatly decreased.
960. Have you watched Dr. Butcher's operations at Tintinallogy? I went there once by instructions of the Department, and remained from the 5th to the 9th March. The special object of my visit was to see to what extent the disease had spread. I have not visited Tintinallogy since.
961. Were you acquainted with the conditions of Tintinallogy before Dr. Butcher commenced operations? No; that was my first inspection. I had sixteen rabbit inspectors' districts to overlook, and as Tintinallogy always carried out satisfactory work I had no occasion to visit that station. I have made a report to the Department concerning my visit and that report is available to the Commission.
962. What condition was the stock in at Tintinallogy Station, in the parts where the rabbits were dying? On the 500 acres that I visited I saw some sheep and goats which appeared to be in fair condition. They were just keeping their condition; but were not in good condition by any means. I cannot say how long they had been in the enclosure. I do not remember seeing any stock along the river frontage. Further out at the back of the run, I saw some sheep which appeared to be doing very well.
963. Generally, then, you came to the conclusion that, although the feed was poor and dry, the mortality amongst the rabbits must have been occasioned not by scarcity of feed but by disease? I cannot say, because I did not understand anything about disease. I thought the disease was caused by the feed. I did not inspect at that time any of the runs further out.
964. But what was your conclusion then? At the time I was there I was under the impression that the rabbits were dying of some disease, and I thought the disease was caused by the feed.
965. Has your subsequent experience caused you to modify your opinion as to the origin of the disease? No; I am still of the same opinion. I think this disease has been caused by the poverty and dry state of the feed, and my inspection of other runs has made me still more strongly of the same opinion.
966. What did you see on other runs that strengthened you in this opinion? Since leaving Tintinallogy I travelled through Kinchega Run and inspected the country on horseback. I saw dead rabbits here and there on Kinchega, but nothing like so many as upon Tintinallogy. Yet I consider the country I inspected on Kinchega was much better off for feed.
967. Have you had any further experience in connection with the Tintinallogy disease? No; not since.
968. Have you had any experience in connection with the disease which has been attributed to the eating of bark? I have examined several of the rabbits in travelling through the different runs, but I have not noticed any particular disease, unless a few cases where the liver seemed to have a few streaks upon it. It was on Kinchega I saw this. These streaks were light-blue and there was water inside in the cavity of the belly.
969. *Mr. Lascelles.* Have you since altered your opinion that disease was more confined to the frontage than to the back country of Tintinallogy? Well I have not inspected the run since. At the time I inspected it there were more dead rabbits on the frontage and in the lignum. Since my inspection at Tintinallogy I have been out on the Wilcannia Common, at one of our Government camps. Some grass had shown up and the rabbits seemed to be as lively as ever; this is upon thickly infested country. There was an increase in one week of from 800 to 1,300 killed with the same number of men employed.
970. Do you attribute that increase of deaths to an increase in the number of rabbits? It is very hard to judge; the men may not have worked so hard at first, though they had the same number of traps, &c. One of the rabbit inspectors came and told me that the rabbits were swarming in from other parts to where there was good feed on the Common.
971. What is the history of the country around Silverton with regard to rabbits? I think they have decreased very much. In July last year the rabbits were very numerous. In driving from Broken Hill to Thackaringa I noticed several hundreds, but recently I did not see one. My opinion is that the decrease is due to the eating of dry feed. They seem to be dying very fast around the Pinnacles and Mount Gipps. All the natural feed is now very dry—much drier than when I last inspected the country.
972. Are you clear that the diminution of the rabbits has been due to their dying, or may it not be due to their passing on to other districts where feed is better? I think they do sometimes shift on to better feed. You can to a certain extent clear a paddock by stocking it heavily with sheep.
973. Have you had clear evidence that rabbits have been dying in this country from want of feed? Judging from the reports that I have received from the inspectors, I should say that the rabbits were dying off in the thickly infested districts.
974. Are these reports based on the disappearance of rabbits or on seeing dead rabbits? Seeing dead rabbits.
975. You are perfectly clear, then, that over a large portion of your district there has been considerable mortality amongst the rabbits? Yes, since the beginning of March, and I think such mortality is due to the poverty and dryness of the feed.
976. You have not noticed rabbits dying off in the same way where the feed has been abundant and good? Yes, I have noticed that in different portions of my district where there is plenty of dry feed; but not where there is green feed.
- 977.

977. Have you opened any rabbits in country where feed is abundant? Yes; and I have noticed that they were very miserable and tucked up, and suffering as if from constipation, which I attribute to the dry state of the feed.
978. When you were at Tintinalloggy did you notice any yards where the rabbits were well fed on succulent food? Yes; there were some being fed on cabbage leaves, &c.
979. Were these rabbits wasting away? They appeared to me to look very miserable, just the same as the others. Perhaps they were not quite so bad as the others, though I considered that they were wasting away.
980. *Mr. Quin.*] Do you think well-fed rabbits confined in such an enclosure would remain in good condition, or would they fall away? I think they would fall away, at least for some time.
981. Might they not have had that appearance without being diseased? Yes, they might. This was the first time I had seen rabbits enclosed in that way. I saw the rabbits in the bend twice during my visit; I also saw those in the yard twice when I visited the camp.
982. *Mr. Lascelles.*] Up to the time of your visit to Tintinalloggy, were you on other runs barer of feed than Tintinalloggy, and were the rabbits dying on these runs without poison having been laid? No. Previous to my inspecting Tintinalloggy I inspected Mount Manara, where some of the paddocks were very bare, but I cannot say that I noticed any dead rabbits about, although at that time—it was about September or October of last year—the trees were not barked so much.
983. *The Chairman.*] Did you, during this year, pass through other runs barer of feed than Tintinalloggy, without finding the rabbits dying in this way? No; all the runs that I have travelled through since are, I consider, better off for feed than Tintinalloggy. I have been out through Kinchega and Mount Gipps, &c., and on all of these the feed is better, with one exception, that of Glenlyon. I noticed several dead rabbits in passing through that run, and to show how numerous they are, I saw 1,000 caught in a trap at one of the tanks. The number of dead rabbits that I saw at Glenlyon did not at all compare with the number I saw at Tintinalloggy. I was inspecting on horseback at Tintinalloggy, whereas at Glenlyon I only travelled along the road.
984. What is now your general conclusion with regard to the mortality amongst rabbits at Tintinalloggy—how was it caused? Well, since I have travelled through other stations, I think it is caused through eating dry feed and astringent barks, and through a want of nourishing food.
985. Therefore, when the feed improves the disease will disappear? Yes; I think so to a great extent, and the rabbits will recover.

Abram John Clarke called in and examined:—

986. *The Chairman.*] What is your occupation? I am a rabbit inspector at Wilcannia, for No. 9 district. The chief runs included in that district are Teraweynia, Murlee, Baden Park, Tintinalloggy, Goonalga, and Billilla. I have been in charge of this district since August, 1885.
987. Was this country infested with rabbits on your arrival? Yes, the whole of it.
988. Was it thickly infested? No; not so thickly infested as it has been since.
989. Is the country now very thickly infested? The rabbits have been decreasing lately.
990. Are you clear that the diminution is due to increased death-rate amongst the rabbits and not to shifting from one district where feed is poor to a district where feed is abundant? I think it is due to an increased death-rate, as you can see the dead rabbits lying about.
991. You are then clear, that there has been an increased death-rate all through your district? Yes.
992. Has that mortality been more marked in some parts than in others? Yes. At Tintinalloggy there is the biggest death-rate I have seen. At Billilla, on the Tintinalloggy boundary, the death-rate has also been very marked, and also at Teraweynia on the adjoining boundary.
993. To what do you attribute this mortality? To disease; I have been told so. On some of the adjacent runs I think the rabbits are dying from eating bark. On making an examination of the rabbits afterwards I found that the appearances inside were different from those that had what I understood was disease. I have from the first watched Dr. Butcher's operations at Tintinalloggy.
994. Has your supervision of these experiments been continuous or merely occasional? Occasional; as I went about. I visited the station about once a month. I had to go around the rest of my district, but I stayed at Tintinalloggy as long as I could on every round.
995. Were you acquainted with the condition of the Tintinalloggy run before this disease was first taken up by Dr. Butcher? Yes; it was then very heavily infested with rabbits. The rabbits began to perceptibly diminish in numbers about November last; I then noticed that they were dying in large numbers. The condition of the feed on that station at the time was very good. The condition of stock was very good also. In fact, they sold some fat sheep about that time and they were the best that I saw in the Wilcannia district.
996. What is the condition of Tintinalloggy station now as regards rabbits? I have reported the decrease at about 95 per cent. I would now classify the station as a thinly infested one.
997. In your opinion can this change be attributed to the starvation of the rabbits? I should say not.
998. Can it be attributed to the eating of bark? Well, that is a question which I can scarcely answer; I should think not.
999. Has there been any change in the habit of the rabbits with regard to the eating of bark that would account for that station, which was once densely infested, being now thinly infested? I do not think the eating of bark alone would account for the change.
1000. *Mr. Lascelles.*] Is there less or more scrub on Tintinalloggy than on the other runs in your district? There is more open country on Tintinalloggy than anywhere else, and less scrub than on the average run in my district.
1001. *The Chairman.*] Does this mortality prevail amongst the rabbits on Tintinalloggy both in the open and thick country. It prevails on the whole of the run—on some isolated spots—sand hills on which rabbits were thick on my last inspection—more especially. My last general inspection was about the end of March last.
1002. Have you familiarized yourself with the details of Dr. Butcher's experiments? Yes. Dr. Butcher explained to me everything that I asked him. I was instructed at the commencement to watch the experiments he made when he obtained permission to keep live rabbits.

1003. Did you watch his experiments in placing healthy rabbits in a crate in which diseased rabbits had been previously kept? Yes. I have seen him put them in, but I had been on the station only a few days. I had to go around again. I have seen the rabbits put in and was informed that healthy rabbits were being put in diseased crates.

1004. Were these rabbits so bedded and fed as to exclude the idea of death from other causes? Yes; they were fed much better than wild rabbits running outside. They were fed from the garden.

1005. Did you see the conditions under which the yard experiments were conducted when diseased rabbits were turned in amongst healthy rabbits? Yes, I have seen them all together.

1006. Were those experiments so carried out as to exclude the possibility of death from starvation or unusual exposure? The rabbits were well fed, and sheltered, and watered.

1007. Did you witness any of the inoculation experiments at that time? Yes; I have seen inoculation by the syringe and the seton. I did not watch any of the experiments from beginning to end, because I had no chance.

1008. Did you obtain by your repeated visits a clear understanding of the results of the experiments carried out in the bend of the river? Yes.

1009. Will you describe shortly what results were obtained? Well, on my first inspection of the place I found that all the young rabbits died first. That inspection was made, I think, in October, shortly after the bend was fenced off. I was shown some aborted young that I was told were picked up in the bend by one of the camp men. The rabbits were then very thick in this bend. It was the most heavily infested place in my district. The water had been around it and the men were not able to get at it to work. I also saw a lot of dead rabbits lying about the fence. I inquired how they accounted for this and it was explained to me that they imagined the rabbits were brought from outside and that they were trying to make their way back again. These rabbits were ear-marked.

1010. What did you notice subsequently? That the rabbits decreased very much. In fact, the last time I was there I drove around the bend and only saw five or six where before there must have been between 20,000 and 30,000. The condition of the feed in the bend during the whole of this period was very good; it was not unusually dry. There was green feed there also, as much of the bend had been under water. On every occasion I made an examination of this bend the rabbits were not breeding, and have not bred anywhere in my district since about last September.

1011. Did the rabbits stop breeding at Tintinallogy earlier than in other parts of your district? No, I think not.

1012. Then the cessation of breeding was due to conditions prevalent generally through the district, and not to the occurrence of disease? It ceased through the whole district. Of course I am not in a position to say that it was not on account of disease at Tintinallogy; the feed has not been good enough since; the feed on this bend was not feed that rabbits would breed on; the rabbits only breed after rain.

1013. When was it that you found the aborted young? It must have been about October or November. They were shown to me as having been found in this bend. I think there were three of them; they belonged to the same litter; I did not see any others.

1014. Did you watch the experiments that were made on stock? Yes; I saw a sheep inoculated by a syringe containing blood taken from a diseased rabbit in one of the hutches. This sheep did not suffer; and on my next visit it appeared to be perfectly healthy; I could identify the animal. I was also shown marks on a horse that I was aware had been inoculated; the horse was an old one, but in very fair condition.

1015. Have you ever watched such experiments throughout the whole course? No; but I have seen the same horse and sheep on every visit, and they always appeared to be healthy. I saw guinea pigs living with rabbits that were diseased and that afterwards died. These guinea pigs kept healthy and fat.

1016. What was your general conclusion with regard to the causes of the great mortality amongst the rabbits on Tintinallogy? My conclusion was that some disease existed there which was fatal to rabbits; the rabbits started dying there while the feed was good, and before they died in other parts of my district; the feed was better on Tintinallogy than elsewhere, and yet the rabbits started dying there first.

1017. Do you know whether poison was laid at Tintinallogy which would account for any considerable portion of these deaths amongst rabbits? Some experiments were made with poisons, but they would not account for the death-rate all over the run; the poison experiments were made in fenced-off places.

1018. You were satisfied, then, that the general mortality throughout the run was not due to poison? Yes.

1019. And are you perfectly satisfied that the condition of the feed could not have caused this mortality? Yes; I am sure that the rabbits Dr. Butcher had were fed better than they could obtain outside. I am also satisfied that the mortality in the bend could not have been caused by conditions of feed.

1020. Could the disease at Tintinallogy be possibly attributed to the eating of bark? I should say not; because I saw disease there before any bark was eaten at all. I noticed eighteen months ago, at Mount Manara, that the rabbits were barking the mulga and sandal woods, and yet there was no unusual mortality amongst them.

1021. At Tintinallogy did the mortality prevail in the open as well as in the thick parts of the country? The rabbits had got under the shade of the trees in summer when dying. You will see more rabbits in the scrub than in the open country. In fact the death-rate was so great I recommended that the trappers should be discontinued, as they gave up a large number of skins, and were paid for them, which I would have to pass.

1022. Is there any special bark in the scrub at Tintinallogy that would account for this specially high death-rate? No; it is the same kind of scrub as on the adjoining runs, where mortality has not prevailed to the same extent.

1023. Has there been more marked traces on Tintinallogy of the mortality than on adjacent runs? Yes; until very recently.

1024. Has this recent increased mortality been general throughout, or is it merely on the Tintinallogy border? It has been general throughout; there is no feed.

1025. Has the prevalence of the rabbit plague in itself seriously diminished the carrying capacity of the runs in your district? Yes; very much so. My district is principally a scrubby country, and the scrub died on account of its having been barked by the rabbits.

1026. When scrub is barked in this way and dies off, does it recover itself? Well, we have had only about 18 months of it. The punta, mulga, and sandal-wood scrub are dying, but the leopard-wood tree is not dying; it seems to recover itself.

1027. Has the barking of the scrub increased rapidly? It increased very much in the last six or seven months, but the rabbits are now decreasing everywhere. They have only the bark to live on. The barking is not increasing now although the rabbits are living on the bark.
1028. This means that a large amount of scrub is being permanently spoiled? Yes.
1029. If this continues what will be the result? The country will be bare.
1030. Losing this scrub, could the country be used as a pastoral country at all? It could in good seasons.
1031. But I mean permanently? Well, the grass might come if the scrub were cleared off.
1032. Is it a fact that for some time the sheep have been largely dependent on scrub? Yes.
1033. Are you aware of any facts showing whether grass would or would not grow on this scrubby country after being cleared? Yes; miles of country have been cleared for the purpose of roads, and people do not use them, being sandy. There is no better grass anywhere than on them, in this scrubby country where the scrub has been cleared. I have known patches of this kind for two and a-half years.
1034. Over how many years does your experience of trapping extend? Well, I have known of trapping since I was a boy. I have had experience of clearing on a large scale for four years.
1035. What area have you been accustomed to allow for the operations of each trapper? About one man to every 5,000 acres. It would vary according to whether it was a thinly or thickly infested district, but the whole of my district has been very heavily infested lately.
1036. Did the cost of the operations of the trappers tend to increase during the latter part of the time that they were employed? Yes, very much, notwithstanding that during the last few years less was paid for scalps. While the trapping was going on the price increased very much up to the last. Of course the number of rabbits killed per man increased greatly. I do not think it was due to increased energy; they got just as many as they could at 6d.; the rabbits were far thicker at the end of their operations than at the beginning.
1037. That being so, do you think any good result was obtained by the operations of the trappers in your district? No; not any.
1038. Do you think that any evil results followed their operations? No; except that it was a lot of money thrown away.
1039. Did the operations of the trappers lead to the destruction in any large numbers of the natural enemies of the rabbits? Before trapping began we had large numbers of cats, but there were very few cats left when the trappers knocked off.
1040. Was there any diminution of the other enemies? Yes; the iguanas became very scarce; but the crows, hawks, and other birds remained about the same.
1041. Is it your opinion that the operations of the trappers tended to scatter the rabbits? Undoubtedly they spread the rabbits about.
1042. Would such disturbance prevent them from settling into colonies, and thus militate against operations by poisoning? Operations by poisoning would disturb the rabbits as much as trapping, probably. Rabbits are so general throughout the whole of the country now, that they may run around and pass on to another place.
1043. What is your general conclusion as to trapping as a means of destroying the rabbits? That it is far too expensive at any price per scalp.
1044. Under any circumstances, do you think it would be effective? Yes; it might be if the country was worth going to the expense; but it would cost probably £1 per acre to keep the rabbits down. If you could put on a man to every rabbit you would probably get rid of them. But trapping is of no practical use, taking into consideration the value of the country.
1045. Have you had much experience in poisoning? Yes; both in New Zealand and here. In the former place we used phosphorized grain very successfully; we used to lay the grain in the ordinary way around the burrows. We have found a better way of using phosphorized grain. Lascelles and Anderson's machine was very successful, but it is too expensive to be of any practical use here.
1046. What other poisons have you used? Strychnine and arsenic; we have killed a great many rabbits with strychnine-water. I think that in dry seasons strychnine poisoning is the method which should be adopted. I never tried arsenical water; I have used arsenic on chaff and bran, but not with such great success as the strychnine. It is very difficult to get enough poison on to the medium to kill rabbits with arsenic.
1047. Have you made experiments with poisoned bark and twigs, and other natural feed? Yes; and I watched the experiments on Teraweynia. I found where rabbits were strong that the arsenic would kill very few; but now that the rabbits are weak it is killing any number of them. With some experiments which we made we found that 3 grains of arsenic did not kill a rabbit; there was only one experiment made; the chemist in Wilcannia did it for us: I am certain we got what was said to be 3 grains; the chemist poured the stuff down the throat of the rabbit, which afterwards was killed by 134th part of a grain of strychnine. At Teraweynia I found that they only put 1½ grains of arsenic on 6 square inches of bark; the arsenic was dissolved in ammonia—20 lb. of arsenic and 45 oz. of ammonia; but I am not very sure of the proportions. My general conclusion with regard to the method at Teraweynia was that it was too expensive. In a particularly dry season it can be successfully used; but the system of eating a paddock down bare ruins the country. It will take three years for the paddocks to recover again, when the rabbits would be as thick as ever.
1048. *Mr. Quin.*] Where were these machines used which you say were too expensive? Over some country as Billilla, which is too poor. It only carries a sheep to 30 acres; and some would not carry a sheep to 1,000 acres in a season like this.
1049. *The Chairman.*] In your opinion there are certain districts of waste lands which require special treatment? Yes.
1050. Would it be cheaper to fence in this very bad land or thoroughly and repeatedly poison it? I do not think you could do it. It would be better to sink it altogether, if you could.
1051. But these lands are now sources of danger, and something must be done with them? If you could make rabbit-proof fencing it is far better to fence them in and allow the rabbits to have them entirely; that is, if you can make a fence that will keep them in. Except this or some disease—this is the only hope of this far western country.
1052. Have you had any experience in wire-netting? Yes; I saw it used in New Zealand, and also in the yards at Tintinallogy. I found that the rabbits in the yard would go over it; we put feed on one side of the fence, and discovered that they would go over to it. 1053.

1053. Did you notice the fence around the camp bend, shutting it off from the rest of the run? Yes. That was  $1\frac{1}{2}$  in. mesh, lashed to the existing wire fence. I am not certain of the height, nor positive as to the character of the fence.

1054. Were you satisfied that the rabbits died on the camp side of that fence, having been stopped in their escape from it? The rabbits died on the camp side, but they were too weak and poor to go over it, having been diseased.

1055. What was the character of this fence over which you drove the rabbits? They were yards about 20 feet square. The fence was about 2 feet 6 inches out of the ground, and the rabbits ran across them for feed. We put the feed on one side and the rabbits on the other, and they jumped over. This fence was perpendicular. In fact the rabbits now run up the scrub. You see them up 10 and 15 feet high.

1056. Would the fact that rabbits passed over the fence in these little yards have any great application to the behaviour of the rabbits on a large run? No, I think not. Rabbits, unless they were specially trained, would not attempt to cross. I do not think they would do it naturally on a big run, and I think the fences would check them. At the same time fences in this back country would be in the way. A fatal disease is the only thing; and a fence would be in the way of its spreading.

1057. Apart from disease, do you not think a fence is necessary if the pest is to be successfully dealt with? I do not think the rabbit pest can be successfully dealt with except by disease. The country is too poor and no system of poisoning can be practically carried out. It is too expensive.

1058. Would the revenue from the land justify, in your opinion, the erection of wire-netting fences by the lessees? I do not think the lessees can afford to do it. Of course, in travelling around as rabbit inspectors do, we have a good chance of seeing what the country is like, and the returns from the stations.

1059. And what is your general conclusion? That the lessee cannot afford to fence. The country is valueless; paying the same rents as are paid now the lessees cannot fence.

1060. *Mr. Quin.*] Do you know the cost per 1,000 acres of using poisoned grain? No; I do not.

1061. If land owners were to abandon the present methods of dealing with the rabbits for several months, pending the results of investigations of disease, what would be the consequence? They are simply wasting money in doing work in an isolated way. It is of very little use, whether the method be poisoning or any other.

1062. *Mr. Lascelles.*] And yet you say the rabbits are being thinned down? Yes; they are decreasing now more than ever they did when they were being trapped. The work now being done is done in an experimental way by poisoning on most runs.

1063. *The Chairman.*] In your opinion the diminution of rabbits is not due to poison? No; but to the poverty of the feed and probably to some disease. I have been shown by Dr. Butcher what is said to be the Tintinology disease, and I have opened some hundreds of rabbits in other parts of the country, and the appearances of the organs are different.

John Andrew O'Flaherty called in and examined:—

1064. *The Chairman.*] What position do you hold? I am a rabbit inspector in charge of No. 5, Wilcannia district. The chief runs in my district are Momba, Caulpaulin, Nattalie, Grassmere, Gualta, Menamurtee, and Mootoowinge. I have been eight months in my district.

1065. Is your district thickly or thinly infested? I should call it moderately infested; parts of it near the river are thickly infested.

1066. Has the carrying capacity of any of the runs been seriously affected by the rabbits? I think so. Until last year I was overseer on the Lachlan, so I cannot say much about it. My work on the Lachlan was as overseer of a Government rabbit party. I have been occupied about two years and three months as overseer and inspector.

1067. In your trapping operations what area do you allow to each trapper? It is almost impossible to average, because we have trapped on stations requiring ten men to each 10-mile block. The conditions of runs are very different.

1068. What is your general opinion with regard to the system of trapping? Personally, I do not believe in it. It may have reduced the number of rabbits, but the rabbits are made to travel by it.

1069. But taking any moderately infested country with trapping executed in the ordinary way—granting that vast numbers of rabbits are killed—have you noticed a general diminution in your district? No.

1070. Do you think the scattering of the rabbits resulting from the operations of the rabbiters a real evil? Yes, I do.

1071. Did the cost of trapping operations in your district tend to increase last year? I think so.

1072. Did that occur notwithstanding that the price paid per head was lower at the end of the year than at the beginning? Yes; I think there were more rabbits caught.

1073. Why were more caught at the end than earlier? Because I think the men worked harder when the price was lower. It was not, I think, due to the fact that rabbits were more abundant.

1074. In your opinion, has any real good been obtained by all the outlay on the rabbiters? No, I do not think so.

1075. In your opinion could a system of rabbit parties ever be carried on in your district, so as to obtain substantially good results with trapping? No; I do not believe in trapping at any time as a means of extermination.

1076. Have you had much experience in the use of poisons? Well, within the last two months poison has been adopted in my district—phosphorized wheat, strychnine, and arsenic, have been the chief poisons used. My belief is that phosphorized wheat is the best.

1077. Have you found any special method of distribution best? I do not think there can be anything better than the patent machine used for the purpose. In one case I have found great success with the use of strychnine. The grain was steeped in strychnine, dissolved in vinegar, and very good results were obtained.

1078. Have you used the bisulphide of carbon? Yes; in the winter months I think it is most effective.

1079. Have you had any experience with the use of poisons applied to the natural food of rabbits? No.

1080. Have you had any experience with the use of rabbit-proof netting? I have seen it used around tanks or traps, and it has been most successful. I think the mesh is  $1\frac{1}{2}$  inch, but I am not certain. It is the usual wire netting used; and this netting proved thoroughly effective, and the rabbits did not get out—so I have heard. If they do get out it is only in very exceptional cases. 1081.

1081. Have you visited Tintinallong at all? No, I have not. My district lies on this side of the river.
1082. Have the rabbits in your district been increasing in numbers? Recently they have decreased very much indeed. I do not know what to attribute this decrease to, but some suppose it is due to their eating the bark.
1083. Have you noticed the rabbits dying off both in open and thick country? Yes; more in the thick country. I first noticed it at Caulpaulin run—on the river on the 10th March. I have opened hundreds of them. The only thing I noticed was that the live rabbits were very weak and emaciated looking and gathered up. On opening the rabbit I invariably noticed that the liver was of a very dark colour, and not the same colour as the healthy rabbit. I looked carefully but cannot say that I saw any specks. The only other fact I noticed was that, there was no fluid whatever in the urinary bladder. Though I first noticed this mortality at Caulpaulin, I am of opinion, from what I have seen, and from opening the rabbits, that the deaths of rabbits in the back country are due to the same cause as the deaths at Caulpaulin.
1084. Did you see anything in your examination of these rabbits which you could fairly attribute to the eating of bark? No. The stomach was full, but I cannot say of what. I concluded it was bark from the way the trees were barked.
1085. Do you know anything about the mortality that has been prevalent amongst the rabbits on parts of Momba? Well, I cannot say that I do. I know the rabbits have been dying there; but I have not given any special attention to the matter.
1086. Generally, then, you have found that the rabbits have enormously decreased in numbers within the last two months? Yes; but I am uncertain as to the cause, except that the decrease has been by actual deaths. I think anything that is tried before wire-netting is adopted will be ineffective. Wire-netting is the foundation; and when it is done, methods of destruction will be effectual.
1087. Has breeding stopped in your district? Yes; the rabbits have not bred for certainly four or five months.
1088. Has this cessation of breeding been an extraordinary circumstance this year? Yes; I think it is owing to the want of green feed, and also to the emaciated condition of the rabbits.

John Lynden McMaugh called in and examined:—

1089. *The Chairman.*] What is your address? Cuthero Station, on the Darling, via Wentworth.
1090. You are a rabbit inspector? Yes; my district is No. 3. The chief runs in that district are Polia, Cuthero, Nctley, Buchleo, Burta, and Ophara. I have been in the district four years last November. It was only lightly infested with rabbits when I first took charge. On first coming here I was appointed to No. 16 district, but the districts have been altered since then. I have been in charge of No. 3 district for about two years; portions of it are now thickly infested. On other portions, of late, the rabbits have been dying very rapidly, and these portions are now thinly infested.
1091. In the thickly infested portions, has the carrying capacity of the runs been seriously affected? Not very seriously affected. It is only lately that the rabbits have become so numerous there.
1092. What has been the nature of the operations that you conducted? Up to the last four months we only used the ordinary rabbit-traps.
1093. What is your opinion as to the results of the trapping system? I do not consider it a sufficient means of coping with the rabbits at present.
1094. Do you think that the numbers of rabbits in the thickly infested portions of your district were sensibly diminished by the operations of the rabbiters? No; I do not.
1095. Do you think, then, that any good result was really obtained by the expenditure of a large amount of money in connection with the operations of the rabbiters? No; I do not think there has been any very good result. Of course they have been keeping the rabbits down to a certain extent, but they have kept on increasing in spite of every effort, and I hardly think any good result has been obtained. They have just been kept in abeyance for a time.
1096. Do you think that any evil result has come from the operations of the rabbiters? No; I think not.
1097. Do you think their work has tended to scatter the rabbits more widely? No; but of course I am only speaking now of my own district. We have had a very heavy influx of rabbits from South Australia, and I attribute to them, in a great measure, the difficulty our owners have had in keeping the rabbits down.
1098. Was there any special reason causing the rabbits to travel towards you? Yes. They were very numerous in South Australia, and had eaten the country very bare. They were then travelling on to Burta Run, and Mr. Armstrong erected 2 miles of wire-netting along the border in one particular place down the creek. I think the mesh was 1½ inches. There was afterwards a great number of rabbits dead on the South Australian side—hundreds of them lay dead all along the fence. I think this fence formed an effective barrier for this particular part. I have seen other netting around tanks at stations—on Cuthero, for instance. I know the gauge is that recommended by the New South Wales Government. This fence is effective in keeping the rabbits in. I have been told that occasionally odd rabbits get through it.
1099. Have you had any experience with the protection of gardens by wire-netting fences? Yes; I believe it is quite effective for that purpose—that is, the ordinary netting. Mr. Armstrong has poisoned rabbits by thousands. He had an enclosure around his garden, and adopted the system of laying poisoned herbage out of the garden around this fence. The rabbits were attracted inside by the green feed, and ate the poisoned herbage and died in hundreds. None of them ever got through into the garden. Of late, different methods of poisoning have been adopted by us. Mr. Armstrong's method seems to be the most effective. He boils vegetables for a short time in a strong solution of arsenic and sugar, and then strains the herbage, and lays it around the netting enclosure. The rabbits go in after the water, consume the poisoned herbage, and die in hundreds. Mr. Armstrong has cleared his run well with this; he also used sandalwood leaves, which the rabbits eat freely. This was during a rather dry time, when there was not much else for the rabbits to obtain. I have had no experience with disease in rabbits.
1100. Have the rabbits been dying in large numbers in your district during the last few months? Yes; there has been a sensible diminution in their numbers.
1101. Can you give any explanation of this fact? No; but my opinion is that it is due to want of water and green feed. I think they have eaten bark and it has had some ill effect upon them.

1102. Is the feed very scanty now? Yes. There is any quantity of saltbush, but rabbits do not seem to eat that. As for grass, there is none at all in the back country. The bushes are dying in my district in consequence of having been barked.
1103. Have you arrived at any general conclusion as to the best way of dealing with rabbits in your district? No; I cannot say that I have. I believe in the poisoning system, in wire-netting and trapping, and wire-netting at water-tanks.
1104. Would it be practicable to introduce boundary netting around the runs in your district? Yes; I think it would be. I would recommend it.
1105. Do you think poisoning operations would be permanently successful without the use of such netting? No; I do not think so—if you have anything like good seasons. The rabbits would multiply again, and come in from other parts.
1106. Then, generally, you would recommend that netting fences should be erected—that poisoning should be adopted along with trapping of rabbits at tanks? Yes.
1107. Do you think that these measures would be effective in exterminating rabbits? I do not know of anything that would be more effective.

Mark James Curry Tully called in and examined:—

1108. *The Chairman.* What is your office? I am inspector of stock for the sheep district of Wilcannia. Until last December this included all that country west of the Paroo down to the South Australian boundary, to the north point of Corona Station, about 100 miles north from here; then in an easterly direction across the Darling, nearly as far as Mount Manara; then across the Darling River, above Kallara, up to the Paroo, and to the Queensland boundary-line west of the Paroo. I have been in charge of that district nearly three years. At the end of last year the district was divided, and I have a smaller district now under my charge.
1109. You were, I believe, sent by Mr. Stanley to Tintinallogy to examine the experiments made by Dr. Butcher respecting the transmission of the so-called Tintinallogy disease to stock? Yes; I went there early in January. On my first visit, I had the stock yarded of which I had a description sent me by Mr. Stanley. I examined each animal separately and carefully. I was pointed out on the animals that were inoculated the spot of inoculation, which showed a slight mark. I saw that the animals corresponded with those described by Mr. Stanley, and was satisfied that they were the same. They appeared to be in perfectly good health, with no signs of disease of any kind.
1110. Did you personally see any experiments conducted on stock? No; no experiments were conducted in my presence. I merely had a list of the animals that had been treated, with instructions to watch those animals, and see whether any disease might develop itself. I stopped at Tintinallogy about two days at that time. I have been at Tintinallogy twice since. I was there on the 5th February, and again on the 18th March. I should have visited it before, but I was called to Sydney to give evidence before the Tanks and Wells Commission. I remained two days each time I visited Tintinallogy.
1111. You have not, then, seen any of the experiments continuously performed either on rabbits or on stock? No; I have not.
1112. During this February visit, what did you see? I had the stock again collected and examined them carefully, and saw that they were the same stock, by the description and marks, as I had at first examined. They all appeared to be perfectly healthy. The same remark applies to the third visit. When I examined them again they were in a healthy condition, and without any sign of disease of any kind.
1113. Did you see any of Dr. Butcher's experiments in progress either on rabbits in crates or in isolated yards? Yes; I had an opportunity of seeing all his experiments, as they were going on at the time.
1114. Were the rabbits under experiment, in your opinion, so housed, bedded, and fed as to put death from starvation or exposure out of the question? They appeared to be as well housed, bedded, and fed as could be wished for to keep animals in a healthy condition. They had an abundance of feed.
1115. Did you examine the camp bend experiments? Yes, on each of my visits. I did it for my own satisfaction, so as to have a knowledge of what was being done.
1116. Was the food there sufficiently abundant and green as to put death from starvation or from excessive dryness out of the question? On my first two visits the food was quite green; but on my last visit it was getting a little bad and rather dry, but not sufficiently to lead to the idea that the rabbits were dying from starvation, because stock were in the paddock at the time of my last visit.
1117. Were you able to form a general opinion about the available feed on Tintinallogy Run during your visits? I can only speak of the frontage portion of it. There was green feed there, because there had been water on the ground. This was during my first two visits. On my last visit the country was getting dry.
1118. Do you think that on this river frontage any great mortality amongst the rabbits could be attributed to starvation? I do not think so. I saw no great mortality on my first visit, and there was very little evidence of general mortality in the country that I passed through when going to Tintinallogy. I saw evidence of mortality in the camp bend on the first occasion, though there were very few dead rabbits to be seen lying about.
1119. What did you see on your second visit? I observed that there did not appear to be anything like the same number of live rabbits in the bend. There were carcasses under the lignum bushes and in the holes on the bank of the river that I particularly examined. I saw no appearances of disease on the first occasion until I got within two or three miles of Tintinallogy, although I passed along the river-frontage. I could see that something ailed the rabbits, and noticed that they were in very much lower condition than elsewhere, as if they could only run a short distance. On the first occasion I saw carcasses lying about some three miles distant from Tintinallogy. On my second visit I noticed a falling off in the condition of the rabbits, which were apparently ill from some cause a much greater distance up the river, a little more than nine miles from Tintinallogy. On one particular sandhill I noticed several dead rabbits, and the general body seemed to have numerous sickly ones amongst them.
1120. On your third visit, what did you see in the bend? There were very few rabbits there then. I reckon that the number had decreased about 50 to 75 per cent. There were a good many dead rabbits lying about, and though the country is full of lignum, I could see a great many. The live rabbits were all very weak, and all apparently sickly. The condition of the river frontage at the time was good, yet dry, and a little

little bare; but there was quite sufficient feed in the paddocks for the working stock. The condition of the rabbits along the frontage outside the enclosure appeared to be more or less sickly, and the numbers had decreased amazingly. The rabbits then appeared to be sickly for quite 20 miles up the river from Tintinallogy, the disease appearing to spread up the river as time went on. At that time certain of the rabbits were dying in the experimental yards. I asked that some of these should be killed, and one was killed, and another died in my presence. They were opened, and I examined them. I then requested that some of the strongest rabbits running in the bend should be shot. This was done. They were examined in my presence, and the same appearances were distinctly to be seen. I did not see what I considered to be one healthy rabbit in the bend at the time of my third visit.

1121. Are you familiar with the appearances of the organs in healthy rabbits? Yes; I have seen many of them.

1122. Tell the Commission the chief things you noticed in these diseased rabbits? Without looking for disease, I do not know that one would notice anything wrong except the emaciated condition of the rabbits. You would wonder why, in the midst of feed, they should be so emaciated. On closer examination certain of the internal glands appeared to be congested, with a darker colour than usual. These were the mesenteric glands, and what I was told were the supra-renal capsules.

1123. Did you notice anything in the liver? Yes; very minute white specks were to be seen in the livers of some, but all did not show them. I had an opportunity of seeing many of the rabbits opened, and examined perhaps ten or twelve in all. Some of them presented no appearance of disease in the liver, but many of them did show symptoms of the disease; these were little whitish specks.

1124. Could you satisfy yourself that in the bend and along the river frontage the mortality of the rabbits during your first two visits there was not due to starvation? I was quite satisfied that it could not have been due to starvation.

1125. On your second visit, was the condition of the feed such that you could fairly believe any great mortality amongst the rabbits was due to starvation pure and simple? Even on my third visit the condition of the feed was not such that I could conclude that the mortality was due to starvation.

1126. Did you watch the condition of things on any of the adjacent stations, as to the prevalence of the rabbit plague, so as to compare it with things at Tintinallogy? Not to compare it with Tintinallogy; but in a general way I took notice of the state of the rabbits on all stations in my district that I passed through.

1127. What was your general conclusion? That for several months after the disease appeared at Tintinallogy I saw no traces of it except at Tintinallogy. The rabbits were not dying off in the same way on any other station.

1128. Is it within your knowledge that at this time poisoning was being largely used on adjoining stations and not Tintinallogy? Yes; poisoning was largely used on Teraweynia at that time.

1129. And was the mortality there anything approaching that at Tintinallogy? No; I do not think it was.

1130. What was the general condition at Teraweynia—the part of it that you saw—as regards feed? The portion of it that I first saw poisoned was in very poor condition. It was entirely destitute of feed.

1131. And in this very poor destitute country, were the rabbits dying in anything approaching the degree which you noticed at Tintinallogy? No; they appeared to be dying only where the poison had been used.

1132. Did you see any great mortality on Teraweynia Station apart from the operation of poisoning? None whatever, though the feed was very good in some places and very bad in others.

1133. Is there anything further with regard to these experiments at Tintinallogy which you think would be of service to this Commission in its inquiry? I do not know of anything further. I distinctly noticed the spreading of what I considered to be disease amongst the rabbits from Tintinallogy.

1134. Do you think that this mortality amongst the rabbits at Tintinallogy could in the smallest degree be attributed to the eating of bark by the rabbit? I do not think so. I do not think the eating of bark has anything to do with the mortality of the rabbits.

1135. What reasons have you for that opinion? Because I have noticed the rabbits dying both in the country where they had eaten the bark, and where there was no bark to eat, and where their principal food was merely the ordinary bushes and grass. Of this fact I have clearly satisfied myself.

1136. Taking the country of which you have charge as a whole, has the carrying capacity been seriously affected by the rabbit invasion? In the more thickly infested parts it has been most seriously affected.

1137. Can you illustrate that in any way by reference to examples? On the south-east side of the Darling station-owners have had to sell off numbers of sheep, and have very little left to feed the remainder. Many complained that they would have had to sell these only that the rabbits have died off instead.

1138. Do you attribute the scarcity of feed distinctly to the rabbit plague, as distinct from the dryness of the season? I do not attribute the scarcity of feed to the rabbit invasion, though in a great measure it may have been due to it. The season has been very dry.

1139. What have you found on the north-west side of the Darling? The food is plentiful on all the north-west side.

1140. Yet a large portion of the north-west area is thickly infested? No; not nearly so thickly infested as the south-east. I would classify part of it as rather thickly infested, but some portions of the north-west side have not felt the full effects of the rabbit invasion.

1141. On the north-west side, is feed fairly abundant? Yes, in many places.

1142. What has been the rainfall in the district this season? In some parts they have had 1 inch, but scarcely an inch in the most of it.

1143. Yet the feed is fairly abundant, although the rabbits are not numerous? Yes, but the feed is gradually falling away.

1144. Are the rabbits producing any perceptible effect on the bushes by barking them? Yes, a very perceptible effect, by killing nearly half the best feeding-bushes in the country. You can see that wherever you go.

1145. What are the bushes that are suffering in this way? The sandal-wood, leopard-wood, emu bush, as it is called, the quondong bush, and several other edible bushes.

1146. Have you sufficient knowledge to say whether these bushes will recover after having been barked? I have not had sufficient experience, and there has not been time to judge since the barking, but apparently they are absolutely dead; and I do not believe they will ever recover, because the bark and the wood beneath have been eaten right into the sap.

1147. Have you noticed, when the scrub is being cleared away for roads, and when the roads have not been used, that grass springs up in the country so cleared? Yes; wherever there has been a clearance of the scrub some little grass springs up, but not sufficient in any case to compensate for the destruction of the scrub.

1148. You have watched for some years the effects of trapping? Yes, and my opinion as to the general result is that trapping is no check whatever upon the spread of the rabbit. Although bonuses were offered, large numbers of men put on, and thousands of rabbits killed, yet every month showed that the numbers were increasing.

1149. Have you had any experience yourself with regard to poisoning? No; I have had no experience either with poisons or with wire-netting fences.

David Brown called in and examined:—

1150. *The Chairman.*] What is your position? I am manager and part owner of Kallara Station, near Bourke. I have been resident on Kallara about eleven years. Kallara is situated on the western side of the Darling River, 100 miles above Wilcannia, and 120 miles below Bourke.

1151. When did the rabbits first make their appearance on Kallara? The first I saw was in 1883, but it would be difficult to say when they first became a nuisance on the run. I do not consider that they are thick enough now to be a curse to Kallara particularly.

1152. Have the surrounding properties become thickly infested? Yes; neighbouring properties have.

1153. Have special means been adopted on Kallara to prevent the rabbits becoming a plague? No special means. The work of trapping on Kallara has been avoided as much as possible.

1154. A certain amount of trapping was, I suppose, necessary? It was compulsory; I never considered it necessary.

1155. How many men were employed on Kallara, as a rule, in trapping? On the whole run, which embraces a million acres, from two to twelve men were employed in trapping from 1885 to 1887.

1156. Did any good come from the operations of the trappers, in your opinion? Absolutely none.

1157. Do you think any harm was done by the trappers, either in the way of positive mischief or by the prevention of good? I think good was prevented by confining us to a method which compelled us to produce the scalp.

1158. Do you think any positive evil resulted from the system of trapping? Yes, I do. My reason for that statement is that more bucks were caught than does, and there being a larger proportion of does left after trapping than bucks, this proportion was more favourable to an increase of the pest than if the natural proportion of the sexes had been allowed to remain. I was instructed by the first rabbit inspector I ever saw to set the traps at dung-heaps, and not at the burrows. His reason was that, the dung-heaps being removed from the burrows, the rabbits caught there would not frighten the others; while, if caught at the mouth of the burrow, the rabbit in the trap would frighten the others away. Much the larger proportion of the rabbits caught at the dung-heaps are bucks.

1159. Do you think that the trappers killed the natural enemies of the rabbits in any large numbers? They could not well avoid doing so.

1160. What would these natural enemies be? Iguanas and cats.

1161. Have you noticed any decided lessening in the number of cats about Kallara? No; I have not, because I had very few trappers employed.

1162. Have you known the number of cats to be seriously diminished on other stations? Not to my own knowledge.

1163. Do the operations of the trappers tend to scatter the rabbits all over the country? Most decidedly.

1164. Is a serious evil caused thereby, in your opinion? Yes, very serious. The same objection applies to the use of dogs, and with even greater force.

1165. In fact, hunting the rabbits with dogs would be even more objectionable in this respect? Yes.

1166. Have you used poisons largely in connection with the suppression of the rabbit trouble? Yes; during this year I have given it a trial. I have used phosphorised wheat only, distributed by Lascelles and Anderson's machine.

1167. What results have you obtained thereby? Very good results.

1168. Do you recommend that method for general adoption? Yes. The good results were not immediately apparent, but within a fortnight they were evident. A very large number of dead rabbits showed all over the country in which the poison had been used.

1169. Have you had any experience in poisoning the natural food of the rabbit—bark, twigs, &c.? None. In my opinion, unless the rabbits are very thick, they will not take the broken-off branches at all; the rabbits must be very thick and the feed bare.

1170. Have you had any experience in the use of wire-netting fences? No.

1171. Have you watched their use on other properties? I have only seen them around gardens. I think they are sufficient to keep the rabbit out.

1172. Is that the case even when the feed outside the garden is very bare? Yes.

1173. What fence have you found sufficient for this purpose? 1½-in. mesh, about 2 ft. 6 in. or 3 ft. out of the ground.

1174. Do you regard the difference between 2 ft. 6 in. and 3 ft. as of much moment? No.

1175. I believe you paid a visit to Tintinallogy? Yes, at the end of February, and remained there the better part of a day. I was appointed by the Wilcannia Pastoral Association to visit Tintinallogy and to publish what I saw. I went down through Murtie and Billilla, and through Tintinallogy to the station. The Billilla country was exceedingly bare, and the rabbits were there plentifully. On Tintinallogy the country was not quite so bare, but the rabbits were as plentiful. I noticed as we approached Tintinallogy particularly considerable numbers of dead rabbits on the road. We first noticed them above Wilcannia, and there were dead ones more or less from 15 miles above Wilcannia to Tintinallogy. I noticed as we got nearer Tintinallogy the number of dead rabbits became greater. I arrived there in the evening late, after dark, and in the morning I went down to what is known as the camp bend. After seeing the pens in which the rabbits were kept and the crates, and the different arrangements about the camp, we went through the bend. We caught a number of live rabbits there, some of which we killed and examined; and, in the absence of Dr. Butcher, we were shown by Mr. Reid the diseased appearances. These were similar

similar in every rabbit we examined, and most apparent in the rabbits that were thinnest. We did not open one rabbit in the bend in which these appearances were not more or less apparent. In opening the rabbit, with the tail towards you, if you turned the entrails towards your left, and examined the membranes which attach the bowels to the lower part of the stomach, there was an appearance of discoloration in patches, just over the spine, right in the little membrane. In many rabbits there was liquid in the cavity of the belly, and on the membrane there was an enlargement. In the enlargement there seemed to be a fluid matter of brown colour. Then I was shown another organ called the supra-renal capsule, and was told that in a healthy rabbit that ought to be nearly white and full. In many rabbits that I examined this organ was very much shrivelled and of a dark colour, and there was no fat in any of them; they were all more or less emaciated. On one or two of the livers we saw specks, but in the majority of cases the liver was apparently healthy.

1176. Were these the chief appearances that you saw? They were the only appearances that were universal; they were in every rabbit. After going back to the camp we took a turn down to the bends lower down the river. It struck me as curious that in these bends lower down, which were not fenced off, in which there had been fewer experiments, and which were open to the rabbits from the back country, there were fewer live rabbits and more dead ones than in the camp bend, which was fenced in for experiments. I should think there were twice as many dead rabbits in the outside bend as in the bend that was fenced in, and distinctly fewer live ones. We opened a number of the rabbits in these unfenced bends, and they all presented the same appearances. In the afternoon we took a turn out on the back portion of Tintinallogy, about 15 or 20 miles; the rabbits out there appeared to be in very much the same condition as on the frontage. There was a considerable number of dead rabbits about 5 or 6 miles from the river, and fewer the further you got away from the water. The next morning we left Tintinallogy and returned to Murtie, and all the way up the river it was evident that there was some cause which produced the same sort of wasting disease amongst the rabbits. On Murtie Station I suggested to Mr. Johnson that we should catch a few rabbits and take them in to Dr. Butcher, who was then in Wilcannia, so that we should be able to hear from him whether those appearances which we had been told were the disease were so or not. We caught twelve rabbits in a wire-netting trap that night, and selected three from them—one of the fattest and two of the poorest of those caught in the yard. We took them in, and Dr. Butcher agreed to examine them. He said he did not think these rabbits had the disease; that although they were poor, their poverty was perhaps caused by something else, and was not disease. When he examined the rabbits I saw the same symptoms exactly that were described to me as the morbid appearances, and he then said that they were affected with the same disease as he had been experimenting with at Tintinallogy.

1177. Did he test this disease by inoculation? I am not aware whether he tested it any further to establish its identity by inoculation or otherwise. The distance from Tintinallogy to Murtie is 57 to 60 miles. On Murtie we caught twelve rabbits and opened them, and we traced the same appearances in about half of them. The others were apparently healthy; throughout in good condition. Three or four weeks later I went down to Murtie again, and I examined a very large number of rabbits, and did not get a single one that did not clearly show the diseased appearances. The manager of the station, Mr. Johnson, who accompanied me to Tintinallogy, assured me that within that month 80 per cent. of the rabbits had died; that applies to the whole of Murtie—certainly to the whole of the frontage, and particularly to the southern or lower end—next Billilla. I have looked for these diseased appearances higher up the river, but I could not trace them. The rabbits there are very much scarcer than further west.

1178. In your opinion, then, have these diseased appearances anything to do with the scarcity or plentifulness of feed? I think that probably they have a close connection with the supply of feed, because where feed has become scarce, so also have the rabbits. Where the rabbits are very thick, and feed very scarce, there this disease appears; although the rabbits are thicker on the east side of the river than on the west in the neighbourhood of Kallara, they are not nearly so thick even on the east side as they are on Murtie, Billilla, and Tintinallogy.

1179. Is it your opinion that this disease has developed in consequence of the density of the rabbits and the scarcity of feed, and that, in all probability, it will disappear if the rabbits be somewhat thinned out and feed becomes again plentiful? I cannot state that, even as a matter of opinion, because I have had no means of forming one. It seems to me possible that a disease produced by bad feed conditions may be infectious, and that the infection from it may spread in spite of altered and better feeding conditions.

1180. Have you, on examination of this disease, been able to form an opinion as to whether it is a new disease, or whether it is some old disease that has prevailed occasionally? It is impossible to form any opinion on that subject, because an unprofessional eye could not detect any disease. But there is no difficulty for anyone of ordinary intelligence, on opening a rabbit that is diseased and a rabbit that is healthy, in at once recognizing the difference between the two, after it is pointed out.

1181. Did you see any of Dr. Butcher's experiments in progress at Tintinallogy? Yes; I saw all stages. I saw the rabbits in crates and yards. The conditions as to feed and bedding and covering were such as to put on one side all possibility of death being due to starvation or to exposure. The rabbits appeared to me to be as well cared for as if they had been domestic pets.

1182. Have you any personal knowledge of the experiments that were made on stock with a view of testing the transmissibility of this disease to stock? None.

1183. When you found the difference between the mortality of rabbits near Tintinallogy home station, and on parts more distant from Tintinallogy, did you notice any corresponding difference in the feed available for rabbits which might explain the difference in the mortality? I think not. It appeared to me that on Billilla feed was the worst, while on Tintinallogy the feed was not so poor as to cause sheep to be in a low condition. All the sheep I saw on Tintinallogy were in fair condition. I saw the sheep running in the camp bend, and they were penned in. I do not think there were rabbits running in the same pen. The sheep were said to have been inoculated.

1184. Did you pay any attention during your visit to the question whether this disease prevailing at Tintinallogy could be attributed to the rabbits eating bark? No. I had never seen the shrubs barked before as I noticed on that journey. The barking began on Murtie, and became more noticeable further down the river. The barking of all these shrubs is a new thing to me. I never saw rabbits thicker than during that journey. I had heard of the Tintinallogy disease for a considerable time previous to this visit. I saw a considerable number of dead rabbits on the road, although at that time the disease was only just noticeable

noticeable on Murtie. A month after that I travelled through Murtie, and the mortality was so great that the stench from some of the sand-hills was exceedingly bad. So that, within a few weeks of the disease becoming apparent on Murtie, a much greater effect had been produced than on Tintinallong with six months of experiments.

1185. *Mr. Lascelles.*] Did you satisfy yourself as to the cause of there being more deaths on the unfenced bend at Tintinallong than on the fenced land? I merely describe this as a remarkable fact and tried to find out the cause, but did not succeed. The only cause that struck me as probable was this; that the rabbits sick kept going to the river for water were prevented from getting to the camp bend, and were able to get to the river at the unfenced bend. Hence we found more live rabbits there.

1186. If the laws of the Colony allowed you to spread this disease would you take steps to have it spread over your run? I certainly would, because I look upon it as nature's remedy for the plethora of rabbits, and to refuse to use nature's remedy would, I think, be excessively foolish, particularly so as you cannot limit it by any effort on the part of the law. I remember that there was a somewhat similar disease amongst opossums. In 1881, I had occasion to travel from Louth to Cobar, through Nyngau, to Sydney. The first time I made that journey the opossums were very plentiful, dozens visible along every yard of the road. In fact every tree had its opossum. A few months later I made the same journey and I noticed that a few of the opossums were dead, and that others seemed very weak, while others still remained apparently healthy. Some months later I again made the same journey—this would be in 1882—when practically the opossums were all dead. There were none at all visible along the road. Since then I understand they have slowly increased; but there are very few indeed visible now compared with the numbers previous to 1881. The outward appearances were very much the same—staring coat, extreme poverty, and so on.

1187. *The Chairman.*] Did you notice whether opossums were affected with scabs on the skin or not? No; I did not.

1188. Have you seen any scab disease amongst rabbits? One or two rabbits that were caught on Murtie showed slight eruptions about the belly. It was a scab eruption and very slight, but I could not connect it in any way with the death of the rabbits. You may see similar eruptions on rabbits in good condition.

James Charles Wilkinson Crommelin called in and examined:—

1189. *The Chairman.*] I believe you were superintending inspector of the Rabbit Department? Yes, for the whole Colony. I held that office for three years—from 1882 to 1885. I had not had previous experience in the Rabbit Department.

1190. In your opinion, has the general carrying capacity of stations been seriously injured by the rabbit trouble? That is a rather difficult question to answer. On some stations the carrying capacity would be diminished, but on others not.

1191. Do you think serious evil has been produced to the sheep-carrying power of the Colony of New South Wales by the rabbit plague? Most decidedly.

1192. Has the progress of that been rapid during the last two years? Yes. Although I have not had anything to do with the rabbits since March, 1885, I know, as inspector of stock, that the rabbits have been spreading and increasing.

1193. Have you noticed any great destruction of the edible bushes used by stock during the last few years? Since I came to the Silverton district, I know of one run where the bush is stripped of its bark for miles and miles by the rabbits. The bushes are dying, and of course they will be dead in another twelve months.

1194. Do you know whether bushes thus stripped of their bark will recover themselves? I do not. I have had thirty years experience of the country, and think no tree can possibly recover after it has been ring-barked.

1195. Does the stripping which the rabbits cause amount to ring-barking? Most decidedly, in many instances.

1196. Are large number of edible bushes suffering in this way? Yes.

1197. When these bushes are cleared away, as in the making of roads, does the grass grow up if the roads are not used? No; no grass grows up in this part of the world. If a tree is cut down, it is stripped by the rabbits immediately.

1198. I suppose you watched the operations of trapping parties in some general way over several years? Yes, and I wrote a book on the subject.

1199. What is your opinion with regard to the operations of trappers taken altogether? That is a very wide question; as a whole, the trappers did not try to exterminate. They simply trapped at one portion of an estate, and then moved on to another portion; and while they were absent the rabbits kept multiplying. I found the rabbits suddenly increasing—not decreasing—when I was Superintendent. I recommended that no more bonuses should be paid, as the increase in rabbits kept on.

1200. Have you had any experience in the use of wire-netting? No; only what I have seen others do with it. I saw Mr. Bertram, of Euston Station, employ it to enclose a paddock of medium size. He put the fence up in order that he might keep the frontage to the river clear from the rabbits. I do not think he was successful in this. I made a personal inspection to see whether he was or not. Mr. Bertram took all possible steps to destroy the rabbits on his property, and paid £95 per mile for putting up his fence.

Henry Prideaux Richardson called in and examined:—

1201. *The Chairman.*] You are I believe one of the rabbit inspectors of New South Wales? Yes. My district is No. 4, Menindie. The chief runs in my district are—Kincheega, Winterriga, Glenlyon, Cuttawarra, Topar, and Redan. I have been in the district since June, 1886. I had been in the Department previously, and had charge of Narrara run, in the Poonearric country, as a rabbit inspector. The district of which I am now in charge is thickly infested in portions, and in these the carrying capacity of the runs has been seriously affected.

1202. Has there been during the past few months any serious destruction of edible shrubs or bushes by barking, by the rabbits? Yes; very serious destruction indeed on some runs.

1203. Does your experience enable you to say whether the bushes barked in this way can possibly recover themselves? No; latterly I have noticed a great many of them dying. Any of them barked all the way around die; those only barked in part sometimes live.

1204.

1204. Have you watched whether the grass grows on the roads made through your district where the scrub has been removed, and where there has been no traffic? Yes, I should think it does; I have seen it on old roads.

1205. Does it grow to such an extent as to make up for the loss of the bushes? I could hardly say that; I should not think it would make up for the loss of the bushes; not in this country.

1206. You watched the operations of the trapping parties in your district for some time? Yes; and in other places as well, since 1882.

1207. In your opinion has any sensible effect been produced in diminishing the numbers of rabbits on thickly infested country by the operations of the trapping parties? Well, rabbits have diminished for a short time by numbers of trappers being kept on, but at the same time I never looked on trapping as a success, and I am now quite sure it is a failure.

1208. During the latter part of last year was there any marked increase in the numbers of rabbits killed by the trapping parties? Yes; there was. There was no increase in the amount of money paid during the last few months in consequence of the reduction of the bonuses; I think there was some reduction towards the end of the year. I am not certain that the number of rabbits killed and for which bonuses were paid, was not greater.

1209. Your general conclusion, then, is that trapping is a failure? Yes; I think so.

1210. Do you think it could under any circumstances be made a success in your district? No; I do not think so.

1211. Have you had any experience in poisoning rabbits? Yes, with phosphorized grain, wheat, oats, and barley. Some of these operations have been very successful indeed in my district, those with wheat and oats. We had used Lascelles & Anderson's grain distributors; I have not used any other persons. At Weinterriga they used poison on the branches of the emin bush, but I do not think the results were very good. The results were good until rain came.

1212. Have you had any experience in the use of wire-netting? Yes; around tanks for catching the rabbits. We used 4 ft. 2 in., and some 3 ft. 6 in. with 1½ in. mesh for this purpose. On one occasion, at Glenlyon, I saw a rabbit go right over the fence.

1213. Do you think that any number of rabbits could have escaped in this way without your knowledge? No; because I was watching the whole time. It is only in very exceptional cases that a rabbit can get over such a fence.

1214. Have you had any experience in connection with diseases in rabbits? No; but I have seen a number of rabbits that I thought were diseased on Cuttawarra, Topar, and in fact, all over my district.

1215. What were the characteristics of those rabbits that appeared to be diseased? They seemed to be very weak and poor, and the liver quite rotten, it would fall to pieces if you took hold of it. The liver is of very dark colour, and in odd ones you see a little blue streak.

1216. Did you see any yellowish white spots? No, I did not. I have noticed some of these animals with sores, and their legs seemed to have been singed as if they had run through the fire. From inside the sore goes up to the crutch.

1217. Is that disease now in existence? It was about ten days ago. It prevails extensively through the district, and has produced great mortality amongst the rabbits. On Glenlyon, in March last, the rabbits were so numerous that I wrote to the Department about it, and in April two men caught 15,100 rabbits in the wire-netting yards around the tanks. I passed through the run again in May and went all over it, and I do not think two men would catch 300 rabbits in a month.

1218. So the rabbits have practically been weeded out? Yes; on the Glenlyon Run they have. I noticed some to the west of Cuttawarra the last time I was there but once, and wrote to the Department about it. I noticed that the rabbits were dying very fast, and on my next visit I ascertained that where they formerly existed in thousands there are now hardly any at all.

1219. In this place was the available feed so scanty as to account for this great death-rate by reason of starvation? No. The feed was very dry, but there was plenty of it. There was an abundance of salt-bush and other dry feed.

1220. Have you known runs where the feed was just as scanty and dry, or in the same condition, and where the rabbits were not dying in this way? Yes; around one or two of the lakes near Menindie the feed is scanty and dry. I have noticed that on country far drier the rabbits do not die.

1221. Have you in your district in any year known runs where the feed was as dry or drier than on Glenlyon and yet the rabbits held their own and did not die in this way? Yes, I have.

1222. Do you think that this great mortality amongst the rabbits may possibly be attributed to their eating bark? No. I did think so at first but not now. They have died out so suddenly that it could not be possible for bark to have killed them in such numbers, and in so short a time. They had been eating bark for many months and yet in the early months they did not die in this way.

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John Andrew O'Flaherty recalled and examined :—

1223. *The Chairman.*] What is it you wish to say? I desire to make a statement in amendment of my previous evidence. You asked me with regard to Momba Run whether the rabbits were dying out in greater numbers in one part more than in other parts, and I said no. On looking at my diary I find that the rabbits were dying out more rapidly on Tunanulgra Plains block, or what is called the White Cliffs paddock, more rapidly than elsewhere on the same run. I made no inquiries into the matter but I saw for myself.

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Thomas Henry Elwin called in and examined :—

1224. *The Chairman.*] You are a rabbit inspector of New South Wales? Yes.

1225. What districts are you in charge of? I am in charge of district No. 8, Menindie, the chief runs of which are Albemarle, Tolarno, Moorara, and Pan Ban.

1226. How long have you been in charge? I have been in charge of this district for about two years.

1227. Is this district thickly or thinly infested with rabbits? It is very thickly infested and the carrying capacity of the runs has been very considerably affected thereby.

1228. Have the edible shrubs on which stock feed been destroyed in any great quantity? In places the shrubs are dying in acres.

1229.

1229. You have watched the operations of the trapping parties in your district during the time you have held office? Yes; closely.
1230. During the last year was there any marked increase in the number of rabbits killed? Yes; a considerable increase.
1231. Was the cost of the operations of the rabbit parties greater at the end than at the beginning of the year? Yes; I should say so, though towards the latter end the bonuses were considerably reduced.
1232. Is it a fact that the total amount expended was greater at the end of the year than at the beginning, notwithstanding the reduction of the bonus? Yes; I think it was. Many owners reduced their staff of rabbiters. My former remark applies to the time when the full complement of men was retained by the owners.
1233. What is your general opinion as to the results obtained from the work of the trappers? I did not favour the trapping system at all, nor do I think it tends to decrease the rabbits very much. A trapper will not remain long enough in one camp to do very effectual work.
1234. And when he moves to another camp the rabbits increase in the old one? Yes; and the trappers won't work there again until they do increase.
1235. In your district when the rabbit parties had finished their work and were paid off, were the rabbits more or less numerous than when they started? The rabbits were much more numerous at the last than when I took charge of the district.
1236. Have you had any experience in poisoning rabbits? Yes; considerable. I have employed all the known poisons, and that which I found most effective was strychnine. It mixes up with certain quantities of water, flour, and sugar, and then strychnine finely powdered is added to the mixtures; the poisonous solution thus formed is applied to any edible boughs and twigs by means of a small brush, and these twigs are placed where there are traces of rabbits. I have tried this, principally on Moorora, and found it very effective. I introduced it also at Albemarle, and Mr. Phelps, the manager, is well pleased with the result—so Mr. Curtayne, the financial manager, informs me. I have seen other methods of poisoning adopted. The next best is phosphorized wheat with Lascelle's distributor. That is effective, judging from the carcasses of dead rabbits found after its use.
1237. Is there any other special method that you can recommend as effective? Well at Albemarle they went in for Wynne and Yulle's method. I do not think the result was very favourable. The method was also tried on Tolarno, but the owners were not satisfied with it.
1238. Have you had any experience with wire-netting? Yes; with tank-traps, and I found netting fairly effective. I have seen Wreford and Smith's trap erected. I think it would be more useful on a long line or boundary fence than on a short sub-divisional line. I do not think it would be much use on an open tract of country; once they got in they would not possibly get out if it were properly erected.
1239. Have you had any experience in connection with the netting of any large areas of land? No; but I have seen a 2,500-acre netted paddock on Tolarno. At Albemarle the whole run is being fenced in—I think with  $1\frac{1}{2}$  inch mesh. The results have yet to be seen. Sometimes a rabbit gets out through the fences around the tanks—they get in occasionally through the openings at the neck of the tank-trap. I have known rabbits to get over wire-netting also. I have seen them jump 2 ft. 6 in. wire-netting, scrambling over the top. We were after them on horseback, and one or two of them were closely pushed and jumped the fence. I have seen them, too, dig underneath a fence which was sunk 5 or 6 inches in the ground.
1240. Have you had any experience in connection with diseases in rabbits? No; I have examined lots of them that I found in an emaciated condition, but I have never been able to satisfy myself of the existence of disease.
1241. Have the rabbits during the last month or two been dying off in your district? Yes; in the back part of my district.
1242. To what do you attribute the death of all these rabbits? The best term that I can use is inanition—mere weakness, caused by the poisonous nature of bark, which they are compelled to eat.
1243. Has feed been so scanty as to account for the death of so many? Yes; they have had to take to the bark and the leaves of trees. The feed, too, during the last month was bad; in places there is no grass at all. I consider Tolarno is a very suitable place for experiments. This horse paddock which was offered to the Commission was thickly infested with rabbits, but they have been trapping and driving them out. At present I am not certain whether the paddock is thickly infested or not. I do not think it is, but the adjoining country is very thickly infested. St. Helena Island, Boola Boolka Lake, is also a suitable place for experiments.

George Urquhart called in and examined:—

1244. *The Chairman.*] I believe you are the manager of Mount Gipps Station? Yes; I have been on that station for about twenty years in one capacity or another. I first saw the rabbits on Mount Gipps about May, 1883, and it is now only moderately infested. The rabbits first became very numerous there about eight months ago.
1245. Have the rabbits as yet had much effect on the carrying capacity of the run? No, not as yet. They have not yet eaten many of the edible bushes used by stock.
1246. Was trapping carried on on the station on a large scale? Yes.
1247. What is your general opinion as to the results of the trapping system? It is of very little use, I think.
1248. I suppose large numbers of rabbits were destroyed? Yes.
1249. Did the number of rabbits tend to increase last year during trapping operations? Yes; they were increasing very fast.
1250. During the last two months have the rabbits been increasing or decreasing? Decreasing.
1251. To what do you attribute the decrease? They are dying off from some cause or other, but I do not know what is killing them. We have been poisoning them as well with phosphorized wheat, distributed by Lascelle's machine.
1252. Do you think they are dying in greater numbers than the bare and dry condition of the feed would account for? There is any amount of feed where they are dying in this way.
1253. Have you examined any of these rabbits to see whether you could find any disease amongst them? No, I have not. The grass is very dry on those parts where they are dying. I have also tried poisoned water, but it was not a success. I have not used wire-netting at all, and have had no experience with it.

1254. Do you think that the deaths of the rabbits in your district during recent months could be attributed to the eating of bark, or have they died where no bark has been eaten? Wherever I have seen dead rabbits the bushes are barked, and great numbers have died off, although not many bushes are barked.

1255. Did you find that the bushes were barked where the feed was dryest? Yes.

1256. Do you think you will have any chance of getting rid of the rabbits by poisoning, without fencing in the areas? I think we might keep them down by poisoning, though it will be constant trouble keeping the rabbits down that come from other parts. I think it would be better to make fencing the foundation of our operations. I believe the income from the run would justify me in having it fenced in, though I do not say that regarding the whole of the run.

John Binnie called in and examined :—

1257. *The Chairman.*] What are you? Manager of the Mundi Mundi Station, which is about 16 miles from Silverton, in a north-east direction. The area of the station is about 250,000 acres. I have been about three years at Mundi Mundi. When I went there first there was an abundance of rabbits, though they became thickest about two years ago.

1258. Have the rabbits as yet seriously affected the carrying capacity of the run? No.

1259. Has there been recently any great barking by the rabbits of the edible shrubs? Yes.

1260. Have you watched the operations of the trapping parties since you became manager? Yes. The numbers of rabbits killed by these parties greatly increased during last year, although we have reduced the bonuses. The increase in the number killed more than made up for the diminution in the bonuses. We employed in some parts of the year from twenty to seventy men, chiefly in shooting and trapping.

1261. What is your opinion in general as to the results obtained from the system of trapping? I do not think we are doing any good whatever.

1262. Do you think that under any conditions any real good could come from the system of trapping? No.

1263. Did you try poisoning on any large scale? Not at all. I have not tried wire netting, either.

1264. Have you any personal experience of diseases in rabbits? No.

1265. Has there been any marked reduction in the number of rabbits on your run lately? Yes. I think the deaths are due to the dry weather and the eating of bark and the want of water. The rabbits, I think, are dying from the poverty of the feed and the barking of the trees. It was the want of ordinary feed that led them to bark the trees. They had dry grass but they require sap in hot weather.

1266. Have you opened any of these rabbits to see what was the matter with them? No; I have not. All I know is that they have cleared off the run.

1267. Have you stopped the rabbit parties? No; we have some blacks on now.

1268. How are they engaged? Shooting and digging out.

1269. Do you propose to adopt any other measures? No; not at present.

The Commission adjourned.

TUESDAY, 29 MAY, 1888.

The Commission met at 2.30 p.m. at the office of the Commissioner of Crown Lands, Adelaide.

Present :—

Victoria : HARRY BROOKES ALLEN, Esq., M.D.

South Australia : EDWARD CHARLES STIRLING, Esq., M.D.

ALEXANDER STUART PATERSON, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Dr. STIRLING.

Charles Jonas Valentine called in and examined :—

1270. *The Chairman.*] What are you? I am Chief Inspector of Stock for the Colony, and have been such for the past twenty-two years.

1271. During those twenty-two years, have you seen the rise and progress of the rabbit plague? Yes; I have seen it start, and have also seen it cleared out of some parts of the Colony completely, or as nearly as possible.

1272. Where did the rabbit plague first begin? It must have been about 1867 or 1868, but I don't know of any particular place. I think it was in 1871 or 1872 that they were brought under the Game Act. They were then very prevalent north of Kapunda, near the Burra and near Gawler—in the hills about. There were a few, but not in such large numbers. At one place the police prevented the people from shooting them. And on an island in the Coorong there were some rabbits that were very carefully looked after. It was looked upon as a good sporting-ground. In 1874 the rabbits became so numerous that they were struck out of the Game Act, and a movement was made to bring in a Bill to cause their destruction. Tasmania had taken some action in the same direction; and I reported to our Government at the same time on steps which had been taken there with regard to rabbit destruction. Then there came a series of years in which there was a great fight over the principles of the Rabbit Act. By this time the rabbits had increased marvellously. This was about 1876 or 1877, when the rabbits spread over the whole of the best part of the country northwards. The law passed about 1877 threw the onus of destruction upon the owners, and if they did not choose to take action the Government stepped in and put on rabbit parties at their expense. The consequence has been that the whole of the best pastoral land has been entirely cleared of rabbits, which had become very numerous on all the freehold properties about Booboorowie, Canowie, Anlaby, Kanoona, Mount Bryan, and others. The system adopted has completely cleared the country of them. This was by filling up the burrows and destroying the rabbits with the assistance of dogs and men. I do not think that poison was used to any great extent, but the bisulphide of carbon was used by the Government parties at a later date. By filling up the burrows, I mean that the burrows were closed up. I do not suppose there could be a much worse example of the rabbit-infested country than Anlaby, and now it would be very difficult to find a rabbit at all there. Since that time I think the rabbits made a move through the scrub. They were driven outside, and gradually worked their way out into the far country to the

the north-east. I have no doubt a large number of rabbits came here from the scrub country to the east of the Murray River, from the Colony of Victoria.

1273. What is the furthest northerly point that the rabbits now extend to? There have been plenty of them seen in the corner of South Australia near Queensland and New South Wales; also further north, and right away from here to the Darling country. They are also along our west coast, and we know that some of them are already in Queensland.

1274. You have spoken about rabbits dying off in some parts? Yes; the rabbits on the island in the Coorong died out completely, without any known cause. I hold the supposition that they were starved out—that they eat themselves out—and died. A great many also died near Tectulpa at the time that we had the horse disease. I do not know exactly what it was, or whether the rabbits became diseased from drinking the water which the horses had touched. I do not think that was the cause. They died in hundreds.

1275. Did the rabbits not die out also on Yorke's Peninsula in 1865? I do not remember any being on the southern portion of Yorke's Peninsula—in any number, until a later date. Afterwards, when they increased in numbers, they were destroyed by the usual means, and have not since increased to any extent.

1276. *Dr. Paterson.*] Do you mean to say that the rabbits died out completely in Tectulpa? They died in great numbers at one time, but not completely. I do not know what they died from, or whether they were starved. One of my men said he had broken the dead rabbits in two.

1277. Did you see this done? No. He told me he simply broke the back-bone. The liver was also enlarged, and the man thought they had some disease of the stomach.

1278. *The Chairman.*] What parts of South Australia are most infested at the present moment? I cannot say from present knowledge. I will send in this information later on.\*

1279. Have you any information about the mortality of rabbits during the last two months? I have no personal information. I have heard that rabbits are now dying out in great numbers in this Colony.

1280. Can you give us any information as to how the carrying capacity of the different runs has been reduced by the rabbits? I could give the information, but I think it would be better I should do so in writing. [See Appendix.]

1281. Can you say whether these rabbits eat the trees and shrubs? I have seen the shrubs destroyed in some places out in the north-east; the bark was eaten off. The shrubs are acacias, so far as I could see—the mulga and the sandalwood. It is rather difficult to say whether the rabbits have destroyed the salt-bush, or whether it is the long dry weather that has done it. Rabbits do not thrive on salt-bush alone. The punta bush has also suffered.

1282. *Professor Allen.*] Do you know whether these bushes will recover after having the bark eaten off by rabbits? No; I do not, though I was anxious to make observations to discover whether they would or not. Many of our northern bushes recover themselves in a marvellous manner. The first time I saw the country in a drought I thought a great many of the bushes would never recover, but it was astonishing how they sprang up again.

1283. Have you ever noticed the grass and bushes recover after rabbits? Bushes recovered, but they were mallee, and of little service. The grass, too, will grow again where it has not been eaten thoroughly out; but I do not think the grass in that country makes up for the loss of the bushes.

1284. Do you know that the rabbits eat the mallee? I have been told so; but I do not know it of my own knowledge. They will eat anything rather than starve. If there is any green about they will eat it.

1285. We have heard that some rabbits died from constipation from eating the bark fibre? I have heard that, but I do not know how true it is.

1286. What has been the general effect of trapping parties? I do not think the rabbiters could have helped killing the natural enemies of the rabbits in cases. I have no knowledge that it has been done wilfully, though it is quite possible. They would not trouble themselves one way or the other, but if an animal came in their way they would kill it. There is not the slightest doubt that under the scalping system they would not kill the young ones and pregnant does, because for some time it was a profitable business, and they would be doing away with their own livelihood if they killed such.

1287. Have you had any special experience in poisons? No; but I know something of the use of carbon bisulphide. I have watched the use of rabbit-proof netting in certain places; but I have not taken more than a general notice to see what the result would be. I do not think there can be any doubt that 1½-in. mesh is good enough for all purposes. I have seen plenty of fencing 1½-in. mesh, and I do not think the rabbits will go through that in any large enclosure.

1288. Have you seen any of Professor Watson's rabbits? Yes; and I have tried the scab on the sheep that the Commissioners saw. I examined them last about a month ago, and they were then free. I feel quite positive that this rabbit scab is not communicable to sheep.

Samuel Graü Hübbe called in and examined:—

1289. *The Chairman.*] What is your position? I am Chief Inspector under the Vermin Destruction Acts and Government arbitrator for 1888 leases.

1290. How long have you held your present position? Since 1879. During that time I have been in the rabbit country, except during the last six or seven months.

1291. What have you observed in regard to the spread of rabbits? In 1879 I was employed in their destruction at Canowie, and in nine months we cleared that run. This was an estate, roughly speaking, of about 60,000 acres. I was then doing private work. At that time we had no chemicals, and the only method we adopted was digging the rabbits out. We did not employ dogs, because there were valuable stud sheep on that run. Afterwards we used bisulphide of carbon, and that run was cleared out at a cost to the estate of about £12,000, owing to the want of co-operation by some of our neighbours. I then went into the Government service, taking charge of the work of rabbit destruction.

1292. What were the infested portions of the country then? The western portion was from Anlaby, Coringa Camp Creek, Booboorowie, Canowie, Mount Bryen, and Gumbowie. At that time the rabbits were much further out than Gunbowie on the north. On the south they were at Point Sturt, on Lake

\* Witness subsequently forwarded the following reply to the question:—On the country east of the Murray River, towards the Victorian boundary, in the dry north-eastern country, commencing at the edge of the farming districts up to the boundary of New South Wales; and in the western district near the coast.

Alexandria, and in the north-east about Narracoorte. On the west coast they were at Colton, Tabo, and Courtabie. They went out east from Cooringa and Kooromoolloo. That was about the furthest point, but you could trace the rabbits to the New South Wales border even in these days, when they were very limited.

1293. *Professor Allen*] Were there then any traces of the rabbits having come from the Victorian side then? No; but you could find traces from South Australia into the mallee country of Victoria. You would find them thickest where there was an oasis in the dense country. It is my impression that the rabbits went from South Australia into New South Wales, and rabbits, to my knowledge, were liberated at Coringa and Kallooloo, so that from these centres and others they spread out in an easterly direction towards New South Wales. I believe rabbits were also liberated on Narracoorte by settlers. From Glenclyg and along the border rabbits have come from Victoria, and have greatly increased in numbers here. In the north and on the west coast rabbits were again liberated and constituted fresh centres.

1294. *Dr. Paterson*] Do you know if the rabbits were liberated from centres in New South Wales to your knowledge, or have you heard that the same practice as prevailed here also existed there? I know that rabbits were liberated in 1874 in the Barrier Ranges in New South Wales, and at Campbell's Creek, on the Darling, and close to Menindie.

1295. *The Chairman*] You mean that they were introduced for purposes of starting the pest? Yes.

1296. What has been done since 1877-80? The Act under which we were working then was found to bear very heavily upon many of the people, who received notice to destroy the rabbits—I refer to the Act of 1879, which we are at present working under, with some modifications. The preceding Act provided that the Government were to destroy all rabbits existing on Crown Lands at their own cost; freeholders and lessees were also to destroy the pest at their own cost, and in the event of their failing to do so, the Government were entitled to go in and kill the rabbits at the expense of owners. That Act pressed very heavily on those who held large estates, especially those who held poor land, and they strenuously resisted the administration of the measure. In many cases they brought influence to bear to prevent entrance being made. This, of course, entirely nullified the effect of the work done on the adjoining land, which became again largely infested from the centres where the rabbits had not been destroyed.

1297. Were the Government always up to time in clearing their own lands? Yes; in every case the Crown Lands were cleared before the others; and had private owners worked in conjunction with the Government parties, the rabbit pest would have been reduced to a minimum.

1298. When you were in command of rabbit-extirpation parties, what means did you adopt in the early years? We principally relied upon the use of bisulphide of carbon. In the very beginning we only used picks and shovels to dig the rabbits out. We found the carbon very successful in deep alluvial burrows, where there was nothing to allow the fumes to escape. In other parts, where the rabbits do not burrow, we used phosphorized grain, arsenic, bran and chaff, and dry strychnine and bran and chaff. Cyanide of potassium, with bran and chaff, and various other poisons were used; and the trial had the effect of our retaining arsenic and phosphorised grain. In many cases the sheoak and cotton-bush, and other bushes in good seasons, were very successful when the poison was laid upon them. We used a large number of dogs—in fact, every possible means we could adopt we tried.

1299. Where did you first commence working? The first rabbit parties were sent to Point Sturt.

1300. What was the result? The result was that where we obtained co-operation from the settlers we were very successful, but where we did not obtain it we had the reverse of success. I may point out that in the hundreds of Yedualce, Bendleby, Uroonda, Euralba, Aladdie, in 1884, no country could have been more thickly infested than those hundreds were. It was exceedingly difficult country to clear on account of the rock and the dense undergrowth, and there were seven parties of five men each sent out into the country under a very good State inspector. In twelve months the whole of these hundreds were cleared, principally by the use of phosphorized grain, and bran and arsenic. We laid these very sparsely in fairly well-sheltered places, and away from the burrows. It is a mistake to put feed in any way near the burrows, because the rabbits run over it. We scattered the bran and chaff in very large quantities. The men were sent out as you might send out a line of skirmishers, and at the present time you could ride over the country for a week with a pack of dogs and you would not see a rabbit. This result was obtained by the farmers about there helping us in the work. The value of that country, approximately, it would be difficult to say, but it was sold at the upset price of £1 0s. 6d. per acre. This was an agricultural area settled principally by selectors who own from 640 to 1,000 acres each.

1301. *Dr. Paterson*] A large portion of this country was suitable for agricultural purposes? Some of it was also suitable for pastoral purposes. Nearly the whole of the ranges were covered with stunted scrub, such as stunted black oak and sandal-wood. Other portions of the ranges were covered with spinifex, which forms good shelter for rabbits. The plains were covered with saltbush and grass.

1302. *The Chairman*] While you were employed in this place, I presume other parties were working elsewhere? Yes; there were 65 Government parties in the field. Some of these parties met with success, but in no place did we meet with the success that we attained in the place I have mentioned, and that was obtained through co-operation by the settlers. I should like to say that the Act of 1879 was repealed, owing to the action of various persons who were not satisfied with the way it was worked. The vermin destruction of 1884 was then brought in, the main principle of which was payment for scalps. Any person who brought scalps or vermin, and made a declaration of the fact that they were destroyed upon certain lands, was paid at a schedule rate for different descriptions of vermin, including rabbits. The natural enemies of the rabbits were also included in this schedule. The effect of this Act was to introduce a class of people who relied solely upon the wages they could earn by destroying vermin of every description, and the most marked result was that large bodies of men went to the thickly infested districts, more especially where rabbits were said to exist, and commenced the work of destruction. They would remain there till the rabbits became, comparatively speaking, reduced in numbers; then they would go on to another place. This had the effect of driving the rabbits all over the country, to many places where they were never seen before—places which have since become thickly infested. In many cases I know that they were wilfully transported—taken out of thickly breeding spots and planted in new ground. Of this I have absolute proof. I have also absolute proof that rabbits were scalped alive and then allowed to go, in the hope that they would breed again.

1303. What was done with the young ones and the pregnant does? They were scalped; the scalps produced and the money claimed on them, although the rabbits were let loose. If the trappers found a pregnant female, they would scalp her and allow her to go; or, if they thought scalping would kill her, they would let her go unharmed, in order that she might breed. This practice prevails

prevails generally all over the country. I make the statement without any fear of contradiction that it prevailed all over the country in every direction. I attribute the spread of the pest therefore to the action instituted under the Vermin Destruction Act of 1884-85. The expenditure incurred under this Act was ultimately found to be so great that Parliament in 1885-86 repealed the measure.

1304. Do you attribute to this Act the destruction of the natural enemies of the rabbit? No; I do not think it had much effect, because the operations of the rabbit parties would destroy almost as many of the natural enemies of the rabbit as the scalpers. They generally destroyed eagles and iguanas, but unless they were actuated by special malice they would not go out of their way to kill the iguanas and lizards, which are great enemies to young rabbits. Though the iguana is very good eating, yet very few men like to eat it. The Vermin Act having been repealed, the Act of 1879 was reintroduced, and we worked under that until the Local Government Bill was passed in 1887, when the onus of rabbit destruction was entirely thrown on the local councils. The rabbits have increased considerably in many centres since the practice of scalping was discontinued, except in the northern district, where the country is exceedingly dry.

1305. Which are now the worst districts? The west coast, the south-east, and the north-east. I consider these the most badly infested places at the present time. From Koorunga to Silverton is the worst infested part of the Colony, and the country becomes more and more thickly infested the further you proceed eastward.

1306. What is being done now in the infested districts? Practically, nothing.

1307. *Professor Allen.*] Are you aware that there has been a large diminution of rabbits during the last two months? Yes; to some extent there has been in the hundreds of King, Tomlinson, and Rees.

1308. To what do you attribute that decrease? To drought.

1309. From your observation, do you think that any great amount of mortality could be attributed to the eating of bark, or do you attribute it directly to the drought? I think it is an outcome of the drought, because when the rabbits cannot get any feed containing more moisture than the bark they eat the bark. I have opened hundreds of these rabbits, and I have very rarely found this appearance of fibre. I do not think this enters into the element of their death.

1310. Have you made any recommendation to your Government in regard to the suppression of the rabbits in these thickly infested parts? I have suggested the desirability of erecting rabbit-proof fences. My idea was to fence off the pastoral from the agricultural country, as by doing so the rabbits from the pastoral country would be prevented from getting into agricultural areas, and so isolate the country where they are now to be found. My opinion is that if rabbit-proof fences were generally adopted the solution of the rabbit difficulty would be found.

1311. Have you any idea as to what mesh and height should be used? I think the fence erected on the border between South Australia and Victoria would be ample. It is 3 ft. 6 in.—6 in. in the ground and 3 ft. out—1½ in. mesh, with two barbed wires on top. This makes a dog-proof fence as well.

1312. You know what is known as the annually-leased country? Yes; and it was the specially infested nature of this country that led me to recommend rabbit-proof fencing.

1313. How do you deal with this poor pastoral country held on annual lease? After the erection of a main line of rabbit-proof fencing, I should cut the country up into blocks, and give it on long lease with favourable terms, with the distinct proviso that the vermin on the land should be destroyed by the lessee, and the fences kept in proper order. My recommendation, so far as the erection of Government fences, applies to the worst lands, but the divisional lines should be erected by the lessees, and the whole line kept in order by them.

1314. Would you absolutely prescribe the erection of such fence as a condition of the lease? Yes; and to enable them to do it I would allow the lessees to take the country up on lower rentals; but I would make it a *sine qua non* that the fences should be erected by the lessees, kept in repair, and the rabbits destroyed.

1315. *The Chairman.*] Have you considered the difficulty of fencing rough country and watercourses, especially parts that are subject to floods? Yes, I have considered that. It could be met in the same way as with the rabbit-proof fences that were erected east of the Murray on the cliffs for 16 miles. That line of fence crosses innumerable gullies and ravines that run into the river Murray. It was composed principally of pine pickets, set side by side. In places where the line crosses these ravines sluice-gates were left, and these were formed by swinging pickets on strong wires. Whatever flood matter was brought down by the floods swept through these sluice-gates, in some cases doing damage and in some cases not; but in all cases where damage was done it was repaired at very little cost by the boundary-rider who was in charge of the fence. I will send in specifications of this fence. I have found that this picket fence barred the progress of the rabbits, and I have received numbers of letters from settlers stating that these fences saved them from ruin.

1316. Do you feel satisfied that these methods are consistent with the poverty of the country? Unless some method that has proved effective is adopted the country will become entirely worthless, because the land adjoining, which is now occupied to advantage, will become infested. Before the rabbits came the annual lease country gave a very good return.

1317. *Professor Allen.*] Supposing that during this year and next the rabbits were to increase as last year on this annually-leased land, would serious permanent damage result? Undoubtedly.

1318. *The Chairman.*] That country is now particularly bare? Yes; the herbage has been destroyed principally by the rabbits. I think serious permanent damage will result, and also all over the country seriously infested, unless some proper measures are adopted.

1319. Do you think that the trees which are ring-barked die permanently? If they are completely ring-barked, both bushes and trees will die, but if there has been only a mere fluting of the bark and the tree not entirely ruined, it will recover.

1320. What height from the ground have you seen rabbits in trees? Twelve feet high. I was riding with a gentleman on Mr. Love's Mount Wedge Run, and my attention was directed by a movement in the sheoak. I looked up and said, "There's a rabbit in that tree." He said not; that it could not be a rabbit; it was impossible. I said I was sure it was a rabbit. I rode up to the tree, cut at the animal with my whip, and a rabbit jumped out of the tree. The rabbit was above my head, and I was sitting on a horse 15 hands high. It was a leaning stump, and I saw marks of the claws on the bark; the rabbit got there himself. I have seen rabbits while hunting in bushes get readily up five to six feet. I am not an expert in disease, and have not made any study of it.

John Miller called in and examined:—

1321. *The Chairman.*] What position do you hold? I reside at Merriton, and am a member of the Pastoral Board of South Australia.

1322. We understand you are anxious to make some communication to us? Yes. I have been engaged for three years in examining the pastoral leases expiring in 1888. Previous to that I had assisted in passing the Vermin Bill of 1884. While engaged in this work I saw a great deal of the rabbit-infested country. We have made it possible for the rabbits to live in this country by poisoning their natural enemies, by putting out baits for wild dogs, iguanas, &c. These made it impossible for rabbits to exist, because they had first to be protected on the West Coast. The poisoning that is going on to get rid of the wild dogs is wholly ineffective. I would also recommend the introduction of the domestic cat, which I think would be sufficient in conjunction with any disease that might be found suitable. The treatment which you adopt for dealing with the rabbits where they exist in large numbers you cannot extend out to the bounds of settlement of the rabbits, because the animals are more isolated and scattered. Where rabbits are scattered disease will not be communicable. I have had no practical experience with disease, but above all things I would protect the natural enemies of the rabbit, and I would prohibit their being either poisoned or trapped. I do not mean to say that you should not poison rabbits with grain, but I would prohibit poisoned baits that would be taken by carnivorous animals.

1323. As regards the question of fencing, have you made any recommendation as to the 1888 leases? I was asked by the Premier in 1885 to send him some notes, and I then recommended that a rabbit-proof fence should be put along the boundary. I intended to separate the agricultural from the pastoral districts. My experience of rabbit-proof fencing is that no rabbits will get through  $1\frac{1}{2}$  inch mesh. The rabbits are said to run up the stays at the strainers and get over the wire-netting. I therefore have doubts about the fences as at present erected. I know one case where domestic cats were turned out and were killed by the rabbiters, which accounts for their non-success. On Flinders and Schlink Islands the only means used for the rabbit extirpation were cats, and they completely extirpated the pest. I used cats on the Lower Broughton in 1884, where dogs and men could not get at them, and the cats were completely successful.

The Commission then adjourned.

WEDNESDAY, 6 JUNE, 1888.

The Commission met at 10:30 a.m., at the Crown Lands Office, Melbourne.

*Present:—*

*Victoria:* HARRY BROOKES ALLEN, Esq., M.D.  
ALFRED NAYLOR PEARSON, Esq.

*Queensland:* JOSEPH BANCROFT, Esq., M.D.

In the absence of the President (Dr. MacLaurin), the Chair was taken by Professor ALLEN.

Edward Micklethwaite Curr called in and examined:—

1324. *The Chairman.*] You are Chief Inspector of Stock for the Colony of Victoria? Yes.

1325. How long have you held that position? About twenty-five years.

1326. Have you studied the spread of the rabbit plague in Victoria? It is a subject that attracts me considerably. I have obtained a considerable amount of information, and thought it out in my own mind, but I have had nothing to do with the matter.

1327. Can you state briefly what was the general course of infesting Victorian lands by rabbits? Yes; about twenty-five years ago there were about half-a-dozen couples of rabbits imported here from England by Mr. Thomas Austin, of Barwon Park, who tried several times to acclimatize the rabbits and failed, though he eventually succeeded. These rabbits were preserved for some time, but eventually they spread all over the country in the order of things. I heard Mr. Austin's statement as one of the Acclimatization Society, and it was considered rather a feat at the time, nobody foreseeing the result.

1328. Are you aware whether rabbits have been intentionally let loose in Victoria? Not wild rabbits; I have heard of tame ones being let loose.

1329. Then, so far as you are aware, the wild rabbits throughout Victoria have come from the original stock imported by Mr. Austin? Yes.

1330. At about what time did the rabbit plague assume serious dimensions in Victoria? Well, I never heard much about them until about ten years back; before that I do not think they were very troublesome.

1331. What has been the general method of dealing with the pest? Poisoning and trapping, and filling up the burrows; these have been most successful, though most expensive.

1332. This would be on the rich southern lands? Yes; and in the western district.

1333. On these rich lands in the western district, have rabbit-proof fences been largely adopted? I believe so; but as I have not had occasion to make a tour for some years I cannot say so from personal observation.

1334. Are you aware whether any serious difficulty has been met with in coping with the rabbits on the rich western lands? I cannot say that I am.

1335. The principal difficulty, I presume, has been in connection with rocky mountain lands? Yes; it is on these poor rough lands and not on the good lands that the difficulty has arisen.

1336. Is it a fact that this was due to a want of co-operation by adjoining land owners? I cannot say that I personally know that; but I have no doubt that want of co-operation is one great difficulty in the way, and it is a difficulty which I think will never be got over.

1337. In what parts of the Colony have the pastoral lands been seriously affected in their carrying capacity by the rabbit plague? I should think chiefly in the western district, and around Geelong; but I have not had much personal experience.

1338. Have any official reports been made to you with regard to the diminution of the carrying capacity of the land? No; and they would not have been made to me in any case.

1339. Have you visited the mallee country lately? Not since the rabbits have become numerous there; it is about eight years ago since I was there.

1340. What recommendations would you be inclined to make as to the proper modes to adopt in connection with the rabbit difficulty? I do not think any useful result will be got by attempting to secure co-operation; the people will never be got to act together. The whole lot of rabbits have sprung from a-half dozen couples in one place, but you can never expect to get them down to that again. In spite of anything we can do there are likely to remain millions of rabbits in these colonies. When the Colony is cut up in farms, I suppose the rabbits will become as they now are in England and France. You ask me what measures I would propose for getting rid of the plague, or for reducing it. The first thing I would recommend is that the duties should be taken off fencing wire, and that fencing should be made as cheap as it is possible to make it; the law also should be such that neighbours will be obliged to pay their share of the cost of fencing between the two holdings.

1341. Do you, then, consider netting fences as essential to any effective scheme? I consider fencing is the only hope, and I do not think anything can be done without it. It gives resolute men and men of capital a chance of clearing their ground, and so you bring these men to the fore. Experience has shown that the rabbits can be kept down in a paddock of 10,000 acres as they are kept down in England, provided you do not allow it to be overrun from the outset; and hence I say, make netting fencing compulsory and also easy by taking off the duty that is imposed on the wire. I do not think that any Government would let it be supposed that they were adverse to the rabbits being got rid of, and yet they impose a tax upon the only means of disposing of the rabbits, which is netting.

1342. Do you know what is the cheapest form of netting? No; but I would like to mention this, that any establishment existing for the potting of rabbits and of sending them home should be compulsorily suppressed, for as long as you allow people to depend on the production of rabbits you may be sure rabbits will disseminated, whatever you do. This I consider to be a primary matter.

1343. Are you prepared to give any opinion in regard to the fencing in of Crown Lands from rabbits? Yes; I think it should be done.

1344. *Dr. Bancroft.*] Would you not go further and recommend that the Government should contribute to the cost of such fencing? No; I am a free-trader and would never recommend anything of the sort. I think the people should be quite well able to do their own business without any bonus.

1345. *Mr. Pearson.*] Would you not get a better return from the lands on lease if they were cleared of the rabbits? If there were no other means of doing it I think it would pay to give bonuses to get rid of them.

1346. *Dr. Bancroft.*] Would you give free railway carriage to the netting? There would not be much to be said against it. At the same time I do not much believe in these measures.

1347. *The Chairman.*] If large areas of poor land are to be dealt with can anything be hoped for unless the tenure is materially secure? Materially secure and materially long. I think a man must have an interest in his land, and some surety that he will be repaid for what he expends.

1348. Do you think the lessee should be secured against losing his run for some fixed period after he had dealt with the rabbits? Yes. As an inducement to such a man I think it should be said, "There is the country for you—you can have it so long, provided you do so and so."

1349. Are you prepared to make any specific recommendation as to the leases that should be given? No; I have never thought of this except in a general way.

1350. In the case of private or leasehold lands abutting on public lands, do you think the Government should pay its portion towards the erection of intermediate fences? Yes, I do.

1351. Allowing, then, that the erection of netting fences be made compulsory, what would be your next recommendation? It should be so arranged by law that anyone possessing land on any terms—rented or freehold—should be compelled to keep these animals in check. In the event of his not doing so, the Government should do it at his cost with a substantial fine as well. I think this would induce most people to set to work.

1352. *Dr. Bancroft.*] You would not compel a man to do this in any particular way? No; just the same as with scab. We do not say what is the remedy, but we punish a man if we find scab on his property.

1353. *The Chairman.*] Should this power be vested in the central Government or in local bodies? I believe it would be much better if vested in the Government. I do not think any result will ever be reached through the municipalities.

1354. Does your experience with scab and other diseases confirm you in that opinion? Yes, very strongly; I never had to do with municipalities, but from what I know of local bodies it is very hard to do any good with them.

1355. *Dr. Bancroft.*] By having one uniform course of procedure you have managed to stamp out the scab? Yes; and in a very short time and without much expense to anybody.

1356. *The Chairman.*] You think a central department should control all operations having reference to the extermination of rabbits? Yes, and the inspectors should be responsible to the central authority.

1357. Assuming that a certain amount of freedom of choice was allowed to owners of land, what plan of operations would you suggest as reliable? Well, I have not had sufficient personal experience to say.

1358. With the scab you proceeded from the extremity of the Colony and worked in towards the centre? Yes.

1359. *Mr. Pearson.*] You would not recommend a similar procedure with regard to the rabbits? No; because the circumstances are different. They are a different class of difficulties altogether.

1360. *The Chairman.*] What is your opinion as to the employment of any regular class of trappers? Well, that is a very difficult question. If you employ trappers then it becomes their trade and they live upon it. On the other hand they are more expert than others. Could the owner and his men do the work it would be preferable.

1361. Do you think that the mischief in the employment of trappers arises chiefly through their being paid for scalps? I should think it would have a good deal to do with it. When the rabbits begin to get low the trappers move on to where they are more numerous. Then while the trappers are away the district gets as thick as ever. Then if you employ men who are not expert at the work, the work will proceed much more slowly.

1362. Do you think the State should give any contributions to the expenses of rabbit parties? No; except to parties working on its own ground. It should act simply as a private owner or lessee acts with his own lands.

1363. Are you aware which are the best methods of poisoning? No.

1364.

1364. Generally speaking, is it your opinion that the pasture lands are suffering severely from the depredations of the rabbits? Yes, I think so.

1365. Are you aware whether the edible bushes on the mallee country are being destroyed? I have heard so.

1366. Can any reliable figures be obtained showing the diminution in the carrying power of the runs in this Colony? I have seen statements in the papers that certain runs that used to carry so many thousands now only carry so many hundreds. I think in one case, in the mallee country, the carrying power of a run had been reduced from 12,000 to 1,200 sheep. These figures are not obtainable in my Department, and I do not know whether the Rabbit Department has the information or not.

The Commission adjourned.

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MONDAY, 15 OCTOBER, 1888.

The Commission met at 9:30 a.m., at the Crown Lands Office, Melbourne.

*Present:—*

<i>Victoria:</i>	HARRY BROOKES ALLEN, Esq., M.D. (in the Chair). ALFRED NAYLOR PEARSON, Esq.
<i>New Zealand:</i>	ALFRED DILLON BELL, Esq.
<i>South Australia:</i>	EDWARD CHARLES STIRLING, Esq., M.D. ALEXANDER STUART PATERSON, Esq., M.D.
<i>Queensland:</i>	HENRY TRYON, Esq.
<i>Tasmania:</i>	THOMAS ALFRED TABART, Esq.

James Ormond called in and examined:—

1367. *The Chairman.*] What is your address? 119, Collins-street, Melbourne.

1368. Where is your property situated? In the south-western corner of New South Wales near Wentworth.

1369. What area do you hold? About 800,000 acres. It is partly leasehold and partly freehold.

1370. Is the land of much the same value throughout, or is it of variable quality? It is very irregular.

1371. What is the average carrying capacity of your leasehold land? I should say about 12 acres to a sheep.

1372. Is your land very much infested? It has been—not so at present, but several years ago it was very much infested.

1373. When was it most thickly infested? About 1884 or 1885.

1374. To what do you attribute the decrease of infestments since? Partly destroying the rabbits, and largely to the drought, which existed for three or four years. I think it is very difficult to say to what extent the reduction is due either to one or to the other cause.

1375. What are the chief methods of destroying rabbits which you have adopted? During a long period, in which the work was done under Government supervision, it was almost entirely trapping. That was very expensive; and, in my own opinion, was a very costly method indeed.

1376. Was it effective? Well, it was only effective in a partial degree. It was very ineffective in a general sense.

1377. You mean that large numbers were killed but that the runs were not cleared at all? Yes; and never could have been cleared under that process.

1378. What process did you find most effective? Well, I think the process which we found most effective is Lascelles' machine.

1379. What poison do you use, chiefly? Phosphorized wheat, entirely. We tried strychnine and also arsenic.

1380. What was your general conclusion with regard to these three poisons? We found that the most inexpensive—phosphorized wheat—was the most efficient.

1381. You desire to give evidence before the Commission on certain distinct points? Yes. I had been under the impression that this Board had only examined a certain class of Crown tenants. I am possibly mistaken; and if so, I am only taking up your time. I did not think that you had examined tenants who hold excessively poor land; and it was more with regard to wire-netting fences that I wished to be examined than anything else.

1382. We have examined several other holders whose runs carry one sheep to 14 acres? Well, that is a class of country which I wanted to speak of. It is more against compulsory wire fencing of land of that character that I desired to give evidence.

1383. I believe you are prepared to make a statement as to the annual product of land such as is held by you? Yes. So far as my experience is concerned the annual product of such land as I hold has never paid expenses of working the station. I am prepared to go more into figures, if necessary; but this is the general result of my experience of over ten years.

1384. Why, then, is the land held? Because, having put money into it, I do not want to lose all. I am trying to recoup myself by good seasons; but as a matter of fact—I speak now for myself and for others—I have done nothing but lose money on the land, and I should be delighted to give it up if I could get one-half my money back. I am willing to sacrifice my improvements, on which I spent £50,000. I must admit I made a grievous error in making expensive improvements on such land—a thousand miles of fencing and a great number of tanks. I think these are mistakes; but I should like to get some of the money back, if possible.

1385. *Mr. Bell.*] Supposing you had not made mistakes—as you call them—would the land you hold, then, have paid you? Well, I doubt it. I know a great deal more now than I knew then. I went into this land when wool was 50 per cent. higher than it is now. Besides, I knew very little of the climate; very

very little was known of it ten or fifteen years ago. The results of the first two or three years—the good prices for wool—encouraged me to incur these expenses to develop the station. Since then, between the very bad seasons, the droughts and the rabbits, these hopes have all been shattered to pieces, and it has been a series of losses, one after another, year by year. Even had I not gone to the expense I have gone to, I do not think I should have been able to make it pay; but still I should have saved a great deal that was expended on what is now practically useless, except for my own purposes. I have had for some considerable time one or two partners—practical men—who have been squatters all their lives, so that mine has not been an extravagantly-worked station. My partners are thoroughly intelligent squatters, who know their business; and they worked the station probably as well as any station could have been worked.

1386. Supposing that you had not had rabbits to contend with at all, would your land have paid you then? No; unfortunately the continuation of the drought destroyed all hope of that. As a matter of fact, I have not had a good year since 1881. That was a very good year. Last year was a good year, and this year is a very bad one. Like a great many other people, I was understocked in 1881, and I had not courage to buy. And the advantages of last year were not great in my case, nor in the cases of many other people. So that since 1881 we have not had a good year. I do not mean to say that the rabbits have not materially influenced the result, but on them should not be placed the whole responsibility.

1387. Then you desire this Commission to understand that your case is not an isolated one—that what you say applies to other people in the same district? Yes; I know that it is so. I am speaking for every other station in the same district. I have absolute knowledge of it.

1388. *The Chairman.*] What experience have you had in fencing against rabbits? None whatever. The only remark I want to make is that, so far as I am concerned, anything like compulsory wire fencing would make myself, and a good many others like me, throw up their stations and make our loss, or put them into the hands of the mortgagees, who would have to work them themselves. It would be utterly impossible to fence such areas as these in with wire-netting in the hope of making them profitable.

1389. *Dr. Stirling.*] Are you of opinion that the station would not stand the expense of it, or do you think wire-netting is in itself useless as a check on rabbits? I have not sufficient practical knowledge of the effects of wire-netting to give any evidence on that point.

1390. Then your contention is that the stations would not stand the cost of the netting whether the netting is any good or not? Yes; and I have no evidence to give whatever as to the value of wire-netting.

1391. That would apply to a case where a holder was compelled to put fences up; would you still be of the same opinion if the Government put the fence up and called on the holder merely to pay interest on the cost? That would not alter the circumstances; it is the strain of the extra expense that the station would not stand. In country like that—where, perhaps, there are 20 to 30 square miles of impenetrable scrub which is utterly useless for sheep, and is only a rabbit warren—to make any subdivision to keep them out of the enclosure, would be so ridiculously expensive that it could never pay.

1392. *Mr. Pearson.*] A boundary fence would not, then, be enough? That would not be of the slightest use. That would simply enclose rabbits that we could never destroy. We must fence off these parts of the mallee scrub which are no good, and which are merely breeding places for rabbits—where they live without burrowing.

1393. Have you had any attempts made in that district for the extirpation of this scrub, such as were made with the mallee scrub of Victoria? It is a totally different country. This is a loose, sandy soil, which, even if the scrub were taken off, would be utterly useless. We have often tried many miles of this and could not find holding places for water. There is nothing but sand, and you cannot find a place to put a water tank.

1394. *Mr. Tryon.*] Is not the number of rabbits greatly influenced by the influx of rabbits from South Australia? I am on the other side of the river, and therefore they do not affect my portion so much as the western side.

1395. *Mr. Pearson.*] What area of country do you suppose is of similar character to your station? A large portion of the resumed area of Lake Victoria station is of the same class. Take my neighbour, Mr. Cudmore,—I dare say he has got perhaps a couple of hundred thousand acres of that class of country. I would like to add that if we had not been so unfortunate in having a succession of droughty seasons the station might have paid me; but, with the conditions of the seasons and the rabbits, it has been a continual loss. I think had the seasons been fairly average ones I would have been able to save myself making losses.

1396. Are you speaking of fairly average seasons with yourself, or with the grazing areas all over the colonies? No; I speak only with respect to the Lower Darling country.

1397. Had you much experience of that country prior to your occupation of it? Yes; I have now the rainfall and climatic conditions so well before me that I am able to say that, in my opinion, with average seasons, such stations should pay.

1398. *The Chairman.*] What are the names of your stations? Tapio and Turlee.

1399. *Mr. Bell.*] Does what you say apply to both? Yes; they are only 40 miles apart, and are situated at the junction of the Murray with the Darling, on the eastern side of the Darling abutting on the Wentworth common.

1400. How much have you spent in rabbit destruction? I spent during the years 1884–85–86 a gross sum of £20,000 on rabbit destruction. I received as subsidy from the Government perhaps something equal to two-thirds of that amount.

1401. *Mr. Tryon.*] Has there been an unusual increase in the amount spent? In 1884–85 the sums were much larger than in 1883, but I may point out that the lowest amount spent in any year on rabbits was a great deal more than the rent came to. Before 1884, the year in which the new Bill came into effect, the rent of my run was £808.

1402. Had the Act relating to the mallee country in Victoria been in force, would it have had any effect on your position—would it have paid you to hold the station? No. I am not quite sure that I know enough about the Victorian Act to answer your question.

1403. Do I understand that you purchased the station, or did you take the country up in the first instance yourself? I took the country up in the first instance as a partner in a firm.

1404. Your opinion is that a barrier fence would have served no purpose, because when you arrived rabbits were already there? Yes. There must have been a horde of rabbits in New South Wales at the time. We had rabbits when we took up the station in 1871. We had them for years, and looked on the shooting of them as nice pastime, but they never increased much till 1881.

1405. What effect had the drought on the rabbits? It starves them, eventually.

1406. Do they acquire any special habits, owing to the drought, which hasten their destruction? Well, it is very difficult to say. A lot of them die, and the others do not breed very fast. I suppose they have only a certain class of feed, and when this is eaten up they have nothing to fall back on.

1407. Have you ever noticed that they eat any plants which might have a deleterious effect on them? I have no knowledge.

1408. Do you know that sheep thrive on plants which rabbits will not eat? Yes; generally scrub. Sheep eat the scrub, the bark of which has I believe a deleterious effect on rabbits, but of that I have no evidence.

1409. *The Chairman.*] Can you tell us anything about the relative amount of feed consumed by rabbits and by sheep? I can give you a little idea of what rabbits will eat in confinement; what a sheep will eat I suppose you know already. I have kept some rabbits in confinement during the last twelve months. A great many of us tried Professor Watson's scab disease. I got some rabbits affected with it twelve months ago, one of which I still have. I kept other wild rabbits in confinement with them and some of them got the disease, but it went very slowly. There is, however, one remarkable fact in connection with it. One of these wild rabbits had a litter of young after being in confinement for five or six months. Immediately we got the litter we moved them into another room, and in less than a month every one of these young ones had died.

1410. *Dr. Paterson.*] Do you attribute this to the condition of the mother? Yes; because the conditions under which the young ones were kept were as good as possible. There were four or five in the litter. Every one of these rabbits eat a good sized cabbage every day. We gave them as much as they could eat. They had 4 lb. or 5 lb. of oats per day amongst five—about 1 lb. of oats each.

1411. *Mr. Tryon.*] Have the rabbits permanently injured the carrying capacity of the runs by destroying the herbage? Whether they will permanently affect the run or not it is impossible to tell. The effect of a good rainfall in a country like that is something magical. No doubt the loss of the herbage must affect the runs considerably. A good deal of my salt-bush has been killed by them; though I should not like to say that it has been permanently killed.

1412. *The Chairman.*] Can you say that the destruction is due to the rabbits, or was it eaten down by sheep? I should say by both, but more particularly by the rabbits. No doubt both have affected it considerably.

The Commission adjourned.

## SECTION III.

EVIDENCE given before the Executive Committee of the Royal Commission at Tintinallogy and Elsewhere.\*

### TINTINALLOGY.

MONDAY, 28 MAY, 1888.

*Present:—*

*New South Wales:* W. C. WILKINSON, Esq., M.D., M.P.

*New Zealand:* A. DILLON BELL, Esq.

*Queensland:* JOSEPH BANCROFT, Esq., M.D. (Chairman).

*Tasmania:* THOMAS A. TABART, Esq.

John Reid, manager and part owner of Tintinallogy Station, examined:—

*To the Chairman:* I have resided here four years, from July, 1884; there were rabbits here when I came. They were paying 2s. 6d. per scalp here then, and got some of this back from the New South Wales Government; I could not say how much was paid. Rabbits kept increasing till about January, 1888, when they began to die very fast; at present there are not as many as when I came; there has been no poisoning done, except some small experimental work in that way; we have trapped largely, paying at per scalp; latterly, 1½d. per scalp, before that, 2d; it was 1s. in November, 1884, when I took charge. Trapping was an utter failure; it ceased about 25th January, 1888. We tried strychnine last year, put on green feed, cabbages, &c.; not on twigs, I think; poisoning was not destructive enough. The increase was due to the rabbits coming from other places, not to natural increase; I have no doubt of that from the rapidity of the incursion; they came up the river and in from the back country. There was plenty of grass here before that; the rabbits barked the bushes even then when grass was plentiful; they are fondest of hop-bush; they also ate a lot of different bushes, including "old man salt bush" and lignum; they were dying fast before January, but very rapidly since. Before January I think the trappers were skinning rabbits dying from natural causes; I cannot, however, prove that; the skins were not kept for sale. Rabbits are still dying. To

\* Taken by A. D. Bell, Esq., in the absence of the Secretary and shorthand writer, who was in attendance on the Commission at Silverton.

*To Dr. Wilkinson :* I first noticed the disease in the rabbits about August, 1887 ; Dr. Butcher was the first to notice it, and started some experiments, which have gone on ever since ; he first heard of odd ones being dead, then he caught some and tried experiments ; in any infested country we do find dead rabbits, but in this case more than usual.

*To the Chairman :* The reduction, I think, is by death, not by migration ; no one near here has said our rabbits have gone to them.

*To Dr. Wilkinson :* In one month we trapped 56,000 rabbits ; this was the largest month's work we ever did ; it did not reduce them perceptibly ; disease killed far more than 56,000 in a month ; I know this from riding along, and counting hundreds dead on a few acres.

*To the Chairman :* At this time there was plenty of feed for both sheep and rabbits.

*To Mr. Tabart :* I found dead rabbits all over the run. Wynne, Hudson, & Co. were our only neighbours poisoning them ; it was not possible for the dead rabbits found to be from there ; the nearest part of their run is 10 miles from the head station here, and we found dead rabbits 20 miles from there. I think rabbits will only go about a mile for food, but I am not sure. I first noticed barking being done about twelve months ago or more ; since then most of the country has been barked all over.

*To Dr. Wilkinson :* They will bark trees even when there is plenty of grass.

*To Mr. Tabart :* Barking, I think, has nothing to do with the mortality here.

*To Dr. Wilkinson :* On the runs further back from the river barking began twelve months earlier than with us ; rabbits are as thick there now as before ; by " far back," I mean outside our boundary.

*To the Chairman :* The rabbits bark equally summer and winter ; here they bark when there is plenty of feed.

*To Mr. Tabart :* Rabbits are spread by trapping, but in this case I cannot think they left our run, because if so, our neighbours would have had them thicker than ever.

*To Dr. Wilkinson :* The sheep did well here till 1st April last ; after that, they were a little pinched, till the rain came. In counting dead rabbits I would only count those with the fur on, not the skeletons.

*To the Chairman :* I cannot say how long fur would be noticed in dry weather ; not long, I think ; ants and other things destroy them. We had a plague of rats here, about the beginning of 1887, in a wave down the river ; they were not so numerous as the rabbits ; they burrow, and I think eat the grass ; it is the true rat, not the bandicoot.

*To Dr. Wilkinson :* The worst year for rabbits was 1887—the same year as the rats came. But for the rabbits we should have saved much more dry feed for this year, whereas now we pay £9 10s. for chaff. Horses can rub along all right in the horse paddocks on the dry natural grass if the rabbits had not eaten it.

*To Mr. Tabart :* The rats went away gradually ; they were not observed to die ; I think they went down the river ; we heard of them higher up a month before we got here.

*To the Chairman :* I have not much faith in wire netting ; this country is so loose and sandy that in hot winds in summer the net would be silted over in a few hours, and rabbits would walk over. I net my garden and yard with 1½-inch mesh, there being no sand close about here ; the drainage holes also, which are sometimes 20 to 30 yards long, would make roads under the netting.

*To Mr. Bell :* The Darling country, as a whole, is loose and sandy, as described ; I did not mean to refer only to this station.

*To Mr. Tabart :* I would use no larger mesh than 1½ inch ; I have seen a good large rabbit go through 1½ mesh—one that could live well by itself ; I don't consider 1½ rabbit proof ; it is too large. I would not erect netting unless compelled ; if I were compelled I would put up as cheap a one as I could, because I would not believe in its being rabbit proof anyhow.

*To Dr. Wilkinson :* I think 1½ inch would stop any rabbits, except those too small to live alone, if they got through ; a rabbit could get through 1½, however, and run away. I have seen them do it ; they would do it without being hunted, if they saw better feed the other side ; I would recommend 3½ feet out of the ground ; I don't think 3 feet out of the ground enough ; in fact, I believe they could climb any height ; I have seen them run up 3 ft. 6 in. netting like a cat.

*To Mr. Tabart :* This netting was perpendicular, without any belying in it. I think netting worthless in this country ; that is my opinion, but many differ with me.

*To Dr. Wilkinson :* I have only seen them climb the netting in hurdle enclosures ; I have seen the marks where they have climbed trees, even 5 feet high. I never saw rabbits cross the river ; even when dry I have seen no trace of it, but I never looked particularly ; the bed when dry is sandy, not boggy. They will swim when hunted, but not otherwise. Ordinarily, I consider the Darling River rabbit proof. The natural enemies here are iguanas, hawks, native cat (this is very scarce), and tame cats, many of which have gone wild here ; we turn out as many as possible ; some come back, but not many ; they do not come back if half grown when turned out.

*To Mr. Tabart :* The rabbits here are so reduced in numbers now that I think the natural enemies can deal with them unless we are invaded again from elsewhere. The rabbits travel up the river always, not down ; I cannot account for that fact. The paddock we call " the bend " is fenced in and was very thickly infested ; its area is about 500 acres ; they began to die there shortly after Dr. Butcher began experimenting there. The bend is fenced in with 4-foot netting of 1½-inch mesh. Previous to Dr. Butcher putting diseased rabbits in there, all the rabbits were healthy ; I consider the extermination of the rabbits on this 500 acres was solely due to the introduction of disease by Dr. Butcher. There was splendid feed there, and has been ever since, up till the last month or six weeks ; there is plenty there even now ; it has never been short of rabbit feed since it was fenced in. The appearance of the disease among them was that they got very thin, their hair stood up, and they could not run away. I have not been often in " the bend " myself. The land was fenced rabbit-proof in all states of the river ; the netting was continued right out into the river itself, and staked there.

*To Dr. Wilkinson :* I never counted the dead rabbits in " the bend," but I saw lots of them lying about there. I do not know if a record was kept of the number of deaths there.

The question was here raised whether Dr. Ellis should be permitted to be present during the examination of witnesses. The Chairman ruled that examinations by the Committee must be conducted in private, and that Dr. Ellis could not be permitted to be present.

Examination continued,—

*To the Chairman* : Inoculated rabbits were put in "the bend."

*To Dr. Wilkinson* : Before this the rabbits had every appearance of being healthy ; if badly diseased I can pick them out by their appearance, as before described ; I never saw rabbits like these diseased ones before the disease came.

*To Mr. Tabart* : I consider the disease to be very infectious from rabbit to rabbit ; the young ones take it more quickly than the old ones, and die off sooner.

*To Mr. Bell* : I have had sheep running on the same country with these diseased rabbits ; the sheep were there when the rabbits were dying in large numbers—sheep of all kinds, all ages and sexes. I never saw any diseased sheep in that country, nor noticed any deaths of sheep ; the same is true about cattle and horses, and also about the kangaroos ; no disease or deaths were noticed among any of these animals ; I never took any steps to keep stock separate from the diseased rabbits ; I believe, from my experience that the disease is infectious among rabbits only.

*To Mr. Tabart* : The disease has extended into Billilla run, with the same fatal results ; it appeared on the part adjoining us, near the river, on the same bank ; not all over Billilla ; I believe the effect is from infected rabbits having gone there from here.

*To Dr. Wilkinson* : The disease showed in the most marked form near the river, but it went out back and is quite as bad there now, and kills just as fast.

*To Chairman* : The rabbits between this station and Menindie, so far as I know, have not the disease ; I have not been down there, and am not sure.

*To Mr. Tabart* : The weather has no effect one way or the other on this disease, nor the feed, nor the country.

*To Dr. Wilkinson* : On the other side of the river the station Weinterriga has the disease, on the back country ; it is better grassed than this, and less bush.

*To Mr. Tabart* : The disease is there twenty miles back from the river.

*To Mr. Bell* : Our sheep are in very fair condition now for the time of year. Between last January and this time they were much better than they are now ; in January they were in splendid condition ; since January we have sold 13,000 fat sheep off the run. They were fat, but were not sold as fat ; they were fat when inspected, in February. Where the rabbits were dying there is plenty of water ; most of the deaths took place where there was plenty of water. There were no stock but rabbits on the 500-acre bend when the experiments began ; there were sheep, horses, goats, and cattle put in the bend during Dr. Butcher's experiments with rabbits ; Mr. Stanley, V.S., of New South Wales, inoculated these stock there.

*To Dr. Wilkinson* : Some of the sheep were there three months ; there was plenty of feed for them there, and they kept in good condition ; no artificial food was given.

*To Mr. Tabart* : Tintinallogy is about 330 square miles in extent ; the deaths from disease have been all over it.

*To Dr. Wilkinson* : There are a few rabbits left here, but it would be a trouble to find any here now ; I will take you out to-morrow and show you any rabbits we can find. The disease has spread and cleared the run, and gone 10 or 12 miles into Billilla. The rabbits, as I have stated, travel north. The disease was first noticed here on Tintinallogy ; we have 40,000 sheep on it ; I don't think you will see any rabbits to speak of, alive or dead lately, till you get to the other side of Billilla station ; there is hardly a rabbit on the run ; you might ride 20 miles without seeing one, and before the disease you could hardly ride a mile without seeing a thousand. I can show you their dunghills still. I have observed the barking since twelve months ago.

*To the Chairman* : The "old man salt-bush" is a disadvantage on the run, no stock eat it, and it takes up a lot of ground. I don't think it would actually hurt stock if they ate it ; if really starved they do eat a little, but I never heard of fatal results. When the rabbits took to barking there was plenty of grass. The rabbits are dying all over the run, and the "old man" is only in patches here and there ; they die where there is none ; a good deal of the hop-bush close here has been barked by rabbits, and some is dead. We have no myall here.

*To Dr. Wilkinson* : In some places they bark the mulga, but not much so here ; they bark our leopard-trees. The rabbits have been eating "old man salt-bush" all over the Darling for years, without any deaths like this.

*To Mr. Tabart* : Trapping is an utter failure ; besides the other objections I have mentioned, the first thing the trappers kill is the natural enemies of the rabbit. I have said that in one month in 1887 I trapped 56,000 rabbits ; in 1888, from 1st January to present date, I have only expended £47 6s. 2d. on rabbit destruction ; it was unnecessary for me to spend even that ; I only did it because I was forced by the Rabbit Act to keep some men on trapping.

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Alexander Affleck examined:—

*To the Chairman* : I reside on and manage Weinterriga (G. and J. Riddoch's) on the northern bank of the Darling ; the area is 1,200 square miles ; I have been there twelve months. Rabbits, since I came, are much less numerous. We have been trapping to end of March, 1888, and since then have used phosphorized grain, also arsenic, and carbon bisulphide in the burrows. Trapping is not an effective means ; it is a great farce ; rabbits multiply fifty-fold during the trapping ; it is impossible to cope with rabbits by trapping. Last twelve months it cost us £12,000 on trapping ; we caught 1,042,000 rabbits. We have used phosphorized grain largely since the beginning of the year ; we tried wheat and oats ; wheat is good, but they will take oats. The result of the poisoning was very satisfactory ; I have counted 300 in a mile dead. I have no experience in any other methods of poisoning. I think disease is killing rabbits in Weinterriga, all over it. I do not know what disease ; where two months ago there were thousands, you can now see hardly any ; this is everywhere, except just on the river.

*To Mr. Tabart* : I first noticed it two months ago, when neighbours also noticed it ; I do not know where it came from or whether it began on Weinterriga or not ; I have stock all over the run where this disease is ; it has no effect whatever on stock.

*To*

*To the Chairman:* There are no young rabbits now on Weinterriga; during summer they breed very little; I have, of course, only twelve months' experience; there have been no young rabbits since the end of November. In October or November, 1887, one party of rabbiters got 9,000 young rabbits out of 10,000 total—that is, there were only 1,000 old to 9,000 young ones.

*To Mr. Tabart:* I have heard of disease being among rabbits on Tintinallogy; I have been over that run since, and have seen diseased rabbits there, and caught them; I consider the disease at Tintinallogy and at Weinterriga identical; the symptoms are precisely the same.

*To the Chairman:* I am not aware of diseased rabbits being taken from Tintinallogy elsewhere.

*To Mr. Bell:* The symptoms I mean are these: The rabbits fall away to skin and bone, and get very weak; I notice the liver is very black, and looks unhealthy; they get "roach-backed" and doubled up, and you can easily run them down.

*To Mr. Tabart:* I would not have the slightest hesitation in introducing this disease upon a run of my own; it is perfectly safe to stock.

*To Dr. Wilkinson:* When rabbits were on Weinterriga, far back, they were very numerous; about the same as on the east of the run; the feed was abundant there, and it is so still.

*To Mr. Tabart:* The country is open salt-bush country, with sand hills and scrub; rabbits have "rung" a good deal of the bush; not the salt-bush, which they do not touch, but leopard-wood, hop-bush, and others; in places they take the "old man;" in fact, in places, every bush that grows.

*To Mr. Bell:* The rate of progress of the disease on Weinterriga is such that I expect there will be no rabbits left there shortly.

*To the Chairman:* The wire netting we have put up keeps rabbits back; it is 3 ft. 6 in. high, 17 gauge, 1½ mesh.

*To Mr. Tabart:* We have 152,000 sheep on Weinterriga; even with that number of sheep at stake, I would not hesitate to introduce Tintinallogy disease if we had not already got it among our rabbits. When I was first on Weinterriga the bush was not destroyed by rabbits; I first noticed it about December, 1887; eating bush has, I think, had no effect on rabbits, nor has it, in my opinion, anything whatever to do with the outbreak.

*To the Chairman:* I never noticed any young rabbits dying, just as they were born, or later; I have seen none, as I said, dying at all till two months ago, except trapped ones.

*To Mr. Tabart:* Since disease came, we dismissed all trappers, but are still poisoning; there is plenty of water on our run; the rabbits are dying more thickly near the water than anywhere else.

*To Mr. Bell:* Our sheep are all in very good condition.

*To Dr. Wilkinson:* I don't consider our run heavily stocked at about one sheep to 8 acres; that is about what the country will stand.

*To Mr. Bell:* There is plenty of feed where rabbits are dying, and always has been.

*To Mr. Tabart:* They have died all over the run; where there were originally thousands, there were, in a month, hardly any left. They did not leave the run; they died on the run. I have never heard from neighbouring runholders that they have seen rabbits increase on these runs; on the contrary, they have seen them decrease, during the decrease on Weinterriga.

*To the Chairman:* The trapping extends the rabbits and spreads them over the country; if left to form colonies naturally, they are more easily killed; any means is better than trapping.

John James Phelps examined:—

*To the Chairman:* I am manager of Albemarle Station. It is about 740,000 acres; the average stock kept for the last ten years has been about 90,000 sheep; we have however 110,000 sheep on it now. I have been there twelve years; I first saw rabbits on the place about the end of 1882; I only saw one then; after that they kept increasing up to now. After 1882, we paid trappers weekly wages, besides scalp-money; rabbits being so scarce that they would not work without wages. In 1883, this cost £802; in 1884, £1,820; in 1885, £1,767; in 1886, £5,067; and in 1887, it cost £13,000.

*To Dr. Wilkinson:* The bonus system began about December, 1884, starting at 1s. each; in 1885, it decreased, and so up to now, the bonus now being 1d.; it stayed a long time at 6d.

*To Mr. Tabart:* During this time we employed only trappers. Trapping is the most ineffective means you can possibly adopt; it is a retail method, not in any way a wholesale one; I don't think it disperses rabbits much; trapping, in fact, has I think no effect either way; it is useless. Continuing the statement I have made of expenditure in former years, I may say that from the beginning of the present year, we have spent, on trapping, poisoning, driving, and yarding round tanks, about £2,300.

*To the Chairman:* We have no young rabbits now, but they will come very shortly; green feed starts them breeding; in former years there have always been young rabbits when the grass was green. The months or seasons have nothing to do with it; it depends on the presence or absence of green grass; there has been no green feed since last September till now, and consequently no young rabbits.

*To Mr. Tabart:* Ours is sandhill country with "old man" saltbush, and saltbush plain, with a good deal of mallee and pine; rabbits have been destroying the bush very extensively since about last August, when I first noticed odd bushes destroyed by them.

*To Dr. Wilkinson:* Sandalwood is the favourite, even better than leopard, which is a much scarcer tree than sandalwood; they have nearly denuded the "old man" saltbush; they have "ringed" all the mulga, of which we have not much altogether.

*To Mr. Tabart:* I have noticed disease among rabbits commencing about two years ago; it died out in a month or two, quickly; it showed as scabs on the skin; it was on scrubby country first, far away from the river; about 60 miles away. I do not think it has had much effect. The rabbits were very thick, and are now very thin; but it may be starvation that has done it.

*To Dr. Wilkinson:* There were no sheep on this country at the time.

*To Mr. Tabart:* I have been on Tintinallogy several times in this last twelve months. Since the disease there, the first time I came here was about last September; the rabbits were then as thick here as they could well be; I have not been there this year till to-day, but I only saw one rabbit to-day where previously you could see them in thousands wherever you looked. When I first came here I saw diseased rabbits

## EXTERMINATION OF RABBITS IN AUSTRALASIA—EVIDENCE AT TINTINALLOGY. 111

rabbits, but only in the experiment "bend"; you could then see traces of disease on the skin. Since then it seems to have left the exteriors and gone to the interiors; the outward appearance is they fall away to skin and bone; I know of no other sign.

*To Dr. Wilkinson:* I saw very many rabbits so diseased, or showing those symptoms, in the open run, spread over it, just like those in the experimental bend. I have seen them at Albemarle, Henley, and Tintinallogy in the last few months; I saw such rabbits among the general lot. We sometimes drive 300 or 400 in a yard at once; the last rabbits we have been catching are all very poor and skinny.

*To the Chairman:* We employ six men to drive the rabbits into a yard with whips and dogs; in this way we took one day 900. That was our biggest drive; the least was about eighty; one can drive them a quarter of a mile, not farther; to attempt a longer drive is useless.

*To Mr. Tabart:* I have heard of Tintinallogy disease, but have heard of no loss of stock there. As manager of a large station I would not have the slightest scruple in introducing Tintinallogy disease into my flocks; I would be perfectly satisfied that the disease could not hurt my stock.

*To Dr. Wilkinson:* I have seen rabbits on Albemarle affected like those on Tintinallogy, but cannot speak positively that they were diseased; it might have been starvation. It was the same as at Tintinallogy; there were many more deaths than usual at that time; they began to die in large quantities last February, 1888.

*To the Chairman:* I never heard of diseased rabbits being carried from here (Tintinallogy) elsewhere. I am satisfied the rabbits have disappeared at Tintinallogy; I cannot explain why, without seeing the run. On Albemarle they disappeared largely; my present opinion is they disappeared from starvation, because there was nothing there for them to eat. The poor-conditioned rabbits we have on Albemarle are improving. On Albemarle, where the rabbits were dying in great numbers, there were sheep; these sheep fell away considerably in condition from absence of feed; the sheep fell away, and are falling away all over the run. This has been as bad as any year; there was only one year worse, namely, 1884; since the rabbits became thick, this is the worst year for feed we have had. I have not noticed that dead rabbits were thicker near water-holes, nor where food was specially abundant. I have seen these thin dead rabbits even where the first has been plentiful, but no dead sheep. If you overstock a paddock with sheep they will hunt all rabbits out of it. Theoretically, a notion occurs to me that you could dispose of the thick of them by overstocking successive paddocks over the whole country with sheep, and then netting it, but in practice such a plan might not work; I do not say I have thought it out thoroughly. I have not observed deaths among newly-born rabbits.

*To Mr. Bell:* I said I first saw rabbits disappear in large numbers in February last. We have not had much feed since last year. There was not any special falling off of feed in February, when I saw the rabbits begin to die in large numbers.

*To Dr. Wilkinson:* Since Christmas, 1887, we have had from 4½ to 8 inches of rain on our run, in various parts of it. Eight inches is our average yearly rainfall, and so this year we have in parts had a year's average rainfall in five months. But for the rabbits, therefore, this would have been a good year for feed; but, the rabbits being so plentiful, we have none. The rabbits have not bred since Christmas, the green feed having been taken—by the rabbits themselves—as soon as it grew.

*To the Chairman:* I have put up about 11 or 12 miles of wire-netting, and you could have nothing better to keep out rabbits; we have some 1½ and some 1¾ mesh, some 3½ and 3 feet high.

*To Dr. Wilkinson:* I think 1½ is as good as any, and 3 feet is high enough—that is, 2½ feet out of the ground and 6 inches buried; rabbits might be hunted over that, but I think they would not climb it otherwise; only very small rabbits could get through 1½ netting. On a place of my own, I would use 1½ and 3 feet high. I think sand would ultimately cover up wire-netting in this district, on the sandhills; it might happen in six months; not in twenty-four hours, certainly, and in some places it would never happen at all. I would think it even more likely that the sand would blow away from under the netting, leaving the netting above the level of the ground, that sometimes happens here with the fencing-posts, but it is not common. I don't think netting would be much use without sub-division.

*To Mr. Tabart:* I have not heard of any disease among rabbits below Albemarle. Rabbits, when they came first, all travelled north; but I think they are now stationary.

*To Mr. Bell:* In the case of the dying and dead rabbits on Albemarle, the liver I find is very much darker in colour than in the natural state, and very rotten; I observed this myself.

*To Dr. Wilkinson:* I found no well-conditioned rabbits like that.

*To Mr. Bell:* This did not alter my opinion, that they may have died of starvation; I should like to see more of the disease before I abandon that opinion.

*To Dr. Wilkinson:* In my experience in previous years, rabbits have bred noticeably from December to May, but this year I have not noticed any. This year I think there is some interference with the breeding; I attribute it to absence of green feed; they would breed all the year round if we had that; I have no doubt starvation is a large factor in making them thin, at Albemarle at any rate.

*To Mr. Tabart:* If sheep were thriving, and the rabbits had all disappeared on the same country, I would not then say the rabbits died from starvation.

Edward Hungerford Luttrell examined:—

*To the Chairman:* I have been assistant to Dr. Butcher for a time, at Tintinallogy station; I have been assisting him for the two months just past, and on another occasion before that. I am familiar with the condition of the rabbit question as affecting Tintinallogy. I first paid attention to rabbits here about four years ago, but had previous experience of them elsewhere; I noticed them gradually increasing up to December, 1887, notwithstanding the trapping, which did not seem to decrease them at all, though immense numbers were caught. They are decreasing now, however, since December, 1887; they began to die in December, and the mortality gradually increased. I was away from the end of December, 1887, to March, 1888, and on my return in the latter month, I could hardly see any rabbits where there were thousands before. I concluded from the look of the rabbits that they were dying from disease; I thought this from their emaciation and their general appearance. All ages and sorts died, young ones seemed to die very soon, and soon after the dying began no young ones were visible at all.

*To*

*To Dr. Wilkinson :* There were many dead young ones found, and plenty of nests deserted with the young ones in them—the mothers gone ; I dug out many myself and found the young ones dead in the nests ; they were quite young—"nest young"—say about a month old.

*To the Chairman :* Breeding ceased after the dying began ; I saw no young rabbits after that. The best breeding season for rabbits is from May to about October—all the winter, in fact ; I don't know that breeding depends on new grass. In the last year or two there has been more feed than there is just now ; the summer before last, I remember, rabbits were breeding all summer.

*To Mr. Tabart :* We shear here in August ; I saw the stock at shearing for a month or so, off and on ; the stock was thoroughly healthy. I took fat sheep away from here myself, last winter. I have seen nothing to cause me to suspect disease among the stock up to now ; I have been about among them, and seen them in the yards also, while the rabbits have been dying. I was on Tintinallogy when sheep were put in "the bend," and helped Mr. Butcher to inoculate them ; it had no effect on them ; I also helped to inoculate rabbits ; these rabbits died very soon ; they showed the effect in twenty-four hours. In my opinion the wholesale destruction of rabbits on Tintinallogy is due to disease. The state of the pasture all this time was very good, and the stock were fat ; from this, the natural inference would be that rabbits would also be fat. During this time, while grass was plentiful, I noticed rabbits were barking shrubs. I have seen the stock on Billilla Run ; they are perfectly healthy ; rabbits have died on part of that run from same cause, I believe, as on Tintinallogy ; rabbits were very thick there, and now there are hardly any. I cannot say if the disease in the rabbits is extending northward ; on Billilla, about 10 miles back from the Darling, rabbits seem healthy. Rabbits inoculated with this disease, have, to the best of my belief, been enlarged on different portions of Tintinallogy ; presumably from that, the extension of this disease is, I think, caused by infection. Since December, fat sheep have been sold off this run ; I forget exactly the number, I think about 13,000 ; these were all real good stores ; plenty of people would call them fat sheep. Fatality among sheep would not, I think, be caused by barking ; on the barked country back from this, on Terrawinia and Billilla, I saw no dead rabbits. I don't think they have migrated from Tintinallogy elsewhere.

*To the Chairman :* I cannot say if diseased rabbits have been carried from here to anywhere else.

*To Mr. Tabart :* I have never been on Weinterriga Run for twelve months ; Tintinallogy and Billilla are the only two places I have noticed the disease ; I have not been on any other for several months. To introduce this disease on a run where sheep were, I would not consider unsafe ; I would not have the slightest hesitation in introducing it on such a place.

*To the Chairman :* I never saw fat rabbits die with this disease ; all I have seen die are more or less wasted ; the young ones seemed to die very quick.

*To Dr. Wilkinson :* I should say, not long after they come out of the burrows.

*To the Chairman :* The rabbits that died in confinement were also equally emaciated ; I never saw any die in good condition. If a fat rabbit were inoculated, I hardly think it would die in good condition, they wasted away so quickly.

*To Dr. Wilkinson :* I have seen rabbits perfectly healthy and fat inoculated ; those rabbits always became rapidly thin and died ; I never saw any that withstood the inoculation ; I have seen four or five per day die in the crates ; scores of them altogether I have seen die so.

*To Mr. Tabart :* By placing rabbits in a certain particular hutch in the camp, which was considered infected, they always became infected and died. There were only two or three rabbits put in that hutch that did not take the disease. Previous to placing them in that hutch, they had not been inoculated in any way. They were caught and placed in the yards for four or five days to make sure they were healthy and unhurt before experiments were made on them.

*To the Chairman :* Some of these were tame rabbits ; by this I mean, rabbits that had been some time in hand ; the two white rabbits in the camp now, like all the others used, were caught wild on the run.

*To Dr. Wilkinson :* There were experiments made tending to show that, by a certain method of inoculation, rabbits could be protected from the disease ; they were given the disease in a very slight form by a certain method of inoculation, and, after that, they could not be made to take the disease by inoculation ; I do not know whether such rabbits were tried by being placed in the infected hutch.

*To the Chairman :* The confined rabbits never bred, I think ; some which were in young when caught had young ones in the hutches. The appearances I saw of the disease were, that they got watery about the eyes and nose ; the hair looked rough and set up, it did not fall off ; there was no scab, and no purging, though at first I saw a few here that had scabs on them ; when sick they neglected their food, whatever we gave them ; they had plenty of green feed as well as dry—cabbages and lucerne among other things. This neglect of food began about two days after inoculation ; the food at any rate, if they did eat it, did them no good.

*To Mr. Tabart :* The first two sheep inoculated were under observation for two months, and showed no sign of disease. The next lot were in while I was away ; they were a long time in "the bend," fenced in there with netting, where the rabbits were dying from disease, and were occasionally brought in and examined ; they showed no sign of disease ; they were afterwards turned on the run among the other sheep.

*To Dr. Wilkinson :* After inoculation, the inoculated rabbits were generally put in a hutch together, five or six being usually inoculated at a time ; I could not say if any rabbits were kept for a very long time in the experimental camp without being inoculated ; I think, however, that some were kept three or four weeks. We kept healthy rabbits in the yard a fortnight or more, at any rate ; I never noticed any of these healthy rabbits contract the disease spontaneously, without either being inoculated or being put in the infected hutch ; I remember, in fact, no single case of that kind.

*To the Chairman :* The rabbits used for the experiments were dug out of burrows on the run, or driven into V netting-yards ; they were taken where we thought they would be most healthy. They were then so thick that we could get twenty to thirty in a burrow ; they were shallow burrows mostly, running along close to the surface of the ground.

*To Mr. Tabart :* I find now, on the burrow country on Tintinallogy Run, that the burrows are silting up ; they show no signs of workings, and their condition demonstrates that no rabbits are there now ; I notice the same thing on parts of Billilla Run, where rabbits used to swarm in thousands.

## ALBEMARLE STATION.

MONDAY, 28 MAY, 1888.

*Present:—*

*New South Wales:* W. C. WILKINSON, Esq., M.D., M.P.  
*New Zealand:* A. DILLON BELL, Esq.  
*Queensland:* JOSEPH BANCROFT, Esq., M.D. (Chairman).  
*Tasmania:* THOMAS A. TABART, Esq.

Nicholas Sadleir, general manager of Albemarle Station, examined:—

*To the Chairman:* I have been living in this neighbourhood for thirty years. I first occupied Billilla Station near here; I took that place up from the blacks in 1858. Rabbits first appeared here about four years ago, and kept increasing up to October, 1887; during this time they were regularly trapped and dogged; trapping still goes on, and we also use dogs, and poison. We pay the rabbiters 1d. per scalp. My instructions from the owner are to leave no stone unturned to destroy the rabbits. I think if we had not trapped so much we would have lost more feed; but as regards the number of rabbits we should have been in the same position now without any trapping at all as with all we have done. I think that for this reason—that if we had not trapped, rabbits would have increased more rapidly, and the present destructive conditions of disease would not have occurred. Of course I don't know whether it is disease or not, but something is killing the rabbits in a natural way. I would not favour leaving rabbits alone; we must destroy them to save our feed; I would not leave it to natural operations. My experience is that natural loss of rabbits never occurs until certain undesirable conditions occur on the run which it is our interest to avoid. There was no apparent decrease from trapping; wire-yarding, and traps round tanks did however, decrease them; the poisoning by strychnine was the most effective plan of all; it showed results; it cleared the rabbits off largely. No other means showed really important results.

*To Dr. Wilkinson:* I don't think trapping has tended to increase the rabbits. The trappers, I think, have worked faithfully enough; they don't breed rabbits, or deliberately increase them, I believe; but, of course, they will not catch young rabbits, unless you pay them well for it; you cannot blame them for that, I suppose.

*To Mr. Tabart:* I think trapping spreads and extends rabbits; that, I think, must be so, because it is only these last four years we have had rabbits here, whereas eighteen years ago there were rabbits on the Murray; they were as thick there then as they are here now. Rabbits did not seem to work up north at all till the last four or five years; when we heard of them 50 miles off here they were already here too; I attribute this quick spreading to the Murray people working so actively just at that time. The country came into the hands of new people from Victoria, who at once started to destroy the rabbits. Whatever disturbing influence you bring to bear on rabbits scatters them; trapping does this like other means, not pre-eminently so. I except the method of fumigation; that does not disturb, and, therefore, does not spread rabbits.

*To Dr. Wilkinson:* They warren here a good deal; a good number in the same warren some places; in others, few; it depends on the natural features of the country.

*To Mr. Tabart:* I see a great decrease lately in rabbits on Albemarle. I attribute this to want of proper food. The rabbits have died, but I don't think all that have disappeared have died; I do not see so many dead ones as would account for the great decrease; I know however that the holes are full of dead rabbits. I have heard rabbits have been dying in this district from disease, and I think those I have opened are not healthy; I think their stomachs and livers are diseased. I have lived on other rabbit country before this. I have heard of rabbits dying in Tasmania, at Ellenthorpe. I think they died there from bad food. The sheep on this run are all thoroughly healthy. I believe you can breed disease in sheep here as well as in rabbits, by putting them on the same country where the rabbits got unhealthy, and keeping them there. What I mean is this, if you keep sheep on certain food continuously they breed a fatal disease; I think under such circumstances they die from anthrax. They die like that from the description I have heard of anthrax. I don't consider phosphorus poisoning any good here, and I think therefore, that distributing-machines for such purposes are useless; I have used them, and followed regularly on their tracks, and that is my conclusion; We have more sheep on this run now than we had in 1887—only 3,000 or 4,000 more; the sheep are healthy, and the rabbits are dying; and I would not be able to infer from this that the sheep have starved the rabbits. I think the rabbits are dying because they are eating scrub. The past twelve months has been as good a season as we ever had on the Darling—an unusually heavy rainfall floods, in fact. Four and a half rabbits will eat as much as a sheep; this was ascertained by careful experiments made at Tintinalloy. Ever since rabbits became appreciable in number no stock have done really well.

*To the Chairman:* Rabbits breed in winter, from April in average seasons, and breed on till the grass gets dry, ordinarily till October or November, but in a drooping season they may breed all the summer. There was a heavy rainfall in December last year, and the rabbits started making nests, but I have no record of any young being found in them; many nests were dug out, without any young ones being found; actual nests—does' nests—I am talking of, not mere burrows. The instinct of bringing forth the young and preparing for them was manifested, yet no young seemed to come.

*To Dr. Wilkinson:* Lately, though I have seen no young ones, I have found does in young.

*To Mr. Tabart:* The external appearance of the affected rabbits is that they are emaciated and cannot run; when you see their internal organs, you can easily see that such rabbits could not run, the organs are so congested. I have experience in wire-netting, but have not made comparisons much. We use 3 feet 6 inch netting—sometimes it is 1½ and sometimes 1½ inch mesh; I think 1½ sufficient; young rabbits can get through it, but I do not think they do; I consider 1½ safe enough. My cultivation paddock, so fenced, kept all rabbits out; I am using now 42-inch netting, some 1½ and some 1½ inch mesh; I consider them about equally good; I have made no comparison as regards height, having never used or had any experience with 36-inch net. We intend netting the entire run by paddocks successively, lifting the

the netting from the cleared ground behind us, and advancing it further on. Subdivision is essential to dealing with rabbits by wire-netting; if ring-fenced only, such an area as this, 75,000 acres, could not be effectively dealt with—in fact it would be pure waste of money; the smaller the paddocks the better. If it were proved that what is destroying rabbits on Tintinallogy is an infectious disease, I would not fear introducing it here; we have it, in fact; I believe, however, it is produced by the food.

*To the Chairman:* A very similar disease to the present one—in fact, identical, so far as I can observe—has displayed itself on this station during the summer in previous years; but as those seasons were unusually good, and the feed abundant, it did not last long, and the rabbits seemed to get quite healthy again. I think the food being abundant keeps the disease away. At the present time, since the rain a fortnight ago, the rabbits are becoming more active and getting quite strong; they cannot be caught so easily now as before; before the rain the dogs could catch forty to fifty in a day, whereas now, by the time they have caught two, they are exhausted by the run.

## ADELAIDE.

FRIDAY, 1 JUNE, 1888.

*Present:—*

*New South Wales:* W. C. WILKINSON, Esq., M.D., M.P.

*New Zealand:* A. DILLON BELL, Esq.

*Queensland:* JOSEPH BANCROFT, Esq., M.D. (Chairman).

*Tasmania:* THOMAS A. TABART, Esq.

Frederick Langloh Parker examined:—

*To the Chairman:* I have had experience at Darling (Block D) in 1878, when rabbits first appeared; since then on borders of South Australia and New South Wales; the station is called Buckalow, and contains 388,000 acres. I have seen rabbits dying in May, 1888, on Buckalow, for the first time; I was there in November, 1887, when the country was swarming with rabbits. In May I saw very few alive, but hundreds dead everywhere; those left were so reduced that they could be caught with the greatest ease. I never saw this before on the Darling, or anywhere, nor have I heard of it before. There were sheep on Buckalow. In 1881, when I bought, there were no rabbits there; I inspected it in June, 1881, and found no rabbits there; rabbits began to appear there in 1883, and constantly increased, in a regular wave, up to November, 1887. Buckalow is now comparatively clear; men could not make wages at 2s. 6d. a scalp, yet the Government threatens to summons us unless we put on men at once. The few remaining rabbits are weak—one out of five is fairly strong, four out of five are miserable weak crawling objects; I could discover no disease, but a wasting away; I know of no diseased rabbits having been brought there; I have heard reports that some have been brought on to neighbouring stations.

*To Mr. Tabart:* The feed is (where sheep have been running) very bad—very much reduced; but a few miles from water it is very good, the sheep mostly keeping near the water.

*To the Chairman:* Rabbits are more about the water than far out. I inspected the back part of the run, which was well supplied with food; there were rabbits there, but not so many as near water. The deaths are as numerous on good feed country as elsewhere. Rabbits are also caught in bushes sometimes, and so killed.

*To Mr. Tabart:* There is a good deal of bush on my country. Rabbits eat the bush a great deal—in fact, up to 9 feet high; sheep eat the same bushes, but do not bark them as rabbits do. The sheep are in fair store condition there; the only deaths are the usual ones of old sheep—the usual percentage only—and some deaths occur from the unusual distance they have to travel for water; I don't think it possible for sheep to starve rabbits; rabbits, on the contrary, will starve sheep.

*To Mr. Bell:* I noticed rabbits barking trees two years ago, and did not know what was doing it; it was not so extensive as now; I noticed no rabbits dying then. The shrubs being barked then were just the same as are being barked now.

*To Mr. Tabart:* I believe the cause of death is disease; the symptoms seem the same as Dr. Butcher describes about his diseased rabbits at Tintinallogy. Tintinallogy run is about 100 to 120 miles away from mine; my stock are not suffering from any disease. Knowing what I do of it, I would not hesitate, if this is a disease, to introduce it among my stock—not in the slightest degree, though I have valuable stud flocks there. I am satisfied that my country cannot be cleared by present known means without dividing into small paddocks with wire-netting.

*To the Chairman:* On the Darling (Block D Station) rabbits were not so thick as at Buckalow; there are some there now.

*To Mr. Tabart:* I had trappers on Buckalow. In November, 1887, they were killing 100 a day each, at 3d. a-piece; in 1883 I gave 2s. 6d., then 2s., and downwards to 6d., 3d., and 2d. per scalp. According to the boundary-riders on Buckalow, the rabbits there are beginning to breed again; for certain reasons, this statement may be received with caution, still, it may be correct. Rabbits do not breed in the dry season.

## SECTION IV.

EVIDENCE concerning the mortality among Rabbits in the Wairarapa District (N.Z.), given by Mr. Coleman Phillips before Dr. Wilkinson and Mr. Dillon Bell, Members of the Commission.

## GENERAL STATEMENT MADE BY MR. COLEMAN PHILLIPS.

IN 1883-4, finding that our poisoning operations with phosphorized grain were not successful in coping with the difficulty, I determined upon calling my neighbours together to devise some further measure of relief. The neighbouring runholders met and agreed to form a voluntary association for the district. We agreed upon simultaneous poisoning during the winter months, and subsequently upon turning out the natural enemy—chiefly the ferret. The runholders of the district sent me application for some 1,200 ferrets, but one runholder preferred to obtain some stoats and weasels. I think that gentleman obtained some 300 of these animals from England.

It was at my earnest wish that the turning out of these animals was assayed as a general experiment. Previously three of us had been breeding and turning out the ferret, and two or three of us the cat. We found that cats did good work, which they still continue.

Being empowered to proceed I began the purchase of all the ferrets obtainable, and distributed them as freely as I could amongst the runholders. I could not at first obtain many—not more than 100—but these were kept to breed from. Subsequently more were obtained. There may have been turned out up to 1887 some 600 ferrets, 300 stoats and weasels, and 300 cats. We had, of course, all been using dogs in hunting. I should think that some 400 dogs were used; perhaps more. The South Wairarapa district contains over a million acres.

In 1886 signs of disease appeared amongst the rabbits, but little notice was taken of it. Some were affected with bladder-worm, some with liver rot, and some were scabby. Early in 1886 I had noticed that my rabbit-keeper's dogs were looking mangy, and mere skeletons. I told the man that he should keep his dogs in better condition. His reply was "that the dogs were so badly infested with worms from constantly feeding upon raw rabbit that he could not keep them in better condition." My reply was that I had noticed a neighbour's pack of dogs looking in much better condition, and that I would inquire into the reason. Upon inquiry I learnt that these dogs were given areca-nut to expel the worms. I consequently insisted upon my dogs getting this medicine also. To this accident I attribute the great subsequent spread of the disease around and upon my run.

In 1887 the combined operations of simultaneous and proper poisoning operations, the turning out of the cat, ferret, stoat, and weasel, and the spread of disease, produced a remarkable effect upon the pest. The rabbits disappeared like magic. We could scarcely credit the great fact that the pest had been conquered. In three years our operations had succeeded; and as I write now, towards the latter end of 1888, the fact remains that the South Wairarapa district is the first large district in the Australasian colonies which has succeeded in conquering the pest.

It may be said from the above facts that the natural enemy did the work and not the disease. There is a great conflict of opinion among the runholders themselves in the district about this. Some think that the simultaneous and proper poisoning operations did the work. Others that the ferrets did it. Others that there was some other cause, *perhaps* the disease. Few joined with me in thinking that the disease was the *summum bonum*, combined with the natural enemy and the poisoning operations; that one depends upon the other, but all require to be used.

I pointed out that under disjointed poisoning operations poisoning was of no avail whatever. Year after year we had been poisoning and I had personally sent home about a quarter of a million skins. One of my neighbours had sent almost that number from his run in one year. And it will be seen from the last report (1888) of the Chief Rabbit Inspector for New Zealand, that from the South Island of the colony some twelve million skins were sent away last year as the result of poisoning operations, *and that the rabbits were still as bad as ever*. At the present time we do not send away a single bale of skins from South Wairarapa. Surely, then, it cannot be said that poison is effectual.

As to the natural enemy. Many of the rabbit-keepers say that the ferret does little good. They are delicate and die off quickly in bad years. They are not an animal strictly of the *fera natura* (wild nature), like the stoat and weasel. Nor do they kill for the mere sake of killing. I know for a fact that ferrets and rabbits often occupied the same warren when the pest was at its height. In my opinion the ferret eats a certain number of the young ones, but its chief duty is to kill by its intestinal worms, which infect the grass and so kill off. The great use of the ferret is that it is an admirable distributor of worms. That it sometimes dies off rapidly is its highest recommendation to us in Australia. For it is of no use to us in large numbers, when it *has* cleared away the pest in any district. I would rather be constantly turning out a few ferrets upon say 20,000 acres of land, than have to be sweeping off a swarm of ferrets. Not that it would be at all difficult to clear that 20,000 acres of ferrets. That could be done by trapping in about a month with one man. But then there would be the danger to the neighbouring lands. I have no wish to infest the lands of Australia with a worse animal pest than the rabbit.

I scarcely like entering upon the scientific side of this question. My opinion is that we shall get little help from the men of science. I say this with all respect, but I think I have good reason for saying so. Professor Thomas, one of the most able biologists in the colonies, I believe, visited the Wairarapa and failed completely to see the beauty of nature's working—this conquest of a pest by means of a worm. His visit occupied ten days, and his reports contain scarcely a word touching the excreta of the ferret or cat. Sir James Hector, on the contrary ascribes to this disease its full credit. That gentleman very properly instances the fact that the great North American Continent is kept free from a rabbit pest by means of this very disease. M. Pasteur takes no notice of the disease, but wishes to use chicken-cholera  
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The question arises, then, as to whether there is not a higher law than the minute investigations of scientists, which may result one way and may result another; whether the disease that swept off the rabbits upon Tintinallong run, the rabbits in South Wairarapa, the cats near the Darling River, the rabbits in Green Island in Otago, and in one district in Tasmania, may not be one and the same; whether the Commission itself has been right, I make bold to say, in taking the course it has done in its investigations; whether it should not have taken a wider view.

And what is that view? The honorable members of the Commission must pardon me if I speak confidently, perhaps too much so. My excuse is that I occupy the curious position of having passed through and conquered the pest, and that I can now look back and think in the widest sense of the forces which have been at work. Let me suggest the widest view from a map of the earth. Let me point to the great continents of North and South America, Europe, Asia, and Africa. Is there any rabbit pest in any of those places? We hear of none excepting in North America. There at the present moment, the rabbit is crossing the frozen Snake river into Oregon in millions. But what does Sir James Hector say? That every few years these rabbits are swept off by this very disease which I am now attempting to describe.

Again in A.D. 1 the inhabitants of the Balearic Isles in the Mediterranean petitioned the Emperor Augustus for relief against a plague of rabbits, and the emperor sent two legions of the army to repress it. Some persons had doubtless introduced a few rabbits into these insular places, and there was no natural enemy to check their increase.

Again in the 15th century after Prince Henry of Portugal had discovered the islands lying off the western African coast, and sent colonists there, and sheep and goats, and doubtless rabbits, the inhabitants complained of a plague of rabbits. Here, again, an insular speck of land cut off from the inroad of the natural enemy.

So in New Zealand and Tasmania and Australia. We introduce the rabbit, but how have we introduced the natural enemy? Scarcely at all. Practically only in the South Wairarapa district of the North Island, at my earnest suggestion, and what has been the result? The rabbit has disappeared there. It really matters not very much whether the natural enemy actually eat up the rabbits or whether their excreta diseased them. I say, from what I saw, that the latter is the highest good. The fact remains that the rabbits disappeared which they did not do under the poisoning operations.

Has, then, this honorable Commission been right in the narrow course of view it has hitherto adopted, in this total neglect of historical precedent?

I may not be justified in thus venturing to criticise the work of the Commission. But I cannot help pointing out the value of historical precedent in such a question as this. The Balearic Isles, the Islands off the coast of Western Africa; Tasmania, New Zealand and Australia, were and are insular lands separated from the main continents. Rabbits were liberated in those islands and they soon multiplied and became a pest. They would not have become a pest had the natural enemy been liberated with them. On the great continents history is silent as regards any pest, save that Sir James Hector states that from his experience in North America, the jack rabbit does assume the pest form there. (A great distinction exists between the rabbit as a mere animal, and the rabbit as a pest. It is the pest form only with which I am now dealing.) But what follows? Owing to the existence of the wolf, fox, wild cat, prairie dog, other dogs, ferrets, stoats, weasels &c., &c., in North America, the pest is every few years swept away, and the land is strewn with millions of the dead rabbits. So virulent appears the bladder-fluke or worm-disease there, when it does break out, that few rabbits are left alive. Sir James Hector says indeed that his party were almost starving in consequence of their having relied upon catching rabbits for food. I fancy that the rabbits were only reduced to the "minimum of safety." Nature does not entirely exterminate. As a mere animal, the rabbit is useful to man. Sufficient rabbits will escape any disease and breed up afresh.

The question follows, how is the pest cleared off—how comes the land to be strewn with the bodies of the dead? In my opinion the answer is simple. It is a mere repetition of the history of the fluke in sheep. The land becomes thoroughly infected with the eggs of the bladder-worm. For as the rabbit increases in numbers, so do the natural enemies increase theirs, and congregate, and by their excreta thoroughly infect the land. Then some favourable season comes, like the seasons favourable to sheep fluke, and the rabbits die by the million. In England, quite of late years, the sheep have died off by millions. To understand the bladder-worm the Commission should also understand the history of the sheep fluke.

One corollary and one only follows: That the natural enemy *slays by its excreta, and not by directly killing its prey*. I regard the economic arrangement as beautiful in the extreme. Furred and hairy animals are of use to man; therefore they are here. But the majority of these very animals are the living machines which distribute the worm that sweeps off others of them. I would therefore advise station-owners in Australia at once to recognize this great principle. To give their sheep and cattle dogs, where there are no packs of rabbit dogs, raw rabbit to eat, and nothing but raw rabbit. Soon the dogs will become full of worms from constantly living upon this one food. Then, when they get thin and mangy looking, let two monthly doses of areca-nut be given them. This will cause large portions of the worm to be excreted, and the dogs will become sleek again. Their ordinary work will not at all be interfered with, but in all the damp spots of the continent, where these dogs visit, there will the segments of the tape worm be deposited, and millions of eggs will quickly infest the grass. I would rather that small packs of rabbit dogs were used by station holders for this purpose, than their sheep dogs interfered with. But it is essential to spread the worm as quickly as possible.

Areca-nut is a cheap medicine, a shilling's worth goes a long way. We use it in my district, use it as follows:—Take as much as will lie on the point of a sheath knife to half an inch back, mix this up with some butter, spread the butter over some small pieces of mutton and give these to the dogs. Unfasten the dogs next day and take them immediately to any damp lands. Hold them there for a little while and then examine their excreta. Fine long thin segments of the worm will be found wrapped round and round the lumps. Each of these segments, and there may be 50 to 100 in each long thin piece, contains a male and female organ, which stocks the segment with from 1,000 to 2,000 eggs. Each segment separates itself and possesses the independent power of wriggling into the grass, there dying (much after the manner of the female spider and its eggs), the eggs becoming liberated and washed all about by the rain. The rabbit comes along, eats the grass, and the eggs find their proper host, and form the bladders. But the dogs must be allowed to become thin before the areca-nut is administered, for if it is expelled too quickly, the segments of

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the worm are immature and not properly stocked with eggs. The dogs should be fed upon raw rabbit for a year at least, until they do get thin and mangy looking. The bladder upon the rabbit which I gave Sir James Hector, and which is now at Rodd Island, has increased very much since I caught it, but it does not appear to be in so vital a part as others we have caught, or that rabbit must have died. The disease is often most hideous. I have seen the bladder come between the hind legs, and not a sign of the genital organs left. That rabbit naturally soon died. I have again seen it internal, upon the ribs or diaphragm, pressing the heart, liver, and lungs out of all shape. That rabbit soon died. The bladder appears to come anywhere, but wherever it appears there it grows into a hideous sore. I should think that the rabbit upon Rodd Island would soon begin to dwindle away and die. For that bladder, even upon a safe part of the body, where none of the internal organs are affected, as it is, must naturally sap the vitality of the animal. When the rabbit disappeared, my men noticed many dead animals upon the run, which were not killed by poison, gun, or dogs. They were usually mere skeletons, and many rabbits were caught mere skeletons, not having the strength to get away from the dogs. I will of course send over some more of my rabbits, but I have so few left, and it is so difficult to get specimens of the disease, when a run is clear and the minimum of safety reached, that your honorable Commission must not expect good results from me. It would be better to ask the New Zealand Government to forward some for experiment from one of the newly-diseased runs on the South Island.

I mean by this, from some of the runs in the South Island where the disease is beginning to show itself. For I have been distributing my diseased rabbits and dogs about, and people are beginning to adopt the measures I have been urging them for nearly two years to adopt. Ferrets, stoats, and weasels, are to be turned out, and the dogs will get doses of arca-nut. I indeed began confining fluked rabbits for my own experiment about a year ago; but so many persons asked me for specimens, that I gave them away. Now, all that I can do is to catch what rabbits I can off the known fluked portions of the run and send them over, bladder or no bladder. These should be killed. Small bladders, the beginning of the disease, will be found in perhaps half of them. But it takes some months to develop, and death of course will depend on the locality of the bladder. We know the fluked spots of the run, which always appear fluked.

And I desire to say that I have never claimed that this disease will effect a hasty sweeping off, or sudden extermination of the pest. It appears rather to be slow, but effectual. It may only be intermittent, as Sir James Hector says, but it appears certain in its work. The way to properly test it would be this. To let me take a million acres of the worst infested land in the settled districts of Australia. Let me there adopt exactly the same measures as I adopted in my own district, and in three or four years the result would be certain.

The landowners would, I suppose, carry out, as well as they could, the regulations I would suggest which would not be one-fifth as expensive to them as their present system of poisoning. To let me have also a million acres of the worst infested Crown lands, and the Government to carry out the measures there that I would suggest.

As to poison. Poison is quite ineffectual. It is an annual waste of money.

As to rabbit-netting. I cannot help saying that rabbit-netting is a most expensive remedy in any shape or form. I once thought that New South Wales might be netted in with advantage, because I was unaware of the fact that the rabbits had crossed the borders. But now they are across the borders, rabbit-netting can be abandoned as a mere waste of money in Australia. The province of Canterbury in New Zealand is trying to net itself in. It will not succeed; but it has already spent some £60,000 towards the fence. The 30,000 ferrets which the Government have advertised for and will turn out shortly there at a cost of about £15,000, will be of more effectual good than a dozen such fences. (This advertisement upon the part of the New Zealand Government is an entire concession to my plan and process of reasoning and an admission that past measures have been futile.)

Not that the ferret is the proper animal for the Government to turn out in New Zealand, but it will still do the good I say. The ferret is too delicate for the snowy lands of the South Island and dies off too quickly. The stoat, the weasel, and the polecat are the proper animals to get for snowy lands. In Australia I should think the ferret would answer, but stoats and weasels may have to be tried. Nature especially changes the ferret into the stoat so that it may follow the rabbit even to the poles. The jack rabbit is found far north in Behring's Straits.

But this offer to clear a given tract of country in a certain time brings me to this important feature that certain principles of action must be accepted and adopted. I will briefly refer to what I deem these principles to be:—

1. The recognition of the fact that settled districts must be treated differently to unsettled Crown districts.
2. That the rabbit has two forms. (1.) The animal form useful to man. (2.) The pest form.
3. The recognition of the minimum of safety maxim above referred to. That is, that the rabbit cannot be totally exterminated.
4. In settled districts the recognition of the principle of voluntary suppression—to let the district suffer until the settlers take measures for their own relief.
5. The principle of voluntary combination amongst settlers.
6. Rigid inspection either by Government or local officials.
7. Trapping to be made a penal offence.
8. The inutility of rabbit-netting. Nature did not use rabbit-netting to keep down the rabbit pest upon the great continents. It ought perhaps to have done so, but it preferred otherwise.

I should like also to have permission to send over a box of half-a-dozen ferrets immediately, and for the Commission to turn out those animals in the worst infested land and note the result. I remember the Hon. G. M. Waterhouse turning out half-a-dozen ferrets, in my district so far back as 1877-8 and it was surprising how the little animals increased and multiplied.

I think also that a certain number of bladder-wormed rabbits should be got over from New Zealand and fed to the dogs, say at 50 miles distances, in badly infested places, so as to start the disease fairly, in case it does not break out by itself. When once started it will always remain. Rose, writing in 1837, states that the Norfolk warreners in England prick the bladders, expel the seed eggs, and then send the rabbits to market. This shows that the disease has been constant in England for centuries, and proves another thing: that it is not at all harmful to man, else we should have heard of many cases of hydrophobia in England.

England from eating these rabbits. In Australia, owing to the constant eating of mutton many cases of hydatids have occurred and are still in the hospitals. I think it will be better for people not to eat fluked rabbits, but the disease has not been found harmful in England.

In saying that I should like to adopt my plan of suppression upon two separate million acres of land, it is because I have more faith in my proved past measures of relief, than in observations to be taken at Rodd Island. Of course, I wish the course of the disease to be thoroughly investigated at Rodd Island. The scientific gentlemen in charge there may indeed be enabled to suggest a more virulent form of action for the disease and a quicker method of propagation. Professor Thomas told me he thought he might effect that, but that scientist is so much engaged in other duties that he could only give about ten days, as I have stated above, to investigate this important matter. This was not sufficient, and proper observations can therefore be taken at Rodd Island, if it is possible, to obtain the same conditions there as upon a wider area. Wolves, foxes, dogs, cats, ferrets, stoats and weasels are living machines for spreading the disease naturally over a wide area like M. Pasteur wishes to spread disease artificially. Then animals go where man rarely, if ever, goes.

And I would say this, also, with all respect—that I have never believed in M. Pasteur's remedy, as it is opposed to historical precedent. Nature has not kept the great continents free from rabbit pests by chicken-cholera, but by the natural enemy spreading this very bladder-worm I speak about. Chicken-cholera must fail, like the poison remedy, in *ineffectuality*. It will be found useful, but not effectual. But the natural enemy is effectual at once and for ever, for it will place Australia in the same condition as the great continents. It will be found that many rabbits will become proof against chicken-cholera, as I found many rabbits proof against poisoned grain, and the pest will then always be springing up again. Nor is there any *nidus* in the Australasian colonies yet for the proper spread of such diseases as cholera, pleuro-pneumonia, and the like. These diseases start but they soon die out. They will not die out so quickly a century or two hence. Chicken-cholera can however be tried as a process of rabbit extermination, but it must be regarded as an entirely new remedy and therefore a dangerous one. I don't think that it will prove effectual, but I am not opposed to its being tried. Let the experiment be tried, just as M. Pasteur directs, upon a large scale, at a distance from or side by side with my own plan. I have no fear as to the ultimate triumph of the natural enemy. Yet, I would rather that M. Pasteur was compensated for his work, and the experiment not tried, as I am convinced that it will end in failure. Australia must be placed under the same conditions as the other lands of the earth, and one of these conditions is not chicken-cholera for rabbit pest suppression.

In the Wairarapa district and in other parts of New Zealand we have had what we thought were visitations of chicken-cholera amongst the fowls. The hen-roosts were devastated. But *all* the animals were not killed in any one particular fowl-house. Some old rooster or hen would resist and laugh at the disease. So will the rabbit. But the animals I mention are nature's machines for always laying fresh supplies of worm disease in places where man does not go. In Central Australia and in south western New Zealand there are, I believe, 250 different kinds of tape-worms fatal to various animals, *ex. gra.*:—The lung worm in our hoggets, trichinosis in pigs.

With respect to the disease being made more virulent—I would ask the Commission to abandon this idea of virulence, and to oppose the general wish that a hasty clearance is advisable—poison is a hasty form of clearance but it is not effectual. I rather like the slow way; the bladder-worm has worked with me. Of course, it is only natural that people wish a hasty clearance, but the more haste in this matter the less speed.

Let no man give up his run in consequence of this rabbit pest, as men did in New Zealand. Let him only be careful what remedies he applies. It is the application of the remedy which saves or ruins him. The grass is not ruined, although eaten almost out of sight. It comes again, when the pest has been conquered, better than ever. One of the most pleasant sights I know is the grass waving upon plain and hill-side after the pest has passed away.

And I would digress for a moment to consider the difference of climate and population conditions here, and to point out that the excess of population often leads to rabbit pests. There is more danger now of rabbit pests upon the great continents than there was when population was scarce. This results from the natural enemy, especially wolves, foxes, &c., being cleared off, and the rabbit left to increase and multiply unchecked, except by men going out hunting. Per contra, Australia has an extremely scattered population; but there no natural enemy has yet been introduced. I say this now owing to the observation often made to me that Australia is different from the great continents.

I think upon the 1,000,000 acres of badly-infested Crown lands allotted to me for clearance—if it should be—I should like to try stoats and weasels, and watch the results there. But generally for Australia I think the ferret and the bladder-worm disease sufficient. I have no wish for more virulence than what I have seen; but if it is wanted, the meer-kat and ard-wolf can be introduced. These animals partake of the fox and wolf tribe. But, as a man whose living depends upon sheep, I should prefer not to introduce these animals; to use nothing, indeed, but the ferret, which does no harm to anything but rabbits, rats, and mice, and can most easily be trapped off if so desired. Fowl-roosts suffer, perhaps, from an occasional visit; but settlers would have to be warned to protect their fowl-houses. I made my fowls roost all about upon different trees, and, strange to say, I have never had any fowls killed. As to the mongoose, I have my doubts about that animal, too.

Ferrets do not eat babies or lambs, or diminish the production of eggs. These are some of the cries that will be raised against them.

A list of measures of relief would have to be drafted for the voluntary guidance of settlers; but this list should not be allowed to be pleaded against the penal clauses of the Rabbit Acts. I think I can furnish such a list. But I must say that I have never yet met with a rabbit inspector in New Zealand competent to express a proper opinion. Such officer's duty is best confined to the mere fact of whether there are or not rabbits upon any particular place.

As to droughts—droughts will be found most useful in diminishing the number of rabbits; but droughts will not exterminate the pest. In New Zealand, in summer time, I always found that the rabbits left the hills and came down to the wet and damp places. It is, therefore, fortunate that it is these very damp places which first become infected with bladder-worm, and the rabbits then carry the disease back to the dry lands when rain comes.

Care must be taken to check the preservation of rabbits in Australia. The thing should be nipped in the bud. In New Zealand (in the Kaikouras) one settler is preserving and tinning the rabbits which he traps, and consequently traps off the ground vermin his neighbours turn out. The settler employs some 200 men in the work; and democratic members of Parliament point to this and say that it is better than sheep-breeding, where no men are employed. Of course, this one preserving staff benefits, and all the neighbourhood suffers.

I wish, of course, that all my statements should be rigidly investigated, and those rejected which cannot be fairly supported. Some are certain to be wrong. No scientific man even can tell us the proper remedies to pursue. How much more can I? My evidence may perhaps be of use in lifting the question out of the grooves of science. This honorable Commission will cull the best measures to adopt from all plans. Yet should it not hastily dismiss mine as being local to my district; for I claim that it is world-wide, and that Australia must inexorably be brought within its action.

I should be glad to know how the foxes have progressed which were turned out a few years ago in Victoria. I believe great pains must be taken in following these animals up and watching the effect of their excreta upon the rabbit.

There may be some native animals in Australia fitted to spread the bladder-worm about. This point will also require investigation.

I would, of course, recommend every runholder in Australia troubled with rabbits not to wait for Government action, but each to buy and breed a few ferrets and let them loose; to go on poisoning just the same, and to keep a book of the number of skins daily gathered and rabbits killed. The Governments of South Australia, Queensland, Victoria, and New South Wales to each start a breeding establishment and turn out what ferrets they can. (I can easily send over some of my old hands or neighbours' hands thoroughly used to ferret-breeding. It will be necessary to get men used to the work, and then the breeding is quite easy). But I should like to take a run through the badly infested country first, and then suggest where these animals should be liberated upon the Crown lands. I should like them liberated near water; for the ferret is a thirsty creature. It must get blood or water. I shall be happy to describe my ferret-breeding house if the Commission wishes to know of it. I will also send over copies of the proceedings of our voluntary association in 1883-4-5 for attachment to this evidence.

I regret that the full Commission does not happen to be sitting, so that I might be fully cross-examined. A full cross-examination would bring out many matters that I may now overlook.

The question of sheep-fluke should also be investigated. Sheep grow strong and fat under the fluke, and they are then sent to the market. But if they once begin to fall away there is no saving them. It is, or was, a penal offence in England to fatten sheep for the market by fluking them. The course of the bladder-fluke disease appears much the same to my mind as that of the sheep-fluke disease.

Settlers will find that ferrets will vastly reduce the plague of rats and mice in Australia.

No difficulty will be experienced by keeping small rabbit-packs of dogs. It will be best to let the men own their own dogs; but swapping or changing dogs should on no account be allowed amongst them. I do not like using the sheep dogs as worm distributors. They would do it, of course; but then they have their own work to do, and shepherds don't like their dogs interfered with.

There appears to be fair reason for thinking that the bladder-worm disease which sweeps off the rabbits periodically in North America is a more virulent form of the disease than I had at Dry River. It may be the tape-worm of the wolf or wild cat. Inquiry should at once be made from the United States and Canadian Governments concerning this.

Sir James Hector did not think, when I called his attention to the disease, that the tame dog or cat could distribute it; that the wild dog or cat, wolf or fox, would be required. I could only point to the state of my run for proof that the tame dog and cat could distribute it.

A curious thing happened directly I called public attention to the disease, and the matter became known. Many settlers who had been badly afflicted with the pest declared that they knew of the disease long before I did; that it was upon their runs, and they had thought little of it. Chiefly that such rabbits had been wounded only by gun shot; hence the bladders. But as to its clearing off the rabbits, that was absurd. I always notice that those people who said this had *got through their rabbit difficulty* and had reached the *safety* stage. The poison, the ferret, and the disease had worked the cure unknown to the very people whose lands had been cleared. I instance the case of the Taratahi in the Wairarapa—well known to my neighbours.

In sending over what diseased rabbits I can, I would rather that the Commission requested the Government of New Zealand to forward them on by steamer from Wellington, as I reside some 60 miles from Wellington, and wild rabbits require to be properly looked after *in transitu*.

Whether a confined experiment with the disease will work out well I cannot say. Fluke and bladder-worm require to pass through two or three stages, and one of these stages may be wanting in confinement. But it may not be. The Commission would confer a vast public good by allowing me to try the experiment I wish to try upon these two separate blocks of country; any one else can try it that the Commission wishes, but I doubt whether they will have my experience.

With regard to the present state of large estates in England and Scotland it appears to be somewhat as follows:—Rabbits, polecats, stoats, weasels exist side by side upon the same estate, and have so existed for a thousand years past. Trap off the ground vermin, as it is called, and the rabbits soon increase in numbers. A natural balance of prey upon prey appears to be attained in England and the rabbit does not assume the pest form except where there is no ground vermin. As to stoats and weasels, farmers like to see one or two about their barns, as they keep the rats away from their stacks. Other people immediately they see them kill them off as vicious. Ferrets do not exist widely in number at all. Weasels are vicious. I am not disposed to introduce weasels if it can be avoided. But the stoat might be introduced. I would prefer to work first with the ferret and then the stoat.

I should like to see the evidence that has been printed, as it will prove useful to me. This evidence upon my part is written in Sydney, and I have not been able consequently to refer to my own papers.

I have little wish to be regarded as an enthusiast. I feel certain that the remedy I now propose will eventually be adapted. It will clear any piece of country just as it cleared my district. Practically the North Island of New Zealand is now free from a rabbit pest.

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The question is of vast importance for Australia. The Commission has barely begun its labours. The experiments with M. Pasteur's remedy has, I am afraid, been only waste of time, but it is nothing but right that these experiments should have been made. I should like to visit Tintinallong run and inquire into Messrs. Butcher and Ellis' disease and see wherein it differed from mine. At present I can but regard it as a mere local outbreak of disease which died out in consequence of the natural enemy not being there to carry it on and propagate it.

To my mind there is little doubt that a wide and statesmanlike view of this rabbit question will have to be taken, and Australia placed under the same conditions as the four great continents. Had Australia been joined on to Asia by as narrow a strip of land as joins Africa there would never have been a rabbit pest here. That narrow strip of land would allow the passage of the rabbit and the natural enemy, and long since nature would have worked out its own cure.

I cannot refrain from stating here that little reliance can be placed upon the views of local rabbit inspectors. These gentlemen necessarily take a narrow view of the question. They are useful for rigid observation purposes only. The question is far wider than their ken. I well remember how my efforts were sneered at in 1884-5-6 by foolish inspectors. But it is pleasant to be able to say now that I cleared my district in spite of them, and kept good friends with them, too. The New Zealand Government is now going to follow my plans in the South Island; five years have, however, been thrown away there. I would recommend this honorable Commission to read the last report (1888) of the Chief Rabbit Inspector for New Zealand. A more lamentable display of inefficiency I think upon the part of nine-tenths of the rabbit inspectors cannot well be imagined. But we purpose altering all this, and in five years from this there will be no pest of rabbits in the South Island of New Zealand. I am sorry to say what I do say with regard to these gentlemen, but it will be well for Australia not to make the mistake, which we fell into in New Zealand, of relying upon their judgment. At the present moment, as I write, they are allowing the use of traps all over the Colony, which alone is a sufficient excuse for my speaking so strongly as I do.

Sydney, October.

COLEMAN PHILLIPS.

ADDENDUM to the evidence of Mr. Coleman Phillips.

Before leaving Sydney I wish to append to this evidence one or two points that I have overlooked:—

Firstly,—I wish to emphasize my opinion that it is very desirable for the Australasian Governments to continue the scientific investigations at Rodd Island. The rabbit pest is only in its infancy as yet in Australia. We, who have had ten years' experience of it in New Zealand, alone can tell what it means, and of its danger. I personally never took the proper and minute observations I should have taken with regard to many things I wished information about. Had I done so I should simply have had to neglect all my other work, and I could not do that. The New Zealand Government too never made those observations either, and that colony has suffered to the extent of hundreds of thousands of pounds annually in consequence of that neglect. I may perhaps be allowed to give a couple of instances of loss. Upon a neighbour's run of 20,000 acres in the North Island, which now carries nearly 20,000 sheep, during the years of the height of the rabbit pest not 5,000 were carried. In the South Island (Lake Wanaka, I believe) the steamer used to take down about 5,000 bales of wool annually from that one district before the rabbits appeared, six or seven years ago. Last year the steamer took down 300 bales; this means a loss of at least £60,000 annually to that one little district.

The observations made by Professor Thomas were altogether too hasty and incomplete. An establishment of some kind is, therefore, absolutely necessary to make, and to continue to make, for years to come, these observations and experiments which any private individual can hardly be expected to go through, without sacrificing all his other work. No matter what the cost may be, I strongly urge upon the Australian Governments the absolute necessity of keeping up such an establishment, sharing in the expense, and, for the sake of the landowners, trying every experiment which may be deemed feasible and worthy of trying. If, for no other thing, the Rodd Island experiments may have saved the Colony from the wrongful application of M. Pasteur's remedies.

I have omitted, also, to mention hawks as a natural enemy to the rabbit. In the Wairarapa, the hawks increased very fast as the rabbit increased, and they killed off large numbers of young and weak rabbits. One of my neighbours indeed thinks the hawks almost cleared her run. They certainly did a fair amount of good, and no harm, that I could see, to the stock. We had an idea, too, that those birds carried the bladder-worm about. Birds of the captive order may, perhaps, do so: eagles and the like. I should recommend landowners troubled with rabbits to get a few hawks. They will soon increase, and when the pest is conquered they can easily be cleared off from the settled districts. In Central Australia they will, with the ferret, be always doing a certain amount of good.

As to clearing them off. I have caught as many as four hawks within an hour, by tying a piece of meat to the fall of an ordinary gin trap, and placing the trap upon the top of a post near my house; fastening the trap with a piece of chain to the post.

I should therefore like the excreta of all Australian birds or animals feeding upon the rabbit examined, in order to see whether the bladder-worm and the diseases which we found incident thereto (liver rot, &c.) may not be propagated by this means also. It may be that the ferret and hawk does good only by eating off the young rabbit, and that it takes the dog and cat (to which can certainly be added the fox in Australia) to propagate the disease. We certainly always called the eggs in the bladders dog worm eggs. The hawk may consequently not carry the worm. Sir James Hector told me that only the wolf, the lynx, the fox, and the wild dog could distribute the worm. I think I convinced him and Professor Thomas that the tame dog also carried the disease. Other things may therefore also carry it. I think the cat does, and eagles may. That is why I should have liked to have known more concerning the reason so many cats died lately in one district of Victoria or New South Wales. Carrying the worm about may prove too exhausting for the cat; but that doesn't matter, providing a certain amount of good is effected.

The pity really is that we did not more closely investigate the disease in New Zealand; but, as I have said, the pest was actually conquered in my district before I called attention to the matter. In giving this evidence, therefore, I can only state the broad features of clearance which I wish applied to Australia. I cannot say for certain whether the ferret, stoat, weasel, cat, or hawk carried the disease or not; but I know for certain that the dog did. And if the dog did the good with us, surely it will do the

same

## OF RABBITS IN AUSTRALASIA—MORTALITY AMONG RABBITS, WAIRARAPA (N.Z.) 121

same good in Australia. Poison swept off swarms of old rabbits. Ferrets, stoats, weasels, cats, and hawks swept off swarms of young rabbits, and then the disease attacked what rabbits remained behind. That we all know now. Thus was the rabbit pest conquered in South Wairarapa.

I hope I shall be accorded permission to clear the piece of land I ask leave to clear in Australia. I can assure the honorable Commission of this: That my remedies did no harm to stock in New Zealand, and they will do no harm in Australia. They are simply nature's remedy—(excepting the poisoning)—slow in action, but effectual in the end. And should they be applied in Australia, as I think they must be—should they do the good that I say they will do—and should it be found that all my statements are not scientifically correct, still I shall rest content with having been able to do some little good in directing the minds of my fellow landowners towards the proper method of cure. One can but do but little good to one's fellows in this life. Each of us can but do his best.

COLEMAN PHILLIPS.

MONDAY, 29 OCTOBER, 1888.

Present:—

New South Wales: WILLIAM CAMAC WILKINSON, Esq., M.D., M.P.

New Zealand: ALFRED DILLON BELL, Esq.

Coleman Phillips called in and examined:—

1. *The Chairman.*] Did you make any observations to prove the existence of bladder-fluke in large numbers of the rabbits that died during the epidemic? We made many and constant experiments.
2. What did you find? That three out of five of the rabbits were infested with bladder-fluke; but only in certain parts of the run.
3. Have you any idea how many observations were made—did you examine thousands of rabbits? There were not thousands of rabbits to examine.
4. Then you only began to examine rabbits when they were being all cleared off? When they disappeared we began to examine into the causes of disappearance.
5. And can you say about how many you examined? I should say 100. I gave away more than 100.
6. And you found 60 per cent. of these diseased? It was only diseased rabbits that were brought into me for examination.
7. And what were the evidences of disease? Sometimes none; not the slightest evidence of disease until the rabbit was killed. The rabbits were brought in from a portion of the run which we knew was thoroughly "fluked," and we expected to find the disease there.
8. You examined about 100 rabbits? Yes; or perhaps more; and in 60 per cent. of these we found bladder-fluke. Sixty per cent. of all rabbits caught on my run are now suffering from bladder-fluke; but of course we do not catch many.
9. Have they shown any tendency to increase again? They would if they were not watched. If we did not turn out ferrets occasionally there is no doubt the rabbits would get up again. The ferrets die off and go to other places, or are trapped in the neighbouring districts; so that we have to turn out others in their place.
10. You do not know what sort of tape-worm is in the dog and in the rabbit? Yes. Professor Thomas told me the precise name, but I forget it now. I should know the name if you mentioned it.
11. Is it the *canurus*? Yes; that is the name.
12. You are of opinion that ferrets, cats, stoats, and dogs, are the means of this particular tape-worm which produce bladder-fluke in rabbits? Yes.
13. Well, Professor Thomas' experiments show that the dog is certainly the host of this worm, but have you any evidence to show that the cat or the ferret may also be the host of this particular tape-worm? Yes; the cats upon the run are almost skeletons, and the ferrets, too. A great many of them get like dogs that are fed on raw rabbit. They are mangy, weak skeletons; and I believe also these animals are full of worms.
14. But have you ever proved it? Well, no; I have not proved it. I think that ferrets and cats should be got and examined at Rodd Island.
15. *Mr. Bell.*] The scheme that you have brought forward rests principally upon the distribution of the germs of a particular tape-worm (which in one stage is bladder-fluke in rabbits) by the natural enemy—that is to say, by ferrets, stoats, weasels, cats, as well as dogs? Yes.
16. Then you are aware the truth of that statement must necessarily rest upon the question whether these particular natural enemies harbour the parasite which in one of its stages is bladder-worm in rabbits? Yes.
17. Then upon what does your belief rest that these natural enemies act as hosts of this parasite at all? Well, that we have seen the worms exist in dogs. And because it exists in the dog I am enabled to assume that it also exists in the ferret, stoat, weasel, and cat.
18. Yes; we admit it exists in dogs—Professor Thomas' experiments prove that. But Professor Thomas' experiments, so far as they go, negative the presumption that the other animals named harbour the parasite at all. Do you disagree with that? I think dogs are sufficient to spread the disease themselves. If you use sufficient dogs you can spread the disease. I really have very little faith in Professor Thomas' experiments, so far.
19. *Dr. Wilkinson.*] But he has proved what you maintain? But he has not proved what I wish.
20. *Mr. Bell.*] Your scheme involves—to use your own language—a very large dependence on the spreading of this bladder-fluke, not by dogs, but by other animals? Yes; by ferrets. And I believe that the ferret is full of worms at times.
21. *Dr. Wilkinson.*] Did you always believe that? Yes; since I commenced reading on the subject.
22. It is a wonder, then, that you did not look for yourself? I certainly ought to have killed and dissected one or two.
23. Professor Thomas states in his report:—"I found that the rabbiters were unconsciously doing their best to prevent the spread of the disease. Noticing that their dogs were infected with tape-worms, they periodically

periodically gave them medicine to expel the worm. This may in part account for the much smaller percentage observed by me." You think on the other hand that this very action of the rabbiters tended to spread the disease? Yes; by expelling the worms and the eggs in greater numbers. In reply to that I would say that after eighteen months use of the areca-nut Professor Thomas sent to me for one of my dogs infected with tape-worms. I had been in the habit of giving it regular doses of areca-nut and the worms came out regularly.

24. *Mr. Bell.*] In your view, dosing with areca-nut tends to expel a portion but not the whole of the tape-worm? Yes; I would not turn out a single ferret in Australia if a sufficient number of dogs could be used; but still I think the ferret is far preferable to the dog. Dogs are such enemies to sheep and ferrets are not. The dogs sometimes go wild amongst the sheep.

25. Why do you prefer the ferret? Solely because it is not dangerous to sheep.

26. *Dr. Wilkinson.*] But you will admit that a ferret is no use unless it can be proved that it harbours this particular tape-worm? Yes; they are useful. Besides they are an important factor in killing young rabbits, though they do not kill the old ones.

27. *Mr. Bell.*] You expressly state in your evidence that the natural enemy is of value by virtue of spreading the bladder-worm in much greater proportion than by any direct means. And you then say that you greatly prefer the ferret to turn out, though you admit you are quite unable to say whether the ferret spreads the worm or not? I believe it does.

28. But you have no grounds for making that statement? No. Where the ferret especially comes in—besides the spread of disease—is that, after poisoning (which kills the old rabbits), the ferrets then come in and eat the young ones. Then the disease attacks the old ones again.

29. *Dr. Wilkinson.*] In your written statement, I notice that you seem to lay particular stress upon the use of ferrets? Yes; but dogs would still require to be used. I should like to see sheep dogs used.

30. But you think the introduction of a large number of ferrets is a most important step for the destruction of the natural enemy of the rabbit, the bladder-worm? I wish to make this as an assertion. On the central lands of Australia some disease is wanted—periodically acting of itself, to clear off the rabbits, as cleared off on other parts of the earth, before they become a pest. If you turn out a sufficient number of ferrets to go through the whole of Central Australia they will keep the rabbits in check. This is on the same principle, and I will be very sorry if I cannot prove it.

31. *Mr. Bell.*] You are aware that Mr. Bullen's run in New Zealand was understood to have been cleared by the turning out of a large number of ferrets? Yes; it was cleared once by turning ferrets out, but the rabbits have come there again.

32. When it was cleared, was the work done in your opinion by the outbreak of the bladder-fluke? No. Bladder-fluke never appeared there that I am aware of.

33. Your opinion is that by turning out ferrets rabbits can be cleared off, without bringing in the question of bladder-fluke at all; but would not the rabbits be liable to reappear unless they were kept down? Yes; but unless the bladder worm disease appears the ferrets are not effectual.

34. But I understood you to say that ferrets were effectual in this case? I meant to say totally effectual. They may be effectual for a time, but not permanently.

35. You ask to be allowed to clear a million acres of infested country in Australia? Yes; under the Colonial Secretary and the officers of the Government.

36. *Dr. Wilkinson.*] I do not think that is possible. [No answer.]

37. *Mr. Bell.*] You rely largely in all your conclusions upon what you call historical precedents? Yes.

38. Now what evidence have you that bladder-worm was at work in any of the historical instances which you cite? North America and England.

39. But what evidence have you that bladder-worm was at work in these cases? Rose, and Sir James Hector.

40. You know that Professor Thomas differs with you in these conclusions? Yes.

41. And on this point you differ with Professor Thomas? Yes.

42. In your evidence you express dissatisfaction generally with Professor Thomas' work? Yes.

43. Professor Thomas apportions what he thinks is the greatest share in the disappearance of the rabbits to poison, disease, and other means of destruction? Yes.

44. What fault, then, do you find with that apportionment; do you think he allows too much weight to poisons and other means and too little to the bladder-fluke? Yes. I would say that poison is good, ferrets are good, and disease is good; but one depends upon the other. Disease is the finishing off of the work of the others. I think that Professor Thomas did not take sufficient time for his investigation. This is my reason for being dissatisfied.

45. Are you a candidate for the reward offered by the New South Wales Government? Yes.

46. Do you think that a ferret in killing a rabbit is likely to eat portions of the flesh of the rabbit which is infested with the bladder-worm? Yes; it eats everything to the back bone—save that in poisoning operation, I do not think it eats the intestines.

47. Does it eat the dead rabbit at all? Yes.

48. You express positive disbelief in any disease which works quickly? I do.

49. What ground have you for a disbelief in the existence of any possible disease which might work as an epizootic amongst rabbits? Nature rarely works quickly, and drastic measures appear to be avoided.

50. These are the only grounds upon which you disbelieve in other diseases than your own? Yes.

51. Are you quite sure that ferrets do not hurt lambs? Quite sure.

52. Like everybody that has tried it you hold strong opinions against trapping? Yes. I think it must be made a penal offence.

53. Now will you tell us why? Simply that it destroys the natural enemies.

54. Do you think that trapping has any tendency to spread rabbits? I think it preserves the rabbits.

55. Are you willing to procure rabbits suffering from this disease to be taken to Rodd Island and used for purposes of experiment, so that the life history of the bladder-worm may be traced out, and it may be decided what carnivorous form acts as hosts for this parasite? Quite willing; and I will send over what rabbits I can get that may be affected with the disease.

56. You condemn the investigations at Rodd Island, but in the case of your own disease, you think we ought to investigate it? I do not condemn that; I said that they were necessary. And while I think it is necessary to investigate my disease, it would be better to allow it to be tried on a large scale.

57. You will observe, however, that if tried on a large scale, by turning out dogs, stoats, weasels, and cats together, that the particular point required to be cleared up would not be decided, because such an experiment would not determine what particular animal carried the parasite? Yes.

58. Do you recognize that a mixed experiment of that kind is insufficient to determine the point? I think both experiments would be good; and I think both are necessary. There is an idea in New South Wales that the rabbits will die out of themselves; but people need not buoy themselves up with that fallacious hope, for I still watch my rabbits jealously. It would be well to have a return from every large owner of the cost of rabbit suppression. The Colony will soon find out how much poorer it is annually thereby, as rabbit suppression is a totally unproductive expenditure. Just as the natural enemy becomes spread about, so will this annual loss be reduced.

## SECTION V.

STATEMENT made in lieu of Evidence, by Mr. E. H. Lascelles, a Member of the Commission.

My first practical experience with rabbits was in 1878, when I purchased the Lake Corrong station, in the mallee district of Victoria. It was then mid-summer, and a very dry season. What rabbits were to be seen were in poor condition, and I had the idea that in so dry and waterless a country they could never take possession of it. Up to then the rabbits in the mallee had not been much talked about, the settlers keeping the matter quiet in the hope that buyers for their runs might be found. Their first start was in Morton Plains Station, on the edge of the mallee, where a few couple had been obtained from the westward about 1866; but it was not until 1876 that they began to affect the carrying capacity of that run, from which time they gradually spread throughout the mallee country, the good season in 1878 giving them a great start. Owing to the runs being held under annual licenses, expiring in 1880 (at same time open to free selection) no united action was taken for their destruction. The urgent state of the case was repeatedly brought under the notice of the Government, but no legislation was forthcoming, the consequence being that in 1879 one run after another was abandoned. The first to be forfeited and put to public tender, with all the previous lessee's improvements given in, was the Lake Hindmarsh run, which, up to 1878, paid £705 per annum for rent. By tender it brought £36 per annum. Other runs brought similarly low prices. When the leases expired in 1880, it was thought certain there would be legislation; but the Government, being strongly anti-squatting, were afraid to deal with it, and merely renewed the existing Act for a year. This state of things went on until October, 1883, when the "Mallee Pastoral Leases Act" was passed giving absolute tenure for one-half the country for twenty years, and five years' tenure for the other half. Each existing lessee was entitled to the lease of one block, and the remaining blocks were put to auction, rental being fixed at a minimum of 2s. 6d. per square mile, or if over fifteen sheep to the square mile were carried, 2d. per head was paid for the first five years, 4d. for next, and 6d. for the last ten years. For those going to auction very small sums in the shape of premiums were received, and the country fell almost entirely back into the hands of previous tenants; so that, in endeavouring to find new tenants, valuable time was wasted, with the still greater disadvantage that the new ones coming in being mostly unaware of the difficulties to be encountered, and being without necessary conveniences and plant to carry on work, practically did nothing towards the destruction of wild dogs and rabbits. This, to a large extent, paralyzed the action of other lessees; and it was not until 1885, when the Government agreed to erect a netting fence between the pastoral blocks and mallee allotments, and also gave compensation at end of leases for netting fences, that any show was made in bringing the mallee country again into profitable occupation. Since that time large areas have been netted, and these are now carrying sheep at large, dogs being practically exterminated and rabbits reduced to a minimum.

Having followed the course of legislation, I will now state my experience in destruction of rabbits. In 1879 I laid phosphorized wheat with good results, but, owing to their being no tenure, the work could not be systematically carried out, and as the neighbours were doing nothing, I had to follow suit. It may be said that practically nothing was done from 1879 until the beginning of 1884; but in 1882—owing to the rabbits having increased beyond the capacity of the country to carry them, or it may be from disease—they died off in millions. If tenure had then been settled, and netting fences erected, there is no doubt they would have been easily kept in check, but there were enough left to breed up, and when the Mallee Act was finally passed at the latter end of 1883, they were almost as numerous as ever. In the summer of 1884, I started laying phosphorized grain, chaff, and arsenic, with good results; still with the then mode of merely scattering it in heaps amongst brushwood or near burrows, no extent of country could be got over, and merely the best patches were treated. When the green grass came, very little execution was done by poison, and resort was had during the winter to trappers. At first this promised well—rabbit skins were a good price—the Shire Councils gave a bonus for scalps—so the cost was not great. Still at the end of the year, it was found that, although thinned near the favourite camps, the men had no sooner gone to another place, than they were as thick as ever. During 1884, I started a rabbit and dog proof fence, to enclose 31,000 acres, being, I believe, the first large enclosure for such a purpose. The fence consisted of about 24 miles of stubbs and 6 miles of wire-netting. Although the cost came nearly to £100 per mile, I was at once satisfied that the erection of wire-netting fencing was the best means of ensuring finality in both rabbit and dog destruction, and from thence forward my constant endeavour was to induce my fellow settlers and the Government to recognize this.

In the summer of 1885, I again tried poisoning, and seeing a paragraph in some newspaper that it was a good plan to lay the grain in a plough furrow, I tried this with great success, but thinking it involved a deal of unnecessary labour, I hit upon the idea of attaching a scarifier to the axle of a spring cart, and laying the grain in the scratch, which proved quite as effective as the large furrow. My neighbour, Mr. Andrew Anderson, paying me a visit shortly after. He suggested a hopper in the cart and pipe leading from it, to convey the grain to the furrow, which he put into effect. Ultimately, more improvements were added, making

making the present "Lascelles and Anderson Patent Rabbit Poison Distributor," which is so far, I have found, the best means of dealing with rabbits, especially during the summer months. When green grass is plentiful, rabbits require to be very thickly congregated for poison to be much taken. During this winter, I have found wheat poisoned with strychnine—2 oz. to 50 lb.—with the addition of a stick of phosphorous, gave good results; there is no doubt it is a good plan to vary the poisons, chaff and arsenic being often better eaten than wheat. I have felt for some time that the mode of mixing the wheat by the Raymond Phosphorizer could be improved upon; it involved a large amount of labour, careful watching to see that it was well mixed, danger of bush-fires from small lumps being undissolved, and, when too much water was used, the wheat would clog when going through the hopper. At the close of last summer, I came to an arrangement with Messrs. Felton, Grimwade, & Co. to allow me to mix wheat under their patent process, the principle of which is that the phosphorous is dissolved by its cheapest natural solvent—bisulphide of carbon—then mixed with ordinary bookbinder's paste in a "cherry" churn, the paste being revolved with the wheat in an iron cylinder, each grain being coated with the poisoned paste.

My manager reports unmistakably in favour of the new method, so much so that I have put aside the Raymond Phosphorizer and now prepare all my wheat by the Felton, Grimwade, & Co. process.

On the more open country in the winter months I use bisulphide of carbon, but this is too expensive to go over a large tract of country; ploughing out burrows on open sandhills is also a good plan.

When the Mallee Act was passed, wild dogs, from the pastoral point of view, were considered as the greatest evil, and to deal with these and also rabbits, by means of poisoned water, the various tanks were either stubbed or netted. Summer thunder-storms prevented the work being carried out in 1884, but in 1885 the tanks were closed, and particularly in salt-bush country great execution followed. *Vide* a letter of mine to the *Argus* dated 17th January, 1885, showing that at two tanks I had skinned in two nights 1470 rabbits. Where scrub surrounded tanks, the results were not good; showing that where bark is to be had, rabbits can exist without water. During the last two or three seasons there has been so much outside water in swamps and claypans, that there has been no chance to close the tanks during the heat of summer, and when the nights are long and cool I have found very little good is done by having water shut off.

The result of our experience in the mallee country is that rabbits can be kept within reasonable limits by present known means, but except at an enormous cost they cannot be exterminated. Each year there will be the recurring expense of a good systematic poisoning.

In certain descriptions of country where rabbits are not thick, I am a believer in dogs and traps for the winter months, but the latter should only be used by reliable station hands and not professional rabbiters.

My trip through the most heavily rabbit infested country of New South Wales convinces me that the country I passed through is fast drifting into the same state as the mallee country did in Victoria, and with the experience gained there, it seems madness not to introduce remedial legislation. In its present condition there is no chance of the country being taken up under homestead leases, and in any case on the same principle as the old saying that, "horses should not be changed when crossing a ford," it would be a grave mistake to put new tenants on rabbit-infested country. In its transition state, nothing would be done and even when possession was taken, it must be some time before the swing of the work could be got into. The advent of the rabbit has completely put a stop to the squatting tenure. Annual leases and destruction of rabbits cannot possibly go hand in hand. State subsidy is a snare, and nine-tenths of the money so expended might as well be flung into the sea. The goal to be reached can only be attained by the falling on the part of the lessee that if he is successful he will reap the benefit of his labours.

Resumptions of runs must be gradual and certain fixed notice be given—say of at least three years, and then only for limited portions, say not more than a sixth of a run at a time, so that the lessee with some years before him of the balance, would not neglect keeping rabbits down on the resumed piece. If there is no chance of the resumed areas being required, what is the object of keeping a lessee in suspense? The portion of the country that is soon likely to be wanted for settlement should be netted off, and when that is taken up, give notice for other areas, netting them in the same manner. Under present conditions the lessee who does the most to keep rabbits down, has, as his reward, the certainty that his run will be the first to go.

It will be urged that my views are those of a squatter, and that they are formed from self-interest. I can only say that in giving expression to them I have endeavoured to reconcile the three interests to be considered, viz.,—Those of the existing lessees, the homestead lessees, and the State. I have no interest direct or indirect in New South Wales squatting, and I am only actuated by a desire to see the country profitably occupied. If it is not so, it goes without saying that the greatest loser will ultimately be the State.

#### RABBIT DESTRUCTION.

Sir,

To the Editor of the *Argus*.

As further details in connection with rabbit destruction by poisoned water may be of interest to your readers, I now give these, and also other views on the subject.

For some years I have thought that in dry and comparatively waterless country like the mallee, water would prove the means whereby it could be ridded of rabbits as well as dogs. From personal observation I saw that immense numbers of the former watered at the tanks, and having had occasion during the last few years to travel over a large area of the country, I also noticed that in the summer months there were few rabbits—and these very weak—any distance from water, except about dry beds of lakes where green rushes, thistles, &c., supplied a certain amount of moisture.

When the Government passed their Mallee Bill, giving fixed tenure for a term of years, I lost no time in erecting rabbit and dog-proof fencing round my tanks, but I found that to insure a thorough trial it was necessary to make a similar fence round Lake Corrong and Yarrock Swamp, and covering together about 6,000 acres. I therefore decided on enclosing 30,000 acres, which would take in both sheets of water, and I also endeavoured to get the Murray frontage and Lake Hindmarsh lessees to similarly fence off their water, but to no avail. The timber being suitable and handy to the line of fence, I contracted for 23 miles pine stubb fencing at a cost of £64 per mile, but the contractor, before getting half through, failed to complete, and I had to carry out the unfinished portion by day labour at a cost of about £75 per mile. The remaining six miles either ran across plains or through poor timber, and on this portion I erected wire-netting

netting 3 feet 6 inches high, 16 gauge, 1½-inch mesh, let into the ground about 4 inches, and with a thick-set barbed wire about 4 inches above netting. Extra precautions must be taken with fencing around tanks both for rabbits and dogs, and I have put three barbed wires in place of the one wire round the paddock. On the completion of the fencing no animal can obtain water in any portion of my runs outside the stubb fence, but owing to an inch of rain last month, all surface water had not quite dried up over the Corrong run, when I left there last week, and it was only on Tyrrell Downs and back country adjoining there that the gates at tanks could be closed. Previous to this, 6 gallon galvanized iron troughs sunk level with the ground had been kept filled with good water, in a small sheep-proof enclosure alongside the main gate; these were poisoned with strychnine dissolved by putting into a clear bottle an ounce of strychnine with about a third of a pint of acetic acid; the latter can be obtained extra strong, when a much less quantity will suffice. It can easily be seen if the grains of strychnine are dissolved the mixture thus formed will poison 12 gallons of water.

At the two tanks, where it was known most rabbits were in the habit of watering, men were put in to skin the dead rabbits, the result in two nights being 1,470 all gathered within 100 yards of each tank. At the six other tanks the rabbits were not gathered, but the numbers varied from about 20 to 150 each night; in addition I had four arsenic troughs in other parts of the run, around each of these there were a few dead rabbits, but more scattered about; the action of the poison being slower may have enabled them to get back to their burrows, but with strychnine they were completely piled round each trough.

The wild dogs have been so thinned out at Tyrrell Downs, that although sheep are running at large, very few tracks have been seen for some time, so none were got, but at one trough of strychnine water in the back country at Lake Corrong, six were obtained in one night.

I think the results already obtained should cause each Vermin Board to use every effort to have all tanks and dams within their respective districts made dog and rabbit-proof. The Minister of Lands fully recognizes the importance of this, and at once signified his intention of affording the Boards every assistance; these will meet on the 30th inst.

No doubt the Tyrrell Downs run is a specially suitable place for the experiment of poisoned water, being principally open salt bush country, and therefore the feed all of a saline nature. Taking this into consideration it would be a mistake to discontinue laying poisoned chaff and grain, but at any rate, it may be claimed for water, that it is another known method of destroying the vermin, and if they are not got rid of during this summer, I intend making small tanks, of thirty yards each, on every square mile of country habited by rabbits. These would be logged over with a sloping side for rabbits to drink at. A simultaneous closing of these during midsummer and laying poisoned water would mean almost total extermination, as there can be little doubt, that if within a moderate distance of water, all rabbits will drink. When the mallee country was first occupied by rabbits they could stand a dry summer better than now, as the bark of dogwood, hop bush and other scrubs afforded some moisture, but these they have almost entirely killed out, and the necessity for water thus becomes greater.

Looking at the requirements of the Colony as a whole, I am certain that the crection of rabbit-proof wire-netting fencing will prove the greatest factor in getting rid of the pest. And I submit that it would be a wise step on the part of the Government if they at once offered a bonus of £1,000 for say the first 250 miles manufactured here. If this is done, I would undertake to start a company for the purpose. The duty of 27½ per cent. should be abolished. It is an industry which can stand on its own legs, being quite enough protected by the high freights and other charges on the manufactured article; thus, I imported five miles, gauge, &c., as above, costing £34 per mile in England, landed here the cost was £70 per mile. No doubt being wanted quickly extra steamer freight added almost £10 per mile. I believe such netting could be made here for £45, and at such a price a large demand would be created.

One great advantage in having even a portion of a run made rabbit proof, is that before January, the outside portion can be heavily stocked and grass eaten off, the inside portion being held in reserve when rabbits on the former can more readily be poisoned.

Yours, &c.,

EDWARD H. LASCELLES,

Chairman, North Eastern Vermin Board.

Geelong, 19th January, 1885.

## SECTION VI.

### MINUTES of Proceedings of the Experiment Committee.

FRIDAY, 27 APRIL, 1888.

The Committee met at 10.30 a.m.

*Present* :—

*New South Wales* : W. CAMAC WILKINSON, Esq., M.D., M.P.

EDWARD QUIN, Esq.

*Victoria* : A. N. PEARSON, Esq.

*New Zealand* : A. DILLON BELL, Esq.

*Queensland* : JOSEPH BANCROFT, Esq., M.D.

After waiting until 11 o'clock,—

Mr. BELL moved, "That Dr. Wilkinson be appointed Chairman of this Committee."

Mr. PEARSON seconded. The motion was carried.

Subsequently Dr. MacLaurin, President of the Commission, entered the room and occupied the chair.

Dr. WILKINSON mentioned that he had seen Professor Threlfall on 26th instant, and that gentleman had stated the Physical Laboratory at the University would not be ready for three or four weeks.

After

After deliberation,—

Mr. BELL moved, "That Dr. MacLaurin and Dr. Wilkinson, M.P., with their consent, be a Committee with full power to arrange the headquarters of Dr. Katz's scientific work, and with power also to require at any time the attendance and assistance of members of the Committee; further, that Messrs. Pearson and Quin be a Committee to ascertain whether any suitable house is available near Sydney—both Committees to report as early as possible."

Mr. QUIN seconded. The motion was carried.

A letter was received from the Under Secretary for Mines, in reply to an application by the Committee for a site for an experimental station, stating, as regards Shark Island, that stock were expected shortly which would have to be placed there; and as to the Randwick Quarantine Ground, that rabbits could escape from the enclosure at that place.

The Committee adjourned until 11 o'clock on the following day.

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SATURDAY, 28 APRIL, 1888.

The Committee met at 11 a.m.

*Present:—*

<i>New South Wales:</i>	W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).
	EDWARD QUIN, Esq.
<i>Victoria:</i>	A. N. PEARSON, Esq.
<i>New Zealand:</i>	A. DILLON BELL, Esq.
<i>Queensland:</i>	JOSEPH BANCROFT, Esq., M.D.

Dr. WILKINSON having been called away on business, the Chair was taken by Dr. BANCROFT.

Mr. A. BRUCE, Chief Inspector of Stock, was examined, and gave certain information regarding Shark Island, Clark Island, the Quarantine Ground at Randwick, and Railway grounds near Newton, which had severally been mentioned as places whereon experiments with disease might be conducted.

A letter was directed to be forwarded to the Secretary for Mines, asking that the Randwick Grounds and a portion of the buildings thereon should be placed at the disposal of the Committee.

Mr. PEARSON handed in certain papers and plans of enclosures necessary for the carrying on of experiments.

Mr. QUIN moved, "That a sum of money (£10) be placed in the hands of the Secretary for the purposes of petty cash."

Mr. BELL seconded. The motion was carried.

Dr. WILKINSON moved, "That Dr. Bancroft be asked to write a short account of the investigations undertaken by the Commission at Dr. Ellis' house, to be included in the Report of the Proceedings of the Commission."

Mr. BELL seconded. The motion was carried.

The Committee adjourned to Monday, at 10:30 a.m.

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MONDAY, 30 APRIL, 1888.

The Committee met at 10:30 a.m.

*Present:—*

<i>New South Wales:</i>	W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).
	EDWARD QUIN, Esq.
<i>Victoria:</i>	A. N. PEARSON, Esq.
<i>New Zealand:</i>	A. DILLON BELL, Esq.
<i>Queensland:</i>	JOSEPH BANCROFT, Esq., M.D.

A letter was received from Mr. P. Marceau, Adelaide University, stating that most of the rabbits of Professor Watson affected with *sarcoptes cuniculi* had been distributed to stock owners, to whom Professor Watson had transferred all his rights in the disease. It would be difficult, therefore, to obtain the six required by the Commission at a month's notice.

It was ordered that the writer be informed the Commission would meet in Adelaide, about 23rd May next, and it was hoped that some rabbits would be in a fit state at that time for experiments.

A letter was received from the Under Secretary for Lands, stating that the netting in use for the barrier fence between New South Wales and South Australia was only 42 inches wide, whereas the wire recommended by the Commission was 48 inches.

It was ordered that the writer be informed the recommendation was made under a misconception; also that the Committee hope the Government will afford the use of a portion of the wire from that parcel, should it be found necessary to fence any portion of land for experiments.

A letter from Mr. James Tyson, junior, offering the use of Tupra Station, near Hay, for experiments was read. Mr. Quin also handed in similar letters from Mr. N. Sadleir, of Launceston, offering Victoria Lake Station on the Albemarle Run, Darling River; and from John H. Patterson, of Orange, offering Tolgol Station.

Ordered, that Mr. Tyson's offer be acknowledged.

It was ordered that the Tasmanian Government should be communicated with, to ascertain whether it would be possible to collect in vacuum tubes some of the blood of the fowls affected with the disease amongst fowls in that colony, and reported to be chicken-cholera.

It was further ordered that the New Zealand Government be requested to obtain from Professor Thomas a full account of the diseases which he had found in rabbits in the course of his investigations.

The Committee adjourned to 10 a.m. on the following day.

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TUESDAY,

TUESDAY, 1 MAY, 1888.

The Committee met at 10 a.m.

*Present* :—

*New South Wales* : W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
EDWARD QUIN, Esq.  
*Victoria* : A. N. PEARSON, Esq.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.

Correspondence was received from the Under Secretary for Lands relative to remuneration to members of the Commission and to Secretary and shorthand writer.

It was ordered that the following reply be sent to the Minister :—“ It seems that the representatives of the various Colonies look to their respective Governments for reimbursement of their expenses, but the Commission does not know whether or not there will be any further settlement in this matter between the Governments of this and the various Colonies. Naturally, it is understood that the New South Wales Government will make the necessary provision for their own representatives.”

Dr. BANCROFT handed in a paper on fowl-cholera at Mount Grey Downs, New Zealand, by W. H. Symes, Esq., M.D.

Dr. BANCROFT moved, “ That the paper be printed and included in the report of the proceedings of the Commission.

Mr. PEARSON seconded. The motion was carried.\*

Dr. BANCROFT moved, “ That letter No. 647 be printed in the report of the Commission.”

Mr. QUIN seconded. The motion was carried.

Mr. PEARSON moved, “ That a communication be forwarded to the Government of New Zealand, with a view of obtaining from Dr. Symes, or some other suitable gentleman in New Zealand, some of the blood and secretions of the fowls said to be now attacked by fowl-cholera in the neighbourhood of Canterbury; the blood and secretions to be forwarded in vacuum tubes; and further, that a short account of the observations be also furnished to the Commission.”

Mr. QUIN seconded. The motion was carried.

The Secretary was instructed to forward to the Minister for Lands a list of the animals to be included in permit.

Dr. BANCROFT moved, “ That the books referred to in Leuckart giving an account of an infectious influenza in rabbits, be obtained for the Commission through Mr. Bruck, Castlereagh-street, and that the appended extract from Leuckart's work ‘ Parasites,’ be incorporated in the Report of the Commission.”

Mr. PEARSON seconded. The motion was carried.†

Dr. KATZ handed in a schedule of articles required in the laboratory, and an estimate of cost of same, amounting to £80.

The list was approved of.

Mr. PEARSON proposed a motion having reference to the immediate occupation of a site at Summer Hill as an experimental ground.

Mr. QUIN seconded the motion.

Dr. BANCROFT and the CHAIRMAN having spoken, it was decided to visit the ground.

The Committee adjourned to 10.30 a.m. on the following day.

WEDNESDAY, 2 MAY, 1888.

The Committee met at 10.30 a.m.

*Present* :—

*New South Wales* : W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
EDWARD QUIN, Esq.  
*Victoria* : A. N. PEARSON, Esq.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.

In reply to certain correspondence from the Lands Department it was ordered that the Under Secretary for Lands be informed that M. Pasteur's representatives required permission to inoculate only rabbits and fowls in their preliminary experiments at the laboratory of the Board of Health.

Another letter was read from the Under Secretary for Lands, stating that all the correspondence having reference to the introduction of diseases amongst rabbits had been forwarded to the Commission.

A further letter from the Under Secretary for Lands was read, stating that thirty-two rabbits had been sent to the Quarantine Reserve at Randwick, and that one hundred others would be obtained, as requested by the Commission.

Dr. BANCROFT moved, “ That a record of visits to various places, for the purpose of obtaining suitable premises and grounds for experiments, be prepared by the Secretary for insertion in the Minutes of the Proceedings of the Committee.”

Mr. PEARSON seconded. The motion was carried.

Dr. BANCROFT moved, “ That the expenses of the Executive Committee be defrayed by the various Governments represented on the Commission in a proportion to be fixed by the said Governments.”

Mr. PEARSON seconded. The motion was carried.

It was ordered that this resolution be transmitted to the Government of New South Wales.

The Committee then proceeded to interview the Hon. the Secretary for Lands in reference to premises for experimental purposes.

The Committee adjourned to 10 a.m. the following day.

THURSDAY,

\* See Section XII of this Report.

† See Appendix 9.

THURSDAY, 3 MAY, 1888.

The Committee met at 10 a.m.

*Present :—*

*New South Wales :* W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
EDWARD QUIN, Esq.  
*Victoria :* A. N. PEARSON, Esq.  
*Queensland :* JOSEPH BANCROFT, Esq., M.D.

A telegram was read from Dr. John Nicholson, of Benalla, Victoria, stating that a fowl diarrhoea epidemic had broken out there, and asking if a portion of the intestines would be of use to the Commission.

Ordered, that Dr. Nicholson be thanked for his offer, and that he be asked to forward fresh blood from the heart of diseased fowls in vacuum tubes, together with an account of the symptoms and *post-mortem* appearances.

A letter was received from the Under Secretary for Mines asking for detailed statement of experiments to be made, and how they were to be conducted, information that was necessary before acceding to the Committee's request that the Quarantine Reserve at Randwick might be granted for experiments.

The Committee decided to interview the Hon. the Secretary for Mines on the subject.

The Committee adjourned until 10 a.m. on the following day.

FRIDAY, 4 MAY, 1888.

The Committee met at 10 a.m.

*Present :—*

*New South Wales :* W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
EDWARD QUIN, Esq.  
*Victoria :* A. N. PEARSON, Esq.  
*Queensland :* JOSEPH BANCROFT, Esq., M.D.

Messrs. QUIN and PEARSON reported that they had visited Rodd Island, which was proposed to be set apart by the Secretary for Lands for the use of Committee as an experimental station.

Mr. PEARSON moved, "That Rodd Island be obtained for purposes of experiments."

Mr. QUIN seconded. The motion was carried.

The Secretary was directed to forward same to the Secretary for Lands, and to ask that instructions be given the proper authorities for the erection of buildings, to be approved by the Committee.

It was ordered that Dr. Katz be empowered to employ a first assistant at the rate of £16 per month, with board and residence.

Mr. QUIN moved, "That a recommendation be made to the Minister for Lands that Mr. Mahon be paid at the rate of £500 per year for his services in connection with the Commission."

Dr. BANCROFT seconded. The motion was carried.

The Committee then adjourned.

TUESDAY, 8 MAY, 1888.

The Committee met at 10.30 a.m.

*Present :—*

*New South Wales :* W. CAMAC WILKINSON, Esq., M.D., M.P., (Chairman).  
*New Zealand :* A. DILLON BELL, Esq.

A letter was read from Dr. Frank Hinds stating that the preliminary experiments were finished and asking when the Committee would be ready to examine M. Pasteur's scheme.

Ordered, that Dr. Frank Hinds be informed that the Committee hope to be ready to begin experiments with M. Pasteur's scheme within a week; also that a list of experiments be forwarded, and Dr. Hinds be asked to suggest any others.

It was ordered that the parcel received from Dr. Nicholson, of Benalla, and report on fowl disease, be handed to Dr. Katz.

Approval was given to the action of the Secretary in summoning, on the previous day, the following witnesses, whose names had been submitted by Mr. Quin:—Mr. David Brown, Kallara; Dr. Herbert Butcher, Wilcannia; Mr. Alexander Bell, Langawirra; Mr. George Urquhart, Silverton; the Manager, Mundi Mundi Station, Silverton; the Manager, Corona Station, Silverton; Mr. W. Horne, Adelaide Club, Adelaide.

The Committee then adjourned.

MONDAY,

MONDAY, 14 MAY, 1888.

The Committee met at 10:30 a.m.

*Present:—*

*New South Wales:* W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
*Victoria:* A. N. PEARSON, Esq.  
*New Zealand:* A. DILLON BELL, Esq.  
*Queensland:* JOSEPH BANCROFT, Esq., M.D.

A letter was read from Dr. Hinds, Dr. Germont, and M. Loir, dated 10 May, declining to accept any participation in the investigations directed by the Commission to be carried out; and stating that they were prepared to practically demonstrate that M. Pasteur's method was at once efficacious, practical, and without danger to domestic animals.

The Secretary was directed to communicate with M. Pasteur's representatives and request their attendance at 2:30 p.m.

Dr. Hinds, Dr. Germont, and M. Loir accordingly attended, and after deliberating with these gentlemen the Committee discussed the following motion, moved by Mr. BELL, and seconded by Dr. BANCROFT, "That as soon as the preparations at Rodd Island are in a sufficiently forward state, the representatives of M. Pasteur be requested to perform their experiments upon the island with the facilities which we will provide, it being understood that the expert appointed by the Commission shall have full information from the experimenters from time to time with regard to the progress of the experiments, and full access thereto at all times."

The motion was agreed to.

Mr. BELL moved, "That the representatives of M. Pasteur be requested to furnish the Committee, as soon as possible, with a list of the experiments of demonstration which they propose to carry out."

Dr. BANCROFT seconded. The motion was agreed to.

The Committee then adjourned.

MONDAY, 11 JUNE, 1888.

The Committee met at 11 a.m.

*Present:—*

*Queensland:* JOSEPH BANCROFT, Esq., M.D. (in the Chair).  
*Victoria:* A. N. PEARSON, Esq.,  
*New Zealand:* A. DILLON BELL, Esq.

Mr. PEARSON moved, "That the Colonial Architect be requested to conduct gas on to Rodd Island from the mainland by means of a main pipe laid under water, and that such work be executed as quickly as possible."

Mr. BELL seconded. The motion was carried.

Mr. PEARSON moved, "That Dr. Katz be authorized to take immediate steps for procuring the requirements for Rodd Island, a list of which he had submitted."

Mr. BELL seconded. The motion was carried.

The Committee then adjourned.

TUESDAY, 12 JUNE, 1888.

The Committee met at 11 a.m.

*Present:—*

*Victoria:* A. N. PEARSON, Esq. (in the Chair).  
*New Zealand:* A. DILLON BELL, Esq.  
*Queensland:* JOSEPH BANCROFT, Esq., M.D.

*And subsequently:*

*New South Wales:* W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).

Dr. Hinds, Dr. Germont, and M. Loir, the representatives of M. Pasteur, were accorded an interview by appointment.

*The Chairman (Mr. Pearson):* Have you read the account (p. 26, of the Board of Health Papers) of the mixed experiment made by M. Pasteur?

*Dr. Germont:* Yes.

*The Chairman:* Are you acquainted with the account of the experiment made on diseased and healthy rabbits being put in the same enclosure?

*Dr. Germont:* Yes.

*The Chairman:* Have you any objection to the same experiments being made for the satisfaction of the Committee?

*Dr. Germont:* We have been sent by M. Pasteur to make determined experiments with a plan exactly traced for us, and that we cannot change without authorization.

*The Chairman:* Will you allow us to make experiments on the contagious nature of fowl-cholera of rabbits inoculated by you?

*Dr. Germont:* Yes, after the end of experiments made by us.

*The Chairman* : After having proved that chicken-cholera kills rabbits, will you allow us to make experiments showing the contagious character of that disease amongst rabbits, before we make experiments in a place not enclosed, as you proposed in your letter of the 14th of May?

*Dr. Germont* : Yes, if it is to be at the end of our experiments. Have you any special reasons to wish us to make those experiments before the end of all ours?

*Mr. Bell* : Yes, we have many—first, we would not be authorized to incur expenses for buying cattle, &c., unless we are sure that the disease is contagious; second, unless the disease is proved to be contagious amongst rabbits, then since it is certainly deadly to fowls and perhaps other birds, we should not be justified in spreading the disease broadcast in the open country.

*Dr. Germont* : When Mr. Abigail, with the approbation of the Government, proposed a prize for the best method of destroying rabbits, he fixed the conditions and programme of the prize. When M. Pasteur studied this programme he authorized us to make a demonstration of the efficacy of chicken-cholera to destroy the rabbit pest. Sir Daniel Cooper sent a despatch to M. Pasteur asking him for a supply of microbes and instructions how to use them, and invited M. Pasteur to send us out at once. We have come for that purpose here. If you wish to modify the programme, we cannot on our own account, without authorization from him, alter the instructions which we have received. And we cannot either help you with the scientific researches which we are looking forward to. In fact, so far you have not given us a declaration that the programme sent by Mr. Abigail is of no value in your eyes, but we are not allowed to follow any other programme.

*The Chairman* : Is this the proclamation (producing *Gazette* notice dated 31st August, 1887), you refer to?

*Dr. Germont* : Yes.

The Committee adjourned to 2:30 p.m.

On resuming, the chair was taken by A. N. PEARSON, Esq.; also present, A. D. BELL, Esq. Dr. WILKINSON, M.P., attended.

*The Chairman* : In your last answer you referred to this proclamation. That proclamation requires that the approval of the Board appointed by this Government should be given to any scheme that may be proposed?

*Dr. Germont* : After experimenting for 12 months.

*The Chairman* : And we only assume that before our approval can be given such tests as are necessary to convince us of the efficacy and safety of it should be applied. One test that we consider necessary is that a number of (say half-a-dozen) rabbits, which have been fed on microbe-infected food, should be allowed to go amongst a number of other rabbits which have not been so fed. That we consider is a necessary test. If that test be not applied and reliance be placed alone upon direct feeding of the whole of the rabbits with microbe-infected food, we should have no grounds to decide that this was a new process at all. It would be merely the old process of direct poisoning.

*Dr. Germont* : What is the first experiment you intend to perform?

*The Chairman* : The first experiment we propose to perform is to take a number of rabbits that have been fed on microbe-charged food and to place these in an enclosure with healthy rabbits.

*Dr. Germont* : What is your second experiment?

*The Chairman* : The second experiment is very similar to the one which you propose, except that whereas in your experiment it appears that the animals fed with microbe-charged food would be kept separate, while we desire that they should be allowed to mix together, and that a certain number of birds should be allowed to fly about in the enclosure with the animals. We do this to ascertain the effect of the natural transmission of the microbes from one animal to another by means of their droppings.

*Dr. Germont* : For what purpose do you wish to have birds put in that paddock?

*Mr. Bell* : To see whether contagion will spread from rabbits to birds. You have said that after you have performed your own experiments, as laid down in your letter, you will make experiments demonstrating the contagiousness of fowl-cholera?

*Dr. Germont* : No; we will give you the microbes to do it yourselves.

*Mr. Bell* : You have already authority from M. Pasteur to give us your microbes or your infected rabbits for our own experiments.

*Dr. Germont* : We have authority to hand you these microbes, but not for a specific purpose, after our experiments are concluded.

*Mr. Bell* : But you will not do so till you have made your own demonstrations as laid down in your letter of 14th May?

*Dr. Germont* : No; the reason is that we do not want criticism on our experiments before they are concluded. The newspapers have already received communications as to our first experiment, for instance, whether our microbes were alive or dead.

*Mr. Bell* : Our desire is that we should receive your microbes or infected rabbits after the completion of your experiment number one, and before proceeding to numbers two and three. Our reason for that is that unless contagion experiments are successful it is useless and unnecessary waste of time and money to perform your experiments numbers two and three at all. Moreover, we could on no account allow fowl-cholera to be introduced into the open country unless we are first satisfied by experiments in the enclosure as to the disease really spreading from rabbit to rabbit. After this explanation will you now allow contagion experiments, either by yourselves or by us, to follow immediately upon your experiment number one, and before numbers two and three?

*Dr. Germont* : We cannot for the present. We cannot even answer it; and, therefore, we cannot give you the microbes for the present. If you will wait, we will write to M. Pasteur for new instructions, but if you cannot wait it is impossible for us to make experiments without authorization.

After discussion it was decided that the Committee would recommend Dr. Germont to send a cablegram requesting the authority of M. Pasteur for performing such experiments as the Commission desired, the message to be mutually agreed on.

*Mr. BELL* moved, "That the following message be sent by letter or telegram to the members of the Commission:—'Have you any objection that the restriction to the use of Butcher's disease of rabbits be removed?'"

Dr.

Dr. BANCROFT seconded. The motion was carried.

Mr. BELL moved, "That a special requisition be sent to the Under Secretary for Lands for furniture required for immediate use on Rodd Island."

Mr. PEARSON seconded. The motion was carried.

The Committee adjourned to 10:30 a.m. on the following day.

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WEDNESDAY, 13 JUNE 1888.

The Committee met at 11 a.m.

*Present* :—

<i>Queensland</i> :	JOSEPH BANCROFT, M.D. Esq., (in the Chair.)
<i>Victoria</i> :	A. N. PEARSON, Esq.
<i>New Zealand</i> :	A. DILLON BELL, Esq.

The representatives of M. Pasteur (Dr. Hinds, Dr. Germont, and M. Loir), were again in attendance and, after discussion, it was agreed to recommend the Government to despatch the following cablegram :—

"Cablegram. 13 June, 1888. Pasteur, Paris.—Commission ne peut laisser faire nos expériences sur une large échelle avant que la contagion de lapin à lapin ait été démontrée. Même après cela elle ne peut nous promettre d'avance de nous autoriser à faire l'expérience sur une large échelle. Autorisez-vous expérience de contagion suivante : Mêler cinq lapins infectés dans une cage avec vingt lapins sains et observer les résultats pendant six jours. Commission aussi demande lapins infectés pour expériences particulières.—GERMONT."

The Committee then waited upon the Under Secretary for Lands, who arranged to despatch the cablegram.

Inquiry was made as to a telegram authorized to be despatched by the Secretary on the journey from Melbourne to Adelaide, which conveyed a request to the Under Secretary for Lands to receive from Sir James Hector, on his arrival in Sydney, and to convey to Dr. Katz, certain chicken-cholera material from New Zealand. The Secretary stated that the message had been duly despatched by him.

Mr. BELL moved, "That Dr. Katz be instructed to take charge of, examine, and report as to the condition of the chicken-cholera material brought over from New Zealand by Sir James Hector."

Mr. PEARSON seconded. The motion was agreed to.

The Committee adjourned to 2 p.m. on the following day.

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THURSDAY, 14 JUNE, 1888.

The Committee met at 3 p.m.

*Present* :—

<i>New South Wales</i> :	W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).
<i>Victoria</i> :	A. N. PEARSON, Esq.
<i>New Zealand</i> :	A. DILLON BELL, Esq.

The Secretary was instructed to forward the following telegram to each member of the Commission, on the motion of Mr. BELL, seconded by Mr. PEARSON :—

"Commission meet Tuesday, 19 June, 2:30. If Pasteur accedes to our request, contagion experiments begin Wednesday morning. If Pasteur refuses, Commission meet consider situation."

The Committee adjourned to 10:30 a.m. on the following day.

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FRIDAY, 15 JUNE, 1888.

The Committee met at 10:30 a.m.

*Present* :—

<i>New South Wales</i> :	W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).
<i>Victoria</i> :	A. N. PEARSON, Esq.
<i>New Zealand</i> :	A. DILLON BELL, Esq.
<i>Queensland</i> :	JOSEPH BANCROFT, Esq., M.D.

It was decided to appoint Frederick Bell as cook at the experimental station at Rodd Island, at a salary of 30s. per week, with a bonus of 5s. if he should prove suitable, the appointment to date from this day.

Mr. PEARSON moved, "That the Committee have no objection to the removal of any restrictions placed upon experiments conducted by Drs. Butcher and Ellis, provided that they undertake to conduct such experiments only with the so-called Tintinology disease in certain places to be specified by the Commission; that this resolution be conveyed to the Hon. the Secretary for Lands; that Drs. Butcher and Ellis' letter be acknowledged, and they be informed that the Committee have communicated their views to the Hon. the Secretary for Lands."

Mr. BELL seconded. The motion was agreed to.

The Committee adjourned to 10:30 a.m. on the following day.

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SATURDAY,

SATURDAY, 16 JUNE, 1888.

The Committee met at 10. 30 a.m.

*Present :—*

*New South Wales :* W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
*Victoria :* A. N. PEARSON, Esq.  
*New Zealand :* A. DILLON BELL, Esq.  
*Queensland :* JOSEPH BANCROFT, Esq., M.D.

The following was received from Dr. Germont, one of the representatives of M. Pasteur :—

“ Copie du télégramme envoyé à M. Germont par M. Pasteur, le 16 Juin 1888 :— ‘ Contagion notable dans terriers. Faites expérience demandée sur terre foulée, un mètre surface. Attendre pour donner microbes du lapin mort ; mais donner dessin cultures paraffé (1) par membres.—(Signed)—PASTEUR.’ ”

(1) Ce mot est écrit sur l'original “ parapse,” ce qui n'a aucun sens.—Pour copie conforme : DR. GERMONT. Le 16 Juin 1888.

Translation of the telegram (by Dr. Germont) :—“ Contagion great in the burrows. Make experiments demanded on solid ground of a square meter. Wait before giving microbes of dead rabbits. But give drawing of the organisms of the cultivations, to be signed by the members.—(Signed)—PASTEUR.”

Experiments proposed :—Five rabbits, which have received a feed sprinkled with microbes of chicken-cholera, will be put with fifteen healthy rabbits in an enclosure one meter square on solid ground.

Explanation of the despatch :—

We will give proof to the Commission that for each of our experiments we use the same microbe and same cultivations ; and for this purpose the expert named by the Commission shall examine, with microscopic preparations of our cultures, and make drawings of the microbes which he shall sign as a guarantee of their correctness.

The representatives of M. Pasteur having attended, the following questions were then put and answered :—

*The Chairman :* If the experiment described in the telegram to M. Pasteur is successful, have you any objection to make yourselves, or allow the expert of the Commission to make, further experiments to prove that contagion takes place under less favourable conditions than those of the experiment above mentioned ; say, in artificial burrows, or in a larger space, or with fewer rabbits ?

*Dr. Germont :* You have sent a special despatch to M. Pasteur, who has made a direct reply. We cannot modify the instructions which he has given us. It was useless, otherwise, to ask M. Pasteur for instructions. Our position now is the same as before. We can only make the experiments which we are authorized to make.

*Mr. Bell :* Are you willing to make the experiment authorized by M. Pasteur, not only once (which would be of no value) but several times over ; each experiment under identical conditions—for instance, to place in each of six enclosures two infected rabbits and five healthy rabbits. Each enclosure to contain 2 square metres ?

*Dr. Germont :* No ; we refuse to do that.

The representatives of M. Pasteur then withdrew.

Mr. BELL moved, “ That the representatives of M. Pasteur be requested to make their contagion experiments as authorized by M. Pasteur in his telegram received this day, and that such experiments should begin on Rodd Island on Monday.”

Dr. BANCROFT seconded. The motion was agreed to.

Mr. Pearson had left the room before the adoption of the motion.

It was decided to employ F. Ambrose at a salary of 25s. per week, with 5s. per week additional should he prove suitable.

The Committee adjourned to 10.30 a.m. on the following Monday.

MONDAY, 18 JUNE, 1888.

The Committee met at 10.30 a.m.

*Present :—*

*New South Wales :* W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
*Victoria :* A. N. PEARSON, Esq.  
*New Zealand :* A. DILLON BELL, Esq.  
*Queensland :* JOSEPH BANCROFT, Esq., M.D.

The Committee deliberated and adjourned to 2.30 p.m. on the following day.

TUESDAY,

TUESDAY, 19 JUNE, 1888.

The Committee met at 2:30 p.m.

*Present* :—

*New South Wales* : W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
*Victoria* : A. N. PEARSON, Esq.  
*New Zealand* : A. DILLON BELL, Esq.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.

The Committee deliberated and adjourned to 2:30 p.m. the following day.

WEDNESDAY, 20 JUNE, 1888.

The Committee met at 2:30 p.m.

*Present* :—

*New South Wales* : W. CAMAC WILKINSON, Esq., M.D., M.P. (Chairman).  
*Victoria* : A. N. PEARSON, Esq.  
*Queensland* : JOSEPH BANCROFT, Esq., M.D.

*Also present* :—

*South Australia* : A. S. PATERSON, Esq., M.D.  
 E. C. STIRLING, Esq., M.D.  
*Victoria* : E. H. LASCELLES, Esq.

The Committee deliberated and adjourned.

## SECTION VII.

### REPORT of the Experiment Committee.

At our first meeting steps were taken to secure a suitable place for the conduct of the laboratory experiments, a list of which had been drawn up by the Commission. For this purpose Dr. Bancroft and Dr. Wilkinson decided to visit the University, in order to find out whether the physical laboratory, which Professor Threlfall had offered to the Commission for this work, would be a suitable place. The building and surrounding grounds were inspected, but inasmuch as the building was not likely to be ready for some weeks, the idea of undertaking the work in this laboratory was abandoned.

Mr. Pearson and Mr. Quin at the same time made inquiries about suitable quarters in the neighbourhood of Sydney, and agreed to recommend that a certain house with suitable grounds should be inspected at Summerhill. During the next few days we visited Clark Island, Shark Island, and the late Baron Macleay's laboratory at Watson's Bay, accompanied by Mr. Oliver, the Under Secretary for Lands, and Mr. Bruce, the Chief Inspector of Stock. Clark Island was considered to be too rocky for the purpose, and we found that the late Baron Macleay's laboratory had been converted into a private house. Shark Island was considered to be in every way suitable, but was not available, being the chief place for the quarantining of imported stock. Later on we visited the quarantine station at Randwick, which had been suggested to us by Mr. Bruce, but as we found that this station was next to a very valuable poultry farm, we thought it unwise to select this ground as the site for experiments with fowl-cholera.

As no suitable place yet offered itself, Mr. Pearson strongly advised that a certain house at Summerhill should be inspected. Here we might have leased a small paddock a short way from the house. The great objection to choosing a house placed in a populated neighbourhood became apparent upon further inquiry. We learned that if a petition signed by the residents had been presented to the Board of Health, it would have had the effect of putting an end to all experimental work.

At this stage, therefore, we decided that, in order to run no risk of molestation, it would be best to obtain some piece of Crown Land at a convenient distance from any centre of population. With this object in view we proceeded to interview the Hon. the Secretary for Lands (Mr. Garrett). In Mr. Garrett's absence we saw the Under Secretary (Mr. Oliver), and urged upon him the necessity of the Government placing at our disposal some unoccupied land belonging to the Crown. We even suggested that Shark Island should be given to us for our experimental work. Mr. Oliver advised us to visit the Honorable the Secretary for Mines (Mr. Abigail), under whose control Shark Island is; and accompanied by Mr. Oliver, we accordingly did so. Mr. Abigail said he could not comply with our request in regard to Shark Island; but instructed the Inspector of Stock to find out whether the Crown land bordering Sirius Cove could not be secured for us. The next day, with Mr. Bruce, we visited this spot, and found it very suitable for our work. On the day following this visit, accompanied by Mr. Coles, of the Colonial Architect's Office, we visited this site, in order to arrange for necessary buildings. But no sooner was this done, and it became known that we thought of carrying on our work at this place, than objections were raised to our plan by the Board of Health.

After

## 134 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

After some further communication with the Department for Lands, Rodd Island was definitely selected as the site for the experimental station. Mr. Coles visited the island, and no time was lost by him in clearing it and erecting thereupon the necessary buildings. Acting under our instructions, Mr. Coles entered into the work of planning and erecting the necessary buildings and enclosure, with an energy that left nothing to be desired. The plans and general arrangements were drawn up chiefly by Mr. Pearson and Mr. Coles, the fuller details of which are furnished by Mr. Pearson for the information of the Commission.\*

Meanwhile Mr. Pasteur's representatives had been carrying on their work in the laboratory of the Board of Health, and, on Tuesday, 8th May, we were informed by letter that these preliminary experiments, with a view to test the virulence of the microbes of chicken-cholera, were completed, and M. Pasteur's representatives were ready to put the scheme of M. Pasteur upon its trial. We informed Dr. Hinds that Rodd Island would probably be ready in a week or two for experimental work, and forwarded to M. Pasteur's representatives the schedule of experiments prescribed by the Commission. At the same time we asked Dr. Hinds whether M. Pasteur's representatives desired to supplement this schedule by any suggestions of their own.

In answer to our communication we received a letter signed by all the representatives of M. Pasteur:—

To the President of the Commission for the Destruction of Rabbits.

Sir,

Union Club, Sydney, 10 May, 1888.

We beg to acknowledge the receipt of the letter, dated 8th May, from the Committee, informing us that it will shortly be ready to commence experiments of its own upon the method proposed by M. Pasteur for the destruction of rabbits in Australia, and of the list of investigations which it is intended to pursue.

We are unable to accept any participation in these investigations.

M. Pasteur has instructed us to make certain experiments having for their object—strictly in accordance with the conditions for the reward published by the New South Wales Government—the demonstration that his method is at once efficacious, practical, and without danger to the domestic animals mentioned in the note of the Government.

This demonstration we are prepared to make; but we cannot take any part in the proceedings of the Committee, when it seeks to pursue scientific investigations foreign to the purely practical question upon which it is going to decide.

When the Commission is willing to examine the method of M. Pasteur, we shall be at their disposal to make, ourselves, in the presence of the Commission, the necessary experiments.

We have, &c.,

D. GERMONT.  
FRANK HINDS.  
A. LOIR.

This letter received our careful consideration on Monday, 14th May. The attitude adopted by M. Pasteur's representatives seemed to us so serious, and so difficult to understand, after their statements to the Commission, that we decided to call them before us without further delay, in order to hear their own explanation of the contents of this letter. We made an appointment to meet them the same Monday at 2:30 p.m., when M. Pasteur's representatives were in attendance. We expressly asked them to explain why, after having accepted the proposals and arrangements made by the Commission, they stated in their letter that they were "unable to accept any participation in these investigations." We produced in their presence, and read, the report of the proceedings of the Commission, in which they stated they would perform, in conjunction with Dr. Katz, the experiments prescribed by the Commission. They did not hesitate to repudiate any such agreement, stating at the same time that they had no idea that such an arrangement had been accepted for them by Dr. Hinds. They argued that they had come to Sydney on the strength of representations made to M. Pasteur by the Agent-General for New South Wales, for the express purpose of performing a definite series of experiments drawn up for them by M. Pasteur himself, and that, as agents for M. Pasteur, they had only power and authority to carry out this definite series of experiments. They could not deviate in the least from M. Pasteur's set plan. They therefore could not undertake any other experiments than those expressly prescribed by M. Pasteur. Further, they refused to give us any microbes of fowl-cholera until they had completed the programme of experiments that M. Pasteur had authorized them to perform. This was their attitude, and we could do no more than ask them to furnish us with a list of the experiments which M. Pasteur had set down for their guidance. We had no power to modify in the least the programme of experiments arranged by the Commission.

While, however, we accepted no responsibility in the experiments arranged by M. Pasteur himself to test the efficacy and safety of his method, we considered it only reasonable to allow M. Pasteur's agents to carry out their preliminary experiments. We did this more readily because M. Pasteur's agents declined to hand over their microbes to the Commission until these preliminary experiments had been completed. We did not see that any harm—beyond, indeed, a loss of time—could come from allowing M. Pasteur's agents to superadd to our intended experimental work any separate experiments which they might have been instructed by M. Pasteur to perform. We wished, in fact, to allow them to put their own case in their own way. Without, therefore, in any way altering our intention to perform the schedule of experiments prescribed by the Commission after M. Pasteur's should be finished, and desiring to treat M. Pasteur with every consideration, we asked M. Pasteur's representatives to furnish us with a list of the experiments they intended to perform. On the day after this interview took place the members of the Committee had to leave Sydney to attend the prearranged meetings of the full Commission at Melbourne and Adelaide. It thus happened that the reply of M. Pasteur's representatives, furnishing their list of proposed experiments, was not delivered to us until we had left Sydney, and it was not possible to consider this furnished list until we reassembled in Sydney on 11th June.

This letter and list of experiments are here appended, and special attention is directed to the terms and conditions of the experiments:—

To the President of the Committee for Rabbit Destruction,—

Sir,

"The Albany," Bligh-street, Sydney, 14 May, 1888.

We have the honor to lay before you, in accordance with your request, a list of the experiments which M. Pasteur has instructed us to make before you for the purpose of demonstrating—

- (1) The efficacy of the disease which he has proposed for the destruction of rabbits;
- (2) The immunity which is enjoyed by domestic animals with regard to the agent of this disease.

I.

\* See Section VIII of the Report, page 136.

## I. Experiments showing the rapidity and certainty of the action of chicken-cholera :

Three sets of rabbits of ten each will be taken.

- (a) The first ten will have a single feed of green grass, over which a culture of microbes has been sprinkled, given to them.
- (b) The second ten will have a single feed of chaff, sprinkled in the same manner.
- (c) The third ten will have a single feed of oats, treated as above.

II. Experiments showing the immunity of domestic animals to the microbe of chicken-cholera. The following animals will be the subjects of these experiments :—Two sheep, two cows, two lambs, two calves, two horses, two pigs, two goats, and two dogs.

A culture containing the microbes of chicken-cholera will be sprinkled over one of the feeds which each animal will receive daily for six days. These animals will be watched for ten days after the last feed.

When the Committee is satisfied that the disease is not dangerous to domestic animals, we will make a third experiment—really the only one which is at the same time practical and demonstrative. It consists in testing the method upon an area, enclosed with rabbit-proof fencing, in a part of the country infested with rabbits. At the conclusion of each experiment a statement of its nature and result will be drawn up, either by us or by the expert nominated by the Government and signed by both parties.

We have, &c.,

D. GERMONT,  
FRANK HINDS,  
A. LOIR.

It will be seen that experiments (1) and (2) detailed in Dr. Hinds' letter, although quite insufficient and inconclusive, whatever their results might be, were such as we might fairly allow to proceed, reserving, of course, to ourselves the right to impose, after their conclusion, the further tests which obviously suggest themselves as necessary, and which were in fact provided for in the schedule of experiments already prescribed by the Commission. But experiment (3), that is, the proposed experiment in the open country, is on quite a different footing. Besides the fact that the nature of this proposed experiment was in no way defined, it was impossible to allow its performance until we should first have satisfied ourselves that by the introduction of fowl-cholera into the country there was a real and substantial chance of exterminating the rabbits.

It has not yet been proved that true fowl-cholera exists in this country, so that its introduction would clearly be an undesirable innovation, and could only be recommended—if recommended at all—on the distinct ground that it would, in some way, cause much more good than harm.

M. Pasteur's proposed experiments (1) and (2)—even supposing their results were successful in highest degree—were so loose, and so wanting in scientific accuracy with regard to the points especially requiring demonstration, that they could not reasonably be held to justify us in allowing free dissemination of fowl-cholera in the open country.

On our return to Sydney a further interview with M. Pasteur's representatives was at once arranged, and every possible effort was patiently made to impress upon them the unsatisfactory nature of their proposed "demonstration," and the primary necessity of satisfying the Committee, among other matters, of the spread of fowl-cholera from rabbit to rabbit before any introduction of the disease into the open country would be permitted.\* M. Pasteur's representatives, however, for reasons already mentioned, positively refused to make any further experiments with fowl-cholera until they had gone right through with experiments (1), (2), and (3) in full accordance with the instructions received from M. Pasteur. They also refused to hand over to us either their microbe cultures, or any part of them, or any rabbits affected therewith or the bodies of any rabbits that had died from fowl-cholera, until the conclusion of their own experiments, including the so-called demonstration in the open country. In other words, they refused either to demonstrate with any scientific precision the spread of the disease from rabbit to rabbit or to enable us to do it. They only offered to perform a series of experiments, so inadequate and inconclusive as to be of little value; and indeed designed, as it would appear, either to avoid any risk of failure or to prevent the possibility of detecting failure if it should occur. On becoming convinced that experiments (3) in the open country would not be permitted until some proof was given of the likelihood of the spread of chicken-cholera from rabbit to rabbit, M. Pasteur's agents at our suggestion agreed to ask further instructions from M. Pasteur on this most important point. M. Pasteur's representatives were, in their judgment, so tied down to the exact instructions of M. Pasteur that they refused to take any further action until they had asked leave from M. Pasteur to make the "demonstration" we required. It was therefore decided that a cablegram should be sent directly to M. Pasteur asking permission for his agents to make an experiment showing the contagion of this disease among rabbits, and asking also that cultivations of microbes of chicken-cholera should be given to the Commission for the purpose of supplementing the experiments of his own representatives.

We therefore recommended the Government to despatch the following cable message to M. Pasteur in the name of Dr. Germont which was accordingly done :—"Pasteur, Paris.—Cablegram, 16 Juin 1888.—Commission ne peut laisser faire vos expériences sur une large échelle avant que la contagion de lapin à lapin ait été démontrée—même après cela elle ne peut vous promettre d'avance de nous autoriser à faire l'expérience sur une large échelle. Autorisez-vous expérience de contagion suivante :—Mêler cinq lapins infectés dans une cage avec vingt lapins sains, et observer les résultats pendant six jours? Commission aussi demande lapins infectés pour expériences particulières."

Translation.—"Pasteur, Paris.—The Commission cannot allow your experiment to be made on a large scale before contagion from rabbit to rabbit has been proved. Even after that it cannot promise beforehand to make experiments on a large scale. Do you authorize the following experiment in contagion :—To mix five infected rabbits in a cage with twenty healthy rabbits, and observe the results for six days? The Commission also asks for infected rabbits for special experiment."

M. Pasteur agreed to a contagion experiment being performed, but under such conditions that we held the experiment to be of little practical value.

The cablegram from M. Pasteur with regard to the contagion experiment and the conditions prescribed by him together with the explanation of his own agents is here appended.

Translation.—"Contagion great in the burrows. Make experiments demanded on solid ground of a square metre. Wait before giving microbes of dead rabbits, but give drawing of the organisms of the cultivations to be signed by the members."

"Experiments proposed :—Five rabbits, which have received a feed sprinkled with microbes of chicken-cholera, will be put in with fifteen healthy rabbits in an enclosure 1 metre square on solid ground."

"Explanation

\* A full account of this interview will be found in the Minutes of the proceedings of the Committee.

"Explanation of the despatch :—We will give proof to the Commission that for each of our experiments we use the same microbe and same cultivations; and for this purpose the expert named by the Commission shall examine with microscope preparations of our cultures and make drawings, which he shall sign as a guarantee of their correctness."

We had a further interview with M. Pasteur's representatives, and the final question put by our Chairman, and the answer of Mr. Pasteur's representatives thereto here follow, and speak for themselves :—

The Chairman asked, "If the experiment described in telegram to M. Pasteur is successful have you any objection to make yourselves, or allow the expert of the Commission to make, further experiments to prove that contagion takes place under less favourable conditions than those of experiment above mentioned (say) in artificial burrows, or in a larger space, or with fewer rabbits?"

To this Dr. Germont replied, "You have sent a special despatch to M. Pasteur, who has made a direct reply. We cannot modify the instructions which he has given us. It was useless otherwise to ask M. Pasteur for instructions. Our position now is the same as before. We can only make the experiments which we are authorized to make."

The same question, asked by Mr. Bell, and Dr. Germont's reply here follows :—

Mr. Bell then asked, "Are you willing to make the experiment authorized by M. Pasteur, not only once (which would be of no value), but several times over; each experiment under identical conditions; for instance, to place in each of six enclosures two infected rabbits and five healthy rabbits; each enclosure to contain 2 square metres?"

Dr. Germont replied, "No; we refuse to do that."

With the exception of Mr. Pearson we thought it best to allow them to undertake this contagion experiment at their earliest convenience on Rodd Island, pending any further action of the full Commission.

It is important to observe M. Pasteur orders his representatives to wait before they hand over their microbes to the Commission for the purpose of experiment.

We now desire briefly to summarize our negotiations with M. Pasteur's representatives since the sending of the first cable message to M. Pasteur. M. Pasteur agrees to a contagion experiment being made, but he stipulates it be made by putting twenty-five (25) rabbits, five (5) of them sick with fowl-cholera, into an enclosure a yard square, and keeping them there six (6) days. He refuses to allow the Commission to have any microbes for any experiments of their own, but offers them instead some "drawings" of the organisms. We felt that our only duty was to leave all further action in the hands of the full Commission. Throughout our negotiations we have striven with the utmost patience to find some common basis of experiment upon which the Commission and M. Pasteur's representatives could act in harmony. The outcome of these negotiations is that M. Pasteur's representatives have obtained permission to give the "demonstrations" of contagion above described. This permission is coupled with a refusal to hand over to the Commission any microbes for experiments of their own. We need hardly add that the conditions of the experiments are such that whatever the result may be the experiment is of little value for testing the spread of chicken-cholera from rabbit to rabbit; in other words, of testing the efficacy of M. Pasteur's scheme. It will now be for the Commission to take up the matter at this point and deal with it. Before the Commission we shall be prepared to make our suggestions as to the course to be pursued.\*

July 3, 1888.

W. CAMAC WILKINSON.

## SECTION VIII.

### DESCRIPTION of the Laboratory Buildings at Rodd Island.

In accordance with the recommendation of the Commission efforts were made in the first instance to obtain a suburban house, with water and gas laid on, having about an acre of land attached, and containing a sufficient number of rooms to provide accommodation for the laboratory, and for the chief expert, his assistant, cook and handy man. It was intended, had this arrangement been carried out, to have done little more in the way of building than to simply enclose a piece of land about 100 feet square; surround and roof this with fly-proof wire gauze, and construct, in open connection therewith, a large shelter shed with stalls and pens. Messrs. Sheerin and Hennessy, architects, of Pitt-street, in response to private inquiries from Mr. Pearson, furnished drawings of such an enclosure, and also a rough estimate of the cost. They estimated that the enclosure and shed, closed in with rat proof wire netting, would cost about £300. If the enclosure were covered with mosquito proof wire gauze the cost would amount to £600. The wire gauze would, however, they estimated, be saleable afterwards for about £150; the net cost being therefore reduced to about £450. Messrs. Sheerin and Hennessy stated that if the work were placed in their hands, they would put up the enclosure and shed, and also fit up the laboratory rooms with gas and water connections, cupboards, tables, and so on, within a week.

In consequence, however, of the final decision of the Government authorities to place Rodd Island at the service of the Commission for the purpose of laboratory experiments it became necessary to make much more extensive building arrangements.

Rodd Island, situated in Long Cove, opposite the Callan Park Lunatic Asylum, contains, above high-water mark, about  $1\frac{1}{2}$  acres, roughly speaking, but of this only about half an acre is suitable for building purposes, the rest being either too rocky or too steep to be of any use without reclamation or levelling. When the island was placed at the service of the Commission it was unoccupied, and covered with scrub. It is now covered on every available spot with a collection of buildings, which present an interesting appearance, and which it is hoped will, after they have served their immediate purpose, become permanently useful for bacteriological work and the investigation of stock diseases. The

\* The substance of this Report, together with the correspondence referred to in it, was submitted to the Commission at a meeting on 21st June, when it was unanimously agreed that the experiments proposed by the representatives of Mr. Pasteur were not satisfactory. (See the Minutes of the Proceedings of the Commission on page 30.)

The buildings consist of a large enclosure covered in with wire gauze, and connected with a shed containing stalls and pens, an aviary, a laboratory containing four rooms, a dwelling-house containing six rooms and a kitchen, with servants' quarters. Water-tanks have been fixed in convenient places, and a wharf constructed, with a road leading therefrom. The general arrangement of the buildings is shown in the accompanying sketch plan.

The enclosure and shed cover nearly a quarter of an acre of ground, thus affording room for horses, cattle, sheep, pigs, birds, &c., to move about amongst one another in an easy and natural manner. There are also artificial burrows constructed for rabbits. Thus it will be possible not only to perform isolated feeding experiments with microbe-charged food, but also to conduct, on a small scale, a general experiment in which the animals shall be placed under conditions similar to those of the open country. By allowing the birds and beasts to mix freely together an almost infinite number of transmissions of the microbes from one animal to another may be obtained. The conditions of the test in this enclosure will be more stringent than in the open country, on account of the confinement of the animals within such a limited area; and if no serious outbreak of disease should occur within the enclosure, there will be good grounds for concluding that none is likely to occur outside.

The object of the wire gauze is to keep away birds and insects, which, by flying to and fro, might carry infectious matter with them. The wire gauze rests upon wire netting of 4-inch mesh, which in its turn rests upon a number of wire ropes, stretched right across, over the ridge beam and the side posts, after the manner of a tent. A barbed wire fence inside the enclosure protects the gauze from injury by the larger animals. The entrances to the enclosure are double, so that the outer door may be closed before the inner one is opened. The shed is constructed of corrugated iron, with a brick basement. The drainage from the stalls will run into a gauze-covered tank, containing disinfecting material. All ventilating openings are covered with wire gauze.

Artificial burrows, which it is believed were first used by Mr. Pearson, in Victoria, for experiments on poisoning rabbits, are very simply constructed, as shown in the diagrams which are appended to this report. [See Diagrams at end of Appendices.]

It will be seen that they are simply small winding trenches cut in the surface of the ground, covered over with boards and then with loose material. The boards are made in short lengths so that the burrows may be easily opened when required. The entrances to the burrows are made as natural in appearance as possible. When wild rabbits have no other cover they go into these burrows quite readily.

The laboratory contains a large general working-room, with tables, sink, shelves, incubator stands, gas and water connections; a microscopic room, with a south-east aspect so as to be as much protected as possible from the daily variations of temperature; a storeroom for apparatus, &c.; and a wash-house with sink, copper boiler, and a furnace for burning dead carcasses and infected matter. The gas is supplied in cylinders from the railway works at Redfern; from the cylinders it is passed in a small gasometer with constant pressure, and to which is attached an automatic tap, which shuts off or turns on according as the gasometer rises or falls. It was at one time thought that it would be possible to conduct the gas from the mainland by a main pipe laid under the water; but the difficulty of preventing an accumulation of water in the bend of the main caused this idea to be abandoned.\* The laboratory as well as the house and kitchen are constructed of corrugated iron, the walls being double and packed with sawdust.

The house contains three bed-rooms, a bath-room, a large dining-room, and a large library and office room. The kitchen quarters are commodious. The cook's room adjoins the kitchen; but it is arranged that the handy man, who will attend to the stables, will sleep in a tent. There are several water-tanks, and there is sufficient roofing on the island to give an abundant water supply.

An aviary, 16 feet square, half enclosed and roofed in, and half open, is provided to accommodate birds before they are put into the experimental enclosure. Arrangements will probably be made for accommodating the larger animals, previous to their being experimented upon, on the Callan Park Asylum reserve; and the smaller animals will be kept in hutches.

The whole of the above buildings have been put up in less than two months, the work having been carried out with admirable expedition by the Colonial Architect's Department. The sum spent upon the work is said to amount to over £2,500, the work having been specially costly owing to the water carriage. Over forty men were at one time employed on the island.

[See sketch plan of Rodd Island and diagrams I to VII.]

## SECTION IX.

### REPORT by Dr. Katz on the Rabbit brought from New Zealand by Sir James Hector†.

Sir,

Rodd Island, 19 November, 1888.

Referring to your letter, dated 16th instant, and received by me yesterday, I have to report that the rabbit, brought from New Zealand by Sir James Hector, and transferred to Rodd Island on the 16th June last, has so far not been made the subject of experiments. All that I can state is, that it is still alive. The tumour which it showed, on arrival, at the left side of the body, over the ribs, has enlarged since. The shape of this tumour, which is firm, elastic on touch, and covered with dense hair in like manner as the body throughout, is a semi-oval, the longer axis of which is parallel to the vertebral column. Its dimensions at the base are at present, 10 centim. (4 inches) in length, and 8 centim. ( $3\frac{1}{8}$  inches) in width. In other respects the rabbit appears in a normal condition. \* \* \*

H. Mahon, Esq., Secretary Rabbit Commission.

I am, &c.,

OSCAR KATZ.

SECTION

\* The supply of gas by means of cylinders having on trial proved inconvenient, this arrangement was eventually replaced by a gasolene generator.

† This is the rabbit suffering from bladder-worm disease, referred to in Mr. Coleman Phillips' evidence at the top of page 117.

## SECTION X.

REPORT on the experiments carried out by M. Pasteur's representatives (M. Loir, Drs. Germont and Hinds), with a view to demonstrating the efficacy and safety of the introduction of the microbes of chicken-cholera as a means for the extermination of Rabbits in Australasia.

THESE experiments of demonstration took place at Rodd Island, near Sydney, and lasted from 7th July till 4th August, 1888.

As a detailed account of the arrangement of these experiments, of the results they yielded, and of other noteworthy facts is given in the attached Appendices A-F, I need only confine myself here to summarising their main contents.

One portion of the experiments was, as stated above, devoted to showing the efficacy of the microbes of chicken-cholera, both as regards their power to kill rabbits by feeding them on infected food, and the contagiousness of the fatal disease which they set up in rabbits.

With reference to the first point, namely, that the microbes under discussion are fatal to rabbits when administered to them along with food, I am perfectly satisfied, taking into consideration not only the result of the experiment recorded in Appendix A, but also the results of experiments made for the purpose of controlling the virulence of the microbes given to domestic animals. (*Vide* below.) The quantity of infected broth as added to food (cabbage leaves, turnip leaves, carrot tops, green barley, chaff, oats) ranged from 1 ccm. to about 3 ccm.\* for each rabbit;† the time which it took until death, from twenty to forty hours. I may here at once point out, although I shall mention it again later on, that death did not always follow after infected food had been placed in the boxes in which the animals were confined. The number used for each experiment of such a nature amounted to from two to ten specimens. Part of such lots always died in consequence of infection; and the reason for the survival of the other part—now and then, as may be seen in Appendices A and D, all of the same experiment died—may be found by assuming that they perhaps did not partake of the infected meal at all (especially when the animals were confined in one and the same box, and not in separate compartments); or, possibly, that they ate only a slight portion of the infected broth, not sufficient to infect; or, lastly, that perhaps this infected broth had become dry, and in this way lost its virulence, when it was eaten by the surviving rabbits. Whatever the cause of such occurrences may have been, such rabbits were not proof against infection by the micro-organisms in question, because they ultimately succumbed after being fed again. (*Vide Appendix E.*)

For demonstrating the presence of the *bacteria* of chicken-cholera in the dead subjects, M. Pasteur's delegates made use of a Zeiss' microscope placed at their disposal; but although the use of homogeneous immersion objectives and of my aniline dyes was offered to them, they contented themselves with demonstrating preparations of fresh blood from the heart by means of Zeiss' F (dry objective, Oc. I and II). In all such preparations micro-organisms were seen not unlike those of chicken-cholera. A demonstration, however, of such a description could hardly have been convincing by itself had it not been aided by the appearance at the *post-mortem* examinations of certain organs and tissues (*e.g.*, lungs, pleura, pericardium), which each time exhibited certain pathological changes met with in rabbits dead of that particular disease, and also by the results of occasional inoculations into healthy rabbits from blood of those which died of the disease.

I feel certain that the microbes of chicken-cholera were present in each of the cases in which a *post-mortem* examination was made, and that they must be looked upon as the cause of the death of the animals under consideration. It stands to reason that the same took place with regard to all those which died under the same conditions and after the same treatment, but on which a *post-mortem* examination was not made.

As to the second point, namely, that the fatal disease set up by the microbes in rabbits, either by inoculation or by feeding, should be contagious among them, two sets of experiments were conducted:

First.—Five rabbits were inoculated‡ with about two drops each of a broth-culture of the microbe, and thereafter placed in an enclosure of 1 square metre area with twenty other healthy rabbits. They were kept under observation for a period of seven days. The five inoculated ones died within fourteen and a half hours; of the remaining twenty not inoculated ones five died within seventy-one hours, and from that time until the conclusion of the experiment no more died.

This experiment does not admit of any inference being drawn from it as to its practical value, because not one of the dead rabbits of any of the descriptions which were left in the enclosure to the last was subjected to an examination.

Out of twenty-five control rabbits (*vide Appendix B*) three died within five days and five hours; an examination of these did not take place either.

Secondly.—Five rabbits in one box were given some cabbage leaves infected with five ccm. of a broth-culture of the microbe, and two and a half hours afterwards placed in an enclosure of one square metre area with twenty healthy rabbits. (*Vide Appendix C.*) They were kept under observation for a period of ten days. Within this period eleven in all died; among them three (specially marked) of the five to which infected food had been given, while one of the latter survived. (*Vide Appendix E, Series III, conf. also above.*) Whether the fifth, which it had been forgotten to specially mark, as forming one of the originally infected ones, was among the dead ones or not could not be decided.

This

\* One cubic centimetre is equal to sixteen minims; one minim is generally considered as equal to one drop.

† All the rabbits used in the experiments here were wild rabbits from Carrathool, near Hay, N.S.W.

‡ Inoculation means here always subcutaneous application.

This experiment, unsatisfactory as it was as regards its arrangement, can, therefore, hardly be utilized for drawing any exact conclusions as to its practical value. All that I can state in reference to the result of this experiment is that on examination of *three* dead rabbits which were not specially marked, that is to say, which had not been given infected food [with the exception possibly of one (*vide* above)], the result as to presence of micro-organisms and pathological changes were the same as usual. Of the *four* original ones (specially marked) not one was examined, but there is no room for doubt that they died in consequence of their having eaten the microbes, since two other rabbits fed the same day on infected food under the same conditions (*Appendix D*) could be shown to have died of the disease.

A control experiment on twenty-five rabbits was not made.

The other portion of the experiments, as stated in the heading, tended to show the safety of the introduction of the microbes of chicken-cholera. It was to be demonstrated that a number of useful animals were immune from becoming infected with such microbes.

These animals consisted of an old horse, a cow (with calf at foot), a sheep (young merino ewe), a goat (in kid), a pig (young sow), and a young dog (half-bred collie). All these animals, with the exception of the calf, which was not experimented upon at all, were given once a day for a period of *five* days varying quantities of broth-cultures of the bacterium of chicken-cholera in or on various articles of food, as may be seen in *Appendix D*. Then came a resting period of *five* days, at the end of which all the animals, with the exception again of the calf, were fed once more on very much larger quantities than before of infected broth in or on food. From that date they were kept under observation for *six* more days, according to the programme, but in reality for *twelve* days up to date (August 7).

The result was a favorable one. At no time did any of the above animals show signs of illness; they presented always normal appearances.

Of course, control experiments on rabbits were made each time when infected food was given to the above domestic animals (*Vide Appendix D*). Of these control rabbits, which always numbered more than one at a time, part often survived, an occurrence already commented upon in the foregoing lines.

The mere fact of this occurrence is no doubt sufficient to render the ultimate result less transparent than it would have been if all the control rabbits had died; but still I incline to the opinion that the microbes of chicken-cholera applied in the way described are harmless to domestic animals of the above description.

Rodd Island, 7 August, 1888.

OSCAR KATZ.

To the Chairman Experiment Committee Rabbit Commission.

I beg to forward the following account of the experiments performed by M. Pasteur's agents, under the supervision of Dr. Katz, and agree fully with the general tenor of Dr. Katz's remarks and inferences.

W. CAMAC WILKINSON,

August 18, 1888.

Chairman Experiment Committee, Rabbit Commission.

## APPENDICES.

A, B, and C.—Details of experiments intended to demonstrate the efficacy of the disease.

D.—Details of experiments intended to demonstrate the safety of the disease, viz., the immunity of certain domestic animals.

E.—Details of further experiments upon rabbits surviving from previous experiments.

F.—Explanation of the diagrams accompanying this Report.

### Appendix A.

DETAILS of experiment intended to demonstrate the efficacy of the Disease.

July 7th—*Three* rabbits were placed in one box (Diag. I, c.) and fed at 3 p.m., upon cabbage leaves and carrot tops sprinkled with about 10 ccm. of a broth-culture of the microbe of chicken-cholera.

*Annotation*.—Most of the infected food was eaten by 10 p.m. on the 7th, and by 11 p.m. the pieces of leaves, &c., not eaten, were trodden flat on the bottom of the box and partly covered with droppings. The next day food was given to them as usual.

*Result*.—

July 8th—*One* died between 8:30 p.m. and 9:45 p.m., or in 29½ to 30½ hours after being fed.

July 8th and 9th—*One* more died between 11 p.m. of 8th and 4:5 a.m. of 9th, or in 32 to 37 hours after being fed.

July 9th—*One* more died between 4:5 a.m. and 7:10 a.m., or in 37 to 40 hours after being fed.

On examination the presence of micro-organisms morphologically similar to those of chicken-cholera was demonstrated in fresh preparations of blood from each of the three. (Zeiss F.)

### Appendix B.

DETAILS of experiment intended to demonstrate the efficacy of the Disease.

July 7th—*Five* rabbits were inoculated at 2:45 p.m., with about two drops each of a broth-culture of the microbe of chicken-cholera, and placed immediately thereafter in a box 1 metre square (Diag. I, a), containing twenty other fresh rabbits.

*Annotation*.—The box referred to consisted of a four-sided wooden enclosure 1 metre square, having for its bottom the paved floor of a stable stall (Diag. I, 1), and for its top a covering of rabbit-proof wire netting.

*Conditions as to treatment*.—All the rabbits to be fed twice a day; the carcasses of dead rabbits to be left in the box until the conclusion of the experiment.

*Result*.—

July 7th—*One* died between 10:40 p.m. and 11:15 p.m., or 8 to 8½ hours

July 8th—*Two* more died between midnight and 2:15 a.m., or 9 to 11 hours

*Two* more died between 2:15 a.m. and 5:20 a.m., or 11½ to 14½ hours

(The above *five* were the inoculated rabbits.)

July 9th—*One* more died between 11 p.m. of 8th and 4:5 a.m. of 9th, or 32 to 37

hours

*One* more died between 1:45 p.m. and 3:50 p.m., or 46½ to 48½ hours

*One* more died between 8:25 p.m. and 9:45 p.m., or 53 to 54½ hours

July 10th—*One* more died between 10:15 a.m. and noon, or 67 to 68½ hours

*One* more died between noon and 1:45 p.m., or 68½ to 70½ hours

*Annotation*.—On the 11th July it was noted that the carcasses of rabbits previously dead were covered with dry lucerne stalks left over after feeding. It was observed at the same time that the bottom of the control experiment box (*v. below*) was partly covered with lucerne stalks also. On the 12th July it was observed that very little food was left at the bottom of either box.

July

## 140 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

July 14th—

*Conclusion of the experiment—*At 4 p.m. the experiment was concluded, and the *fifteen* surviving rabbits were liberated from the box.*Annotation—*An examination of the dead rabbits did not take place.*Control experiment—*July 7th—*Twenty-five* rabbits were placed in a box 1 metre square (Diag. I, *b*) similar in every respect to that described above.*Conditions as to treatment—*To be kept under exactly the same conditions as the other twenty-five rabbits.*Result—*July 9th, 10th—*One* died between 10.45 p.m. of 9th and 7.15 a.m. of 10th.*Annotation—*The skin on the nose of this rabbit had been removed by injury on the 7th July.July 11th—*One* more died between 9 a.m. and 11 a.m.July 12th—*One* more died between 7.40 p.m. and 8 p.m.July 14th—At 4 p.m. the experiment being concluded, the *twenty-two* surviving rabbits were removed from the box*Annotation—*An examination of the dead rabbits did not take place.

Weather during the course of the experiments referred to in Appendices A and B. Fine weather prevailed during the course of the experiments until the evening of the 13th July, when one or two heavy showers fell. From then until midday of the 14th (when the experiments were concluded) the weather was again fine, the air being cool but dry.

## Appendix C.

DETAILS of experiment intended to show the efficacy of the disease :—

July 17th—*Five* rabbits were fed, at 1.30 p.m., upon cabbage-leaves sprinkled with 5 ccm. of a broth-culture of the microbe of chicken-cholera. At 4 p.m. these five rabbits (having finished their meal of infected food) were placed in a box 1 metre square (Diag. III, *a*) amongst twenty other fresh rabbits.

*Annotations—*(a) Four out of the five fed upon infected food were ear-marked with a "fork" taken out of the tip of the off ear just before being placed in the box amongst the other rabbits. The first of the five was inadvertently placed in the box without being specially marked.

(b) The box referred to consisted again of a four-sided wooden enclosure 1 metre square, having for its bottom the paved floor of a stable stall (Diag. III, 6), and for its top a covering of rabbit-proof wire netting.

*Conditions as to treatment—*All rabbits in the box to be fed twice a day, and the carcasses of any that die to be left in the box until the conclusion of the experiment.

*Result—*July 18th—*One* of those fed upon infected food (and ear-marked) found dead at 5 p.m.July 19th—*Two* more of those fed upon infected food (and ear-marked) found dead at 9 a.m.July 23rd—*Two* more found dead at 5 p.m.*Three* more found dead at 8.30 p.m.July 24th—*One* more found dead at 9 a.m.On examination of *three*, out of the six last dead, the presence of micro-organisms morphologically similar to those of chicken-cholera was demonstrated in fresh preparations of blood. (Zeiss F.)

*Two* fresh rabbits, confined in separate boxes, were inoculated at 4.30 p.m. on the 24th with blood from two out of the three examined as above. They were found dead at 9.30 a.m. (July 25th), and, on examination, the presence of micro-organisms morphologically similar to those of chicken-cholera, was demonstrated, as in previous examinations. (Zeiss F.) *One* rabbit was inoculated, at 1 p.m. on the 25th, with blood from one of these two, and was found dead at 9 a.m. on the 26th. On examination the presence of micro-organisms was demonstrated, as in previous examinations. (Zeiss F.)

July 25th—*Two* more found dead at 9.30 a.m.

July 27th—

*Conclusion of the experiment—*At 4 p.m. the experiment was concluded, and the *fourteen* surviving rabbits were liberated.

*Annotation—*One of these fourteen rabbits was observed to be one of the four ear-marked, as noted in Annotation (a) (17th July) above. It was still alive on the 1st August, when it was treated as may be seen in the notes upon the experiment of that date. (Appendix E, series III.)

*Control experiment—**Vide* control experiment of the same date (17th July). (Appendix D, below.)

## Appendix D.

DETAILS of experiments intended to demonstrate the safety of the disease, viz., the immunity of certain domestic animals :—

The following animals were experimented upon :—

An old horse, placed in one of the stable stalls. (Diag. III, 5.)

A cow (with calf at foot), also in one of the stable stalls. (Diag. III, 2.)

A sheep (six-tooth merino ewe), placed in a wire-netting division of the main enclosure. (Diag. III, 7.)

A goat (a female, in kid), placed in a similar division of the main enclosure. (Diag. III, 8.)

A pig (a young sow), placed in a similar division of the main enclosure. (Diag. III, 9.)

A dog (a young half-bred collie), chained to a post (Diag. III, 10<sup>c</sup>), and provided with a box-kennel. (Diag. III, 10.)

*Annotations—*(a) On no occasion was the above-mentioned calf experimented upon. (b) In other respects, all the animals were kept under normal conditions during the course of the experiments.

July 17th, 1 p.m.—

The horse }  
The cow } was fed upon a small portion of moistened pollard mixed with { 5 ccm. of a broth-culture of the microbe  
The pig } of chicken-cholera.

The sheep }  
The goat } was fed upon a handful of green barley, sprinkled with..... 5 ccm. of the same culture.

The dog was fed upon about  $\frac{1}{4}$  of a pint of milk, mixed with 5 ccm. of the same culture.*Control experiment—*Two rabbits (in one box) were fed upon cabbage leaves sprinkled with 3 ccm. of the same culture.

*Result—*The two rabbits were found dead at 2 p.m. on the 18th, and, on examination, micro-organisms morphologically similar to those of chicken-cholera, were demonstrated as in previous examinations. (Zeiss F.)

*Annotation—*In this and all succeeding control experiments the rabbits were kept in boxes placed in a space denoted by  $\beta$ . Diag. III.

July 18th—The several animals, fed yesterday upon infected food, presented normal appearances.

At noon—

The horse }  
The cow } was fed upon similar food to that given yesterday (July 17th), mixed with the same quantity (5 ccm.)  
The goat } of a broth-culture of the microbe of chicken-cholera.  
The pig }  
The dog }

The sheep was fed upon dry lucerne, sprinkled with 5 ccm. of the same culture.

*Control experiment—**Six* rabbits (in one box) were fed upon cabbage-leaves, sprinkled with 6 ccm. of the same culture.*Result—*

## OF RABBITS IN AUSTRALASIA—REPORT ON M. PASTEUR'S EXPERIMENTS. 141

*Result—*

Three were found dead at 9 a.m. on the 20th. On examination the presence of micro-organisms was demonstrated (in each case) as in previous examinations. (Zeiss F.)

*Annotation—*The other three rabbits were still alive on the 26th July, when they were further treated, as may be seen in the notes on the experiment of that date. (Appendix E, series I.)

July 19th—The several animals again presented normal appearances.

At 11:30 a.m.—

The horse  
The cow  
The sheep  
The goat  
The pig  
The dog

was fed upon similar food to that given yesterday (18th), mixed with the same quantity (5 ccm.) of a broth-culture of the microbe of chicken-cholera.

*Annotation—*The pig left uneaten a small portion of the infected food given to it.

*Control experiments—*

July 19th—(a) Three rabbits, in one box, were fed upon about a handful of green barley, sprinkled with 6 ccm. of the same culture.

*Result—*

One was found dead at 9 a.m. on the 21st, and on examination the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

*Annotation—*The other two rabbits were still alive on the 26th July, when they were treated as may be seen in the notes upon the experiment of that date. (Appendix E, series I.)

July 19th—(b) One rabbit was inoculated with about 5 drops of the same culture.

*Result—*

The rabbit was found dead at 9 a.m. on the 20th, and on examination the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

July 20th—The several animals again presented normal appearances.

At 3:30 p.m.—

The horse  
The cow  
The goat  
The pig

was fed upon a small portion of moistened pollard mixed with  $\left. \begin{array}{l} 17 \text{ ccm.} \\ 10 \text{ ccm.} \\ 5 \text{ ccm.} \\ 5 \text{ ccm.} \end{array} \right\}$  of a broth-culture of the microbe of chicken-cholera.

The sheep was fed upon dry lucerne sprinkled with 17½ ccm. of the same culture.

The dog was fed on about ¼ of a pint of milk mixed with 5 ccm. of the same culture.

*Annotation—*At 4:15 p.m. the sheep had eaten a part only of the food given to it, and it was not until 5:30 p.m. that it had finished all but a few stalks of the lucerne.

*Control experiment—*

July 20th—Six rabbits (in separate compartments of one box) were fed upon turnip leaves sprinkled with 1½ ccm. of the same culture for each rabbit.

*Annotation—*Three of the six were observed to have finished their meal of infected food at 5:30 p.m., and were then fed upon uninfected food. The other three, not having finished their infected food, were left unfed until the morning (21st), when practically all the meal given on the previous afternoon was finished.

*Result—*

July 21st—Three were found dead at 3 p.m.; one more found dead at 5:30 p.m.

July 22nd—One more found dead at 11:30 a.m.

On examination of four of the above five, the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

One fresh rabbit was inoculated at 11:30 a.m. on the 22nd, with blood from one of the four examined. It was found dead at 8 a.m. on the 23rd, and on examination the presence of micro-organisms was demonstrated, as in previous examinations. (Zeiss F.)

*Annotation—*The other rabbit was still alive on the 26th July, when it was treated as may be seen in the notes on the experiment of that date. (Appendix E, series I.)

July 21st—All the animals at the time of feeding again presented normal appearances.

At 4 p.m.—

The horse  
The cow  
The goat  
The pig

was fed upon a small portion of moistened pollard mixed with  $\left. \begin{array}{l} 15 \text{ ccm.} \\ 15 \text{ ccm.} \\ 25 \text{ ccm.} \\ 15 \text{ ccm.} \end{array} \right\}$  of a broth-culture of the microbe of chicken-cholera.

The sheep was fed upon some dry oats and chaff mixed with 25 ccm. of the same culture

The dog was fed upon about ¼ of a pint of milk mixed with 12 ccm. of the same culture.

*Annotation—*The sheep did not finish its meal at once, but had done so at 4:30 p.m.

*Control experiments—*

July 21st (a)—Three rabbits (confined in separate compartments) were fed upon dry oats chaff, sprinkled with 1½ ccm. of the same culture for each rabbit.

*Result—*

July 22nd—One was found dead at 4:45 p.m. P.M.—The appearance of the organs was similar to that as observed in rabbits dead of chicken-cholera.

One fresh rabbit was inoculated at 5:30 p.m. on the 22nd, with blood from the above. It was found dead at 8 a.m. on the 23rd, and on examination the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

July 23rd—One more found dead at 5 p.m.

*Annotation—*The third rabbit was still alive on the 25th, when it escaped from its box during the night. It was found on the 26th in the stable-drain and killed.

July 21st (b)—Three rabbits (also in separate compartments) were fed upon dry oats sprinkled with 1½ ccm. of the same culture for each rabbit.

*Result—*

July 23rd—One was found dead at 8 a.m. On examination on the 24th the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

*Annotation—*The other two were still alive on the 26th July, when they were treated as may be seen in the notes on experiment of that date. (Appendix E, series I.)

July 21st to 26th—

From 3:30 p.m. on the 21st to 3:30 p.m. on the 26th July, all the domestic animals presented normal appearances. Between the times named infected food was not given to them.

July 26th, at 3:30 p.m.—

The horse  
The cow  
The sheep  
The goat  
The pig

was fed upon a small portion of moistened pollard mixed with  $\left. \begin{array}{l} 45 \text{ ccm.} \\ 65 \text{ ccm.} \\ 80 \text{ ccm.} \\ 45 \text{ ccm.} \\ 45 \text{ ccm.} \end{array} \right\}$  of a broth-culture of the microbe of chicken-cholera.

The dog was fed upon about ¼ of a pint of milk mixed with 50 ccm. of the same culture.

*Annotation—*The sheep and pig each received a smaller portion of food than usual in the morning, thereby causing them to finish their meal of infected food more quickly.

*Control—*

## 142 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

*Control experiment—*

July 26th—*Ten* rabbits were fed in one box (without separate compartments) upon green barley sprinkled with 15 ccm. of the same culture as above.

*Annotation—*These ten rabbits had not been fed as usual in the morning, thereby causing them to finish their meal of infected food more quickly.

*Result—*

July 27th—*Two* were found dead at 9 a.m., and *one* more at 2 p.m. On examination of two of the three the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.) *Three* more found dead at 5.30 p.m.

July 28th—The remaining *four* found dead at 9.30 a.m. On examination of one of the seven last dead the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

## August 1st—

*Conclusion of experiment—*

From 3.30 p.m. on the 26th July to 2.30 p.m. on the 1st August all the domestic animals under observation presented normal appearances. At the latter date and hour the time for keeping the animals under observation expired.

*Annotation—*At 5 p.m. on the 29th July the goat was observed to have broken into the sheep's pen. The goat was left therein until the conclusion of the experiment, the sheep being placed in the pen previously occupied by the goat. It may also be noted here that (with the above exception) the animals remained, during the whole period in which they were under observation, in the respective enclosures in which they were originally placed.

Weather during the course of the experiments referred to in Appendices C and D: Fine weather prevailed from the 17th to the night of the 27th July, when heavy rain fell. Showers continued to fall during the morning of the 28th; the weather then cleared up until the night of the 29th, when the atmosphere became very damp, with a dense fog lasting until 9 a.m. on the 30th. From the 30th to the conclusion of the experiments the weather was generally fine and cool, with more or less of a westerly wind.

## Appendix E.

DETAILS of further experiments upon rabbits surviving from previous experiments:—

## SERIES I.

## July 26th, 2.30 p.m.—

The rabbits remaining alive from previous control experiments, viz.:—

From control experiment of 18th July (v. page 141),	<i>three</i>
"                    "          19th July (v. page 141),	<i>two</i>
"                    "          20th July (v. page 141),	<i>one</i>
"                    "          21st July (v. page 141),	<i>two</i>

*in all eight*, were placed in one box (without separate compartments) and fed upon green barley sprinkled with 12 ccm. of the same culture as used in feeding the domestic animals on infected food this date. (*Vide* Appendix D, page 3.)

*Annotation—*These eight rabbits had not been fed as usual in the morning, thereby causing them to finish their meal of infected food more quickly.

*Result—*

July 27th—*Two* were found dead at 5.30 p.m.

July 28th—*Two* more found dead at 9.30 a.m.

On examination of *one* of the four the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

July 29th—*One* more found dead at 4 p.m. On examination (on the 30th) the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

*Annotation—*The three remaining rabbits were still alive on the 1st August, when they were treated as may be seen in the notes upon experiments referred to in Series II and IV of this Appendix (E).

*Control experiment—*

*Vide* control experiment to feeding of domestic animals on infected food this date. (Appendix D, above.)

## SERIES II.

## August 1st, 2.30 p.m.—

*Two* of the three surviving rabbits from the feeding experiments of 26th July (*vide* series I of this App.) were fed (in separate compartments of one box) upon green barley sprinkled with 2 ccm. of a broth-culture of the microbe of chicken-cholera for each rabbit.

*Result—*

August 2nd—*One* found dead at 9.30 a.m. On examination the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

August 3rd—The *other* found dead at 8 a.m.

*Annotation—*The third of the surviving three from experiment of 26th July (series I of this App.), escaped from confinement on the 1st August. On the 2nd August it was found again and treated as may be seen in the notes upon the experiments of that date. (Series IV of this Appendix.)

## SERIES III.

## August 1st, 2.30 p.m.—

The surviving *one* of the four rabbits fed on infected food on the 17th July, and *ear-marked* before being put in the square metre box with the twenty healthy rabbits, was fed upon green barley sprinkled with 2 ccm. of the same culture as used in experiment of Series II of this Appendix.

*Result—*

August 2nd—It was found dead at 9.30 a.m. On examination the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

## SERIES II AND III.

*Control experiment—*

*Two* rabbits were fed (in separate compartments of one box) upon green barley, sprinkled in each case with 1½ ccm. of the same culture as used in the experiments of the series named.

*Result—*

August 2nd—*One* was found dead at 9.30 a.m. On examination the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.) The *other* was found dead at 5.30 p.m.

## SERIES IV.

## August 2nd, 4 p.m.—

The remaining *one* of the three rabbits surviving from the experiment of 26th July (*vide* Annotation, Series II of this Appendix), was fed upon green barley sprinkled with 2 ccm. of a broth-culture of the microbe of chicken-cholera.

*Result—*

August 3rd—It was found dead at 2 p.m. On examination (on the 4th) the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

*Control experiment—**One* rabbit was fed upon green barley sprinkled with 2 ccm. of the same culture.

*Result—*August 3rd—It was found dead at 8.30 a.m. On examination (on the 4th) the presence of micro-organisms was demonstrated as in previous examinations. (Zeiss F.)

## Appendix F.

## Appendix F.

EXPLANATION of Diagrams I, II, and III, referred to in this Report :—

*Diagram I* is a sketch of the stable in plane section.

The stable is a galvanized-iron building, one storey-high, containing six paved stalls and an open space (unpaved) between the stalls and the beginning of the roofed-in wire gauze enclosure, as sketched in Diagram III. There is a one-brick wall running round the three inside walls of the stable enclosure, to a height of from 2 to 3 feet from the ground.

1 to 6 represent ordinary paved stable stalls.

*a* and *b* are referred to particularly in Appendix B.*c* is referred to particularly in Appendix A.*d* represents a drain in front of the stalls, running across the whole width of the stable, and emptying outside into a tank.*e, e* represents a porch-entrance to the stable, having double doors.*f* represents a temporary fence of wire and wire-netting, erected to prevent the calf (or any other animal that might get loose) passing from the stable to the main enclosure and *vice versa*.*Diagram II* shows the height of the divisions between the stable stalls, and also a vertical section of the stable, on a scale of 5 feet to the inch.*Diagram III* is a sketch of the stable and main enclosure (on half the scale of Diagrams I and II).*Stable*—The description of the stable, as given above, applies to this diagram also, except in the following respects :—*a* is referred to particularly in Appendix C.*β* The space occupied by the various control experiment boxes referred to in the several Appendices.*Enclosures 7, 8, and 9* represent the pens of wire-netting erected for the temporary accommodation of the sheep, goat, and pig respectively.*10* represents the kennel for the dog, and*10'* represents the post to which the dog was chained.*g* represents the outside wall of the main enclosure.*h* represents an inside protecting fence of posts and barbed wire.*k* represents the direct entrance to the main enclosure (double doors).*l, l* represent posts supporting the wire-gauze roof of the enclosure.

## SECTION XI.

EXPERIMENTS with microbes of chicken-cholera, conducted by Dr. Katz,  
Chief Expert to the Commission.PROGRESS REPORT (No. I.) ON EXPERIMENTS WITH THE MICROBES OF  
CHICKEN-CHOLERA.

Rodd Island, 21 September, 1888.

To the Chairman, Experiment Committee, Rabbit Commission,—

BEFORE proceeding to report on the various experiments conducted by me, during the period mentioned below, with the microbes of chicken-cholera on wild Australian rabbits, I must say a few words as to the material used for the carrying out of these experiments.

On August 4th, 1888, I took—with permission of M. Loir, who was then concluding his experiments of demonstration on behalf of M. Pasteur (*vide* report thereon)—some blood from the heart of a rabbit that had died after having been fed on food infected\* with a broth-culture of the microbe of chicken-cholera, and transferred this blood to two test-tubes containing a specially prepared infusion of rabbit flesh.

This infusion was prepared in the following way :—The lean flesh of a few well-nourished, thoroughly healthy wild rabbits was finely minced up and mixed with double the quantity (in weight) of distilled water in a spacious glass jar. It was then allowed to stand, in a cool room, for twenty-four hours, during which period it was stirred up from time to time. The mixture was then filtered and pressed through strong cheese-cloth into clean glass flasks, which, after having been filled to about two-thirds of their capacity, were exposed to steam of 100° C.† (212° F.), produced in a copper cylinder (steam steriliser) for about three-quarters of an hour. Immediately after that the contents of the flasks were filtered through fine filtering paper. The precipitated albuminous substances having thus been removed, the filtrate, representing in the flasks a clear light-yellowish liquid, was rendered slightly alkaline by means of a 20 per cent. watery solution of pure anhydrous carbonate of soda, which was obtained by heating pure bicarbonate of soda. The liquid was then retransferred to the steam cylinder for some time, filtered again, distributed into test tubes in quantities of about 10 ccm.‡ (for tubes of 25-30 ccm. capacity), and about 20 ccm. (for tubes of 50-60 ccm. capacity), and sterilised.

The nutrient gelatine alluded to in this report was thus prepared :—Six parts of extra fine gelatine were, in proportion, dissolved in a hundred parts of the original rabbit-flesh infusion, after it had been steamed and filtered (*vide* above.) This mixture was then rendered slightly alkaline as before,  $\frac{1}{2}$  per cent. chloride of sodium added to it, and afterwards placed in the steam cylinder for about twenty minutes. It was then filtered, distributed in test tubes, and sterilised.

On this occasion I will remark once for all that the manipulations necessary for the obtaining and successful continuation of pure cultures of the micro-organism under consideration, were guided by antiseptic precautions; that the cotton-wool stoppered glass tubes intending to contain the nourishing soils were sterilised by dry heat; and finally, that the nourishing media, before being used, were thoroughly tested for their sterility.

From the cultures obtained another growth, in similar broth, was secured; from this culture a rabbit was inoculated, which, after death, furnished the material for further cultivations (Aug. 10). A small platinum-loop full of heart-blood of this rabbit was mixed with gelatine, liquefied at between 30° and 40° C., and from this gelatine two successive attenuations in two more tubes with liquefied gelatine were prepared. The gelatine, still liquid in all three tubes, was made to solidify, by means of cold water (according to the "roll-method"), along the inner walls of the tubes, when, after a few days incubation at a temperature of between 20° and 23° C., the third tube was found to answer best for further cultures, as there was only a limited number of points of growth, or "colonies," derived from germs deposited at different spots in or on the layer of gelatine.

One

\* In every case where the word *infected* is used it denotes fed or mixed with material competent to produce the disease—"chicken-cholera."† 1° C. = ( $\frac{9}{5}$  Fahr.)+32. 15° C. (c.g.) = (15 ×  $\frac{9}{5}$  F.)+32.

‡ One cubic centimetre (ccm.) is equal to sixteen minims; one minim is generally considered as equal to one drop.

## 144 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

One of these "colonies" formed the material from which pure cultures in successive generations, as used in the undermentioned experiments, were obtained. I may, however, mention that pure cultures may be obtained directly from fresh virulent\* rabbit blood, which—as direct observations have shown—contains, as a rule, only the microbes under consideration.

The identity of these microbes with the microbes of chicken-cholera was undoubted, as shown by testing their morphological and physiological properties. Besides, the microbes came, indirectly, from Pasteur's laboratory, and this alone should be regarded as a sufficient guarantee of such an identity.†

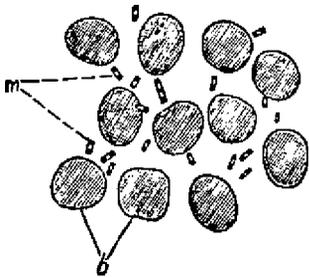


Fig. 1.

Blood of a rabbit dead of "Chicken-cholera."  
Cover-glass preparation stained with Loeffler's  
methylene blue.  
m. Microbes.  
b. Red blood-corpuscles.  
× 1000 (approximately).



Fig. 2

Microbes of Chicken-cholera from fresh broth-culture.  
Cover-glass preparation stained with Loeffler's  
methylene blue.  
× 1000 (approximately).

In order to avoid repetitions, I may state beforehand that the broth-cultures alluded to in the various experiments were always such as had been in a thermostat for two days at temperatures having their maximum at 37° C., their minimum at 33° C. They were taken out of the thermostat immediately before the experiments commenced. Before infecting rabbits with such cultures along with food, I took the precaution to starve them to some slight extent, thereby causing them to eat their infected food speedily. (For further particulars see Appendices.) The same practice was followed with regard to uninfected rabbits used in the artificial burrow experiments (Appendix A). The culture was spread on about as much food as was required by the respective rabbits for one meal.

The way in which the culture was administered along with food (fresh cabbage leaves, with one exception, when green barley was used) was as follows: At the bottom of an ordinary soup-plate a layer of the green food was placed, and sprinkled with one ccm. of culture, by means of a glass pipette, which had been drawn out into a fine tube in the gas-flame. This layer was then covered with another layer, which in case only 1 ccm. of culture was employed, was at once pressed down on the former by means of two flat wooden sticks, the whole repeatedly manipulated and given to the rabbit on a wooden board, on the surface of which there was a fresh leaf, not sprinkled. In case 2 ccm. of culture were to be given to the rabbit, the abovementioned second layer was sprinkled with the second ccm., then covered with another layer, and the whole pressed together. In case 2½ ccm. were to be administered, the third-mentioned layer was sprinkled with the ½ ccm., and so on. The result of all these arrangements was that the infective material adhered firmly to the food, and that, consequently, danger of the infected broth becoming detached from the latter while the animal was eating was reduced to a minimum.

By feeding the different animals to be infected in separate compartments, the arrangement of the experiments was naturally more exact than it would have been if two or more had been fed together.

With a view to ascertaining whether or not infection occurs among healthy rabbits exposed to rabbits which had been infected with the virus of chicken-cholera, three sets of experiments were conducted namely,—

I.—In artificial burrows.

II.—In hutches—wooden bottomed and wire-netting bottomed.

III.—In boxes or hutches in which rabbits had died of the disease ("chicken-cholera").

As a detailed description of the arrangement of these experiments, of the results they yielded, and of other noteworthy facts, is put together in the attached Appendices A–C, I may well abstain here from entering into repetitions, and may at once proceed to give a summary. Before that, however, I will state that all the rabbits used in the course of the above three sets of experiments were wild rabbits from near Hay, New South Wales, and, unless mentioned otherwise in the reports, full-grown animals.

I will now sum up the main results of the above experiments, and the inferences that may be drawn from them.

1. Australian rabbits are, to judge from a number of experiments conducted, highly susceptible to infection by the virulent microbe of chicken-cholera through their digestive organs. Of twenty-seven rabbits in all infected, each with a small portion of a virulent broth-culture (2½–1 ccm.), or of virulent blood (one case), twenty-five succumbed in from 19 to 48 hours from the time the infected food had been given to them (most of them were found dead after 20–24 hours), but as it took some time (in some cases more, in others less) before the respective animals had finished their infected meal, they died from the effects of such a meal in less time than that noted. Of the remaining two (fed with 1 ccm. of virulent culture for each) of those twenty-seven rabbits one died of some other cause (*vide* Appendix B, series I, pages 151, 152), the other did not die at all until it was infected again, seven days later, with 2 ccm. of a virulent broth-culture (*vide* Appendix B, series II, page 153), when it succumbed to "chicken-cholera" about 25½ hours after being fed.

From these exceptions it would follow that the quantity of virulent culture should not be too small, in other words, should be larger than 1 ccm., in order to secure infection without fail. On the other hand it remains yet to be seen whether Australian rabbits may be rendered immune, or, in other words, whether and in what way they may be able to withstand infection, under any shape, by the microbes under consideration. (For a case of immunity in a tame rabbit, *vide* Appendix D, series II, page 154).

Inoculation

\* The word *virulent*, wherever it occurs in the report, is used in the sense of non-weakened, non-attenuated.

† About the bacteria of Koch's rabbit-septicaemia *vide* footnote, p. 147.

Inoculation, *i.e.*, subcutaneous application, of minute portions of virulent cultures of the microbe (blood of dead rabbits, or artificial cultures), caused the death of sixteen wild rabbits thus experimented upon in from 7½ to about 15 hours, as actually observed (found dead up to 18½ hours after inoculation).

2. The disease set up by the microbes in rabbits is a most acute septicaemia. The incubation occupies most of the time until death, the actual disease being only of comparatively very short duration. The death occurs under clonic cramps and dyspnoea.

3. The cause of death in all the rabbits referred to left no doubt as to its being due to the action of the virulent microbes.

This was proved—

(a) *By the course and symptoms of the disease (paragraph 2 above).*

As regards the body temperature during the course of the disease, I shall give particulars in the next report.

(b) *By the autopsy.*

Of the organs which were invariably found to offer characteristic changes, must in the first instance be mentioned the *lungs*. These always proved to be discoloured; they were very voluminous due to an emphysematous hæmorrhagic œdema involving their entire substance. Their surface presented a shining, mottled or tessellated appearance (corresponding to the hæmorrhages).

The *spleen*, which showed a bluish or bluish-red colour, was more or less hyperæmic.

In the *peritoneal, pleural, and pericardial* cavities existed serous, sometimes hæmorrhagic exudations.

The *bladder* was usually empty, only occasionally distended with urine, which, in the majority of the cases examined, appeared highly (yellow) coloured, with a considerable amount of corpuscular matter distributed in it.

The *intestines* were more or less hyperæmic, containing normal-looking feed material in abundance; the *rectum* showed in almost every case normal faecal balls. Hæmorrhages in the *intestines* did not come under observation.

Now and then there was a serous discharge from the *nostrils*, and froth round them, and round the mouth.

(In cases of inoculation, the seat of inoculation was slightly œdematous).

(c) *By direct examination of the blood.*

The blood was derived from the right ventricle of the heart, stained on cover-glasses with Loeffler's alkaline methylene blue, and examined with homogeneous immersion objectives. It invariably showed the characteristic bacteria of chicken-cholera (*vide* Fig. 1, page 144).

(d) *By artificial cultures.*

Cultures in rabbit-broth, in or on nutrient gelatine, and on nutrient agar-agar presented typical appearances.

(e) *By experiments on rabbits.*

Introduction into healthy rabbits, of both artificial cultures and blood of infected animals, succeeded invariably in reproducing the disease. [For one exception (*tame rabbit*) *vide* Appendix D, series II, page 154].

4. A transmission of the disease from infected rabbits to healthy rabbits in *artificial burrows*, such as were used in the experiments and under the conditions recorded in Appendix A, did not take place in any case. Of the *eight* infected rabbits, *six* (or 75 per cent.) died outside the burrows, *two* (or 25 per cent.) inside.\* The result, that of the *sixteen* fresh rabbits† in the same burrows and enclosures not one succumbed to infection by "chicken-cholera," can scarcely be surprising when we see that the disease runs a most acute and rapid course, appearing as it does in the form of a pure septicaemia, and as a rule, unaccompanied by any liquid, simply-diarrhoeal or hæmorrhagic evacuations.‡ I may, however, point out that this is not always the case, as may be exemplified by the result of the *post-mortem* examination of an infected pregnant doe, which showed abortion of part of the foetuses accompanied by severe hæmorrhages from the vulva.¶ [*Vide* Appendix B, series I, hutch VI, page 152.] Another, but altogether different case, is that of a rabbit infected with the virus of chicken-cholera (2½ ccm. of culture), and taken from one of the burrows after having been three days in it. [*Vide* Appendix A, page 150; diag. VI (c).] The contents of the rectum of this rabbit were not in the shape of faecal balls as usually observed in healthy rabbits as well as in infected ones, but soft, without any visible traces of blood. A small quantity of this faecal matter, collected under proper precautions so as not to injure any blood-vessel, was inoculated into a healthy rabbit which died of veritable septicaemia (chicken-cholera), after 23½ hours. [*Vide* Appendix D, series III (a), page 155. Another rabbit, however, which had been given to eat on cabbage leaves a larger portion of this faecal matter remained alive (*l. c.*) The urine usually passed in the case of rabbits infected with the virus of chicken-cholera, and when still in the bladder, found to be free from blood—is not infectious, if I am permitted to draw this inference from the result of one experiment. Two rabbits were inoculated, each with about ½ ccm. (2 minims) of such urine. The one was found dead in its box after somewhat less than two days, but infection with the microbes, as accounting for this occurrence, was altogether out of question. The other rabbit remained alive. [*Vide* Appendix D, series III (b), page 155.]

5. Without further proof we may not, it appears, conclude that the negative results as to the transmissibility of the disease, fairly deducible from these experiments in artificial burrows, would hold good also when infected rabbits were placed amongst those living under perfectly natural conditions in their own warrens. Rabbits dead of the disease may, as a rule, become the source of infection for healthy rabbits in the same or, perhaps, in neighbouring warrens only when their carcasses have broken up by some means or other, so that the virulent blood, or the various organs containing it, may have a chance of becoming exposed, and in this way gain access somehow or other to wounds or to the digestive organs of healthy animals. This, of course, is more or less a supposition, in support of which I am unable as yet to adduce any decisive experiment. At all events I venture to suggest that a repetition of those experiments, only performed under more natural conditions—say in the open—may yield other, possibly more favourable results. These, of course, would be greatly influenced by climate, soil, vegetation, and last but not least, by such factors as carrion-feeding animals capable of disseminating the virus.

I do not know whether I am justified in assuming that rabbits infected with the microbes of chicken-cholera will in the majority die outside their burrows, when in the open, as has been the case with infected rabbits placed in artificial burrows (*vide* above). If this were so—and the chances are in favour of the supposition—the carcasses of the dead rabbits would be more accessible to the agency of factors such as noted above.

The possibility of a successive infection in the open would also seem to be favoured by the fact that the virus of chicken-cholera preserves its infecting power in conjunction with other bacteria in putrefying or putrid substances for a considerable time.§ I have made some experiments with virulent rabbit

\* Their carcasses were left untouched for three clear days after death.

† These rabbits, unless they died before, were left in the burrow enclosures for seven days from the beginning.

‡ In this and other ways the disease is altogether different from that in poultry.

§ Pregnant females were not among the *eight* infected rabbits in the artificial burrows.

§ *Vide* Kitt. Wert und Unwert der Schutzimpfungen gegen Tierseuchen. Berlin, 1886; p. 65.

rabbit blood. Nineteen days after having been derived from the rabbit, during which time it was allowed to putrefy, it was still able to kill a vigorous rabbit in less than seventeen hours; the autopsy showed infection by "chicken-cholera." [Vide Appendix D, Series III. (c.), page 155.] These experiments will be continued.\*

6. A transmission of the disease from infected rabbits to healthy rabbits in *wooden hutches*, (according to the arrangement described in Appendix B), was successful in so far that of *twenty* rabbits placed with *ten* (half the number) infected rabbits (in different hutches, but always in the proportion of *one* infected to *two* uninfected), *four* (or 20 per cent.) died in consequence of infection by the virus of chicken-cholera in from two days sixteen hours to four days seven hours (*vide* Appendix B, pages 163—165) after being put in the hutches.

In what particular way these fatal results (by transmission of the infection) were brought about, I am unable to decide until all excretions and secretions of infected rabbits have been submitted to a whole series of tests, with a view to ascertaining their virulence or otherwise.

What I may, however, state is, that—

- (a). Here, as well as in the artificial burrow experiments, the feeding of the rabbits after they (infected and uninfected) had been placed in the hutches, was so managed that contamination from outside was excluded.
- (b). The droppings in the hutches did not exhibit anything indicating the presence of hæmorrhages.
- (c). The uninfected rabbits were not observed to gnaw at the carcasses of the dead (infected) ones which were left in the hutches for three clear days.

7. A transmission of the disease to fresh rabbits which were placed in hutches or boxes 10 minutes, 2½ hours, and 13–14 hours after rabbits, dead of infection, had been removed therefrom, did not take place in any of the *five* single experiments made. *Four* of the rabbits died within 4½ and 7 days, of some other cause, the *fifth* was still alive after 8 days.

8. The results of these hutches-experiments, arranged and conducted in the way described, show that transmission of the disease from rabbit to rabbit is possible. Transmission in the open may occur where analogous conditions obtain, but the chances in this case will probably be less favourable than those adduced above.

9. Taking everything into consideration it would seem advisable to have further experiments conducted on a larger scale under quite natural conditions, provided other considerations admit of the use of "chicken-cholera" as a means for the destruction of rabbits.

Before concluding this Report, I would draw attention to an article in the "Centralblatt für Bakteriologie und Parasitenkunde," Band IV, No. 6, August 4th, 1888, by Dr. N. Gamaleia, Vice-director of the Bacteriological Station in Odessa, namely,—

"Contribution to the Etiology of Chicken-cholera, together with some Notes on the question of Protective Vaccination."†

I think the article important enough to entitle me to give it in literal translation.

"Twice already, during a hot summer, I have met in carcasses of pigeons killed by poisoning through non-pathogenic bacteria, with bacteria which occur spontaneously, so to say, and which, by successive transmissions through pigeons, attain such a degree of virulence, that a single drop of heart-blood from the dead pigeon is able, by means of subcutaneous application, to kill the next pigeon within a few hours. The carcasses showed the appearances of the most acute septicæmia, no reaction at the seat of inoculation, hyperæmia of the intestinal canal, and a large number of bacteria in the blood.

"These bacteria appeared in the shape of fine rods, their centres staining only with difficulty. They resembled altogether the bacteria of chicken-cholera, both by their form and their growth in broth, in gelatine, and in agar-agar.

"It was not until lately that I had the opportunity of conducting further investigations into the nature and the origin of these unwelcome aggressors. It was to be ascertained, as we had not any chicken-cholera in our laboratory at the time: Can they be identified with the bacteria of chicken-cholera? Are the latter, therefore, to be regarded as being dispersed in Nature, possessed of the faculty of putting in an appearance without specific infection?

"In the literature there are some hints at such a behaviour of the microbes of chicken-cholera.

"Thus, Toussaint, for instance, gives it as his opinion that chicken-cholera is septicæmia, which can be called into existence by various putrid substances. His works to this effect are, however, of little importance, because he evidently confounds chicken-cholera with the vibrio-septicæmia.‡

"Marchiafava and Celli, in spite of numerous experiments, were not able to produce chicken-cholera by means of putrid or purulent substances ||

"Experiments by Kitt also yielded negative results. Nevertheless he supposed—supported by spontaneous occurrences of chicken-cholera, which, for instance, made its appearance in consequence of feeding on putrid flesh or dipterous larvæ—that the chicken-cholera microbe, which has a far range of distribution, may happen to get into a wound of a fowl, and thus give rise to an epidemic.

"Such suppositions, however, are hardly compatible with the biological properties of the bacteria of chicken-cholera. For a general saprophytic distribution of the microbes of chicken-cholera in the dead nature is not at all in harmony with their liability to perish when acted upon by dryness, light, and air.

"I have hit upon the following explanation:—Influenced by poisoning, the organism of the pigeon lost its power to withstand the attacking bacteria from the intestinal canal, and in this way the latter gained the upper hand in the blood. Or, in other words: I thought the bacteria of chicken-cholera to be constant parasites in the normal intestinal canal of a bird.

"For the solving of this question the following experiments were undertaken:—

#### I.

"On 30/V a healthy pigeon was killed (the remaining pigeons of the same lot did not manifest any traces of sickness later on). The contents of the stomach, of the small intestines, and of the rectum were, mixed with sterilised broth, introduced subcutaneously into a fresh rabbit. "On

\* After twenty-two days it killed a vigorous rabbit in from fifty-one to fifty-four hours after inoculation; the autopsy showed the same result. After twenty-six days the blood had lost its virulence, as is evidenced by a rabbit surviving inoculation (after seven days) Oct. 1.

† Zur Aetologie der Hühnercholera. Nebst einigen Bemerkungen über die Schutzimpfungsfrage.

‡ Toussaint, L'identité de la septicémie expérimentale aigüe et du cholera des poules. (Compt. Rend. T. XCI, 1880; p. 301.)

§ S. Kitt's Wert und Unwert der Schutzimpfungen, p. 63.

"On 31/V the rabbit succumbed. The autopsy showed a gelatinous œdema at the place of inoculation. The intestines were filled with liquid contents; the spleen was cherry-brown. In the heart-blood was a considerable number of fine rods, which perfectly resembled the bacteria of chicken-cholera. With this blood another rabbit was inoculated, and agar-agar, gelatine, and broth sown.

"This rabbit was found dead on the morning of 1/VI. At the seat of inoculation was a gelatinous œdema; the spleen was faintly hyperæmic. Numerous bacteria of chicken-cholera occurred in the heart-blood, from which cultures were prepared and a fresh rabbit inoculated.

"This rabbit died at night, 2/VI. At the place of inoculation was a small hæmorrhagic œdema, and the same bacteria occurred in the blood of the heart. With this blood, also, a rabbit and a pigeon were inoculated.

"Both animals succumbed on 3/VI. The rabbit exhibited the familiar appearances. The pigeon had the spleen very hyperæmic and soft, and the intestines filled with a liquid, impregnated with blood. In the blood of the heart were the same bacteria as in the previous cases. With this blood two pigeons were inoculated, and gelatine, agar-agar, and broth sown.

"On 4/VI, at night, the pigeons succumbed. In the first there was hæmorrhagic coagulum at the seat of inoculation,\* a hyperæmic and soft spleen, hyperæmia of small intestines, and many bacteria in the heart-blood.

"The other pigeon showed hæmorrhages in the intestines, and diarrhœa, a very soft and dark spleen, and very many bacteria in the blood. This was inoculated into two pigeons.

"On 5/VI, towards morning, both were dead. The autopsy of both of them yielded the same result.

"I may add that all the dead pigeons exhibited altogether typical symptoms of the disease—spread-out plumage, drowsiness, diarrhœa. Cultures from blood of the above-mentioned manifested all the features of the cultures of the microbe of chicken-cholera—a faint turbidity of the broth, a drop-like growth on gelatine, a white layer on agar-agar, failure of growth in beer-wort.

"A complete proof of the identity of the bacteria found by me with those of chicken-cholera will be given below.

## II.

"On 3/VI a healthy pigeon was killed and dissected, and the contents of the intestines inoculated (subcutaneously) into a *Ziesel*.† On 4/VI the animal succumbed. The place of inoculation, the intestines, and the spleen did not differ much from the normal appearance; in the blood was found a rather inconsiderable number of bacteria. With these a fresh *Ziesel* was infected.

"On 5/VI, at night, it succumbed. At the place of inoculation was a granular inflammation, accompanied by purulence in the centre; there was a hyperæmic spleen, and in the heart-blood a number of typical bacteria of chicken-cholera. This blood was inoculated into a pigeon, which died on 26/V (?)‡, exhibiting the spleen strongly hyperæmic and soft, and the intestines filled with liquid hæmorrhagic contents. In blood from the heart were found the typical bacteria of chicken-cholera. With this blood again, a pigeon was infected, which died on 27/V. (P)§ at night. Hyperæmia of intestines and spleen, typical bacteria in the heart-blood, from which broth, gelatine, and agar-agar were sown. In each case characteristic cultures of the microbe were obtained.

"The result of these two series of experiments shows that the intestinal canal of healthy pigeons contains bacteria, which are identical with the microbes of chicken-cholera in all their morphological as well as physiological characteristics examined. As, however, the bacteria of rabbit-septicæmia resemble altogether the bacteria of chicken-cholera, I have had to prove, in order to complete my argumentation, that my bacteria possess also the specific property of the chicken-cholera microbes, a property discovered by M. Pasteur, namely, that under certain conditions they confer immunity against chicken-cholera.§

"I may be permitted to note something about the conditions necessary for the vaccinations, in so far as they have been made clear by my investigations into protective vaccinations.

"I showed by means of direct experiments on more than 300 sheep, that vaccinations against anthrax bestow a lasting and never-failing immunity when their effect manifests itself by an increased but not long-continued fever (about 2° C. above the normal).¶

"The significance of this *vaccinal fever* is also cleared up by direct researches. It consists in the fact that, during its duration, there takes place a multiplication of the vaccines, as well as a destruction of the same in the interior organs.\*\* From this would seem to follow that the vaccinal fever is indispensable also with regard to other protective vaccinations.††

"The following experiment justifies this presupposition as regards chicken-cholera.

## III.

### *Protective Vaccination.*

"On 24/V, the heart-blood of a pigeon (I series) was mixed with broth, and, in the portion of  $\frac{1}{4}$  ccm. inoculated under the skin of the wing of a fresh fowl. The fowl remained somewhat languid on the following day, but soon recovered. On 27/V the heart blood of a pigeon (inoculated the day before with a culture that had been obtained from the I series—the pigeon died at night) was mixed with broth, and, in the portion of  $\frac{1}{2}$  ccm. inoculated into the pectoral muscle of the same fowl. This time the fowl evidently became sick; it had bad appetite for two days, the evacuations were somewhat thin and liquid, but it recovered again. "On

\* "Repeatedly I have found, at the place of inoculation, these changes which Kitt considers as characteristic of cholera in pigeons. Thus, a pigeon was inoculated, 24/VI, with a culture of my bacteria. At night it succumbed, showing, besides the typical features, at the place of inoculation yellow, subcutaneous, and inter-muscular formations."

† A rodent (*Spermophilus citellus* (L.) Wagler), very common in certain parts of Europe. (O.K.)

‡ Should probably be 6/VI. (O.K.)

§ Should probably be 7/VI. (O.K.)

¶ So far as I am aware experiments in this direction with the microbes of (Koch's) rabbit-septicæmia, have not yet been conducted or at least published. It is premature, in my opinion, to say that the two microbes differ from one another on account of the one (the microbe of chicken-cholera) being shown to possess the faculty alluded to, and the other (the microbe of rabbit-septicæmia) not yet being shown to possess it or not. (O.K.)

\*\* "I vide my accounts in the 'Agricultural Society,' Odessa, January and May, 1888."

†† "Sur la destruction des microbes dans les organismes fébricitants (Ann. de l'Inst. Pasteur. Mai 1888)."

‡‡ "Save rabies, where the same effect is caused in another way. 'I vide 'Sur la vaccination préventive de la rage.' (Ann. de l'Inst. Pasteur. Mai 1887)."

"On 2/VI the heart-blood of a pigeon (inoculated the day before with a culture that had been obtained from the I series—the pigeon died at night) was mixed with broth, and, in the portion of a full cem. inoculated into the pectoral muscle of the same fowl. The fowl did not become sick at all.

*Control by the virus of chicken-cholera.*

"On 5/VI a culture of the virus of chicken-cholera, sent to me from Pasteur's laboratory, was inoculated into a fresh fowl, which died on 7/VI, at night. Its heart-blood containing typical bacteria of chicken-cholera, was, in the same portion (1 cem.) inoculated into the pectoral muscles of the preserved fowl as well as the control fowl.

"The control fowl perished the following night, of typical chicken-cholera, as was proved by the course of the sickness, by the *post-mortem* examination, by microscopical examination, and by cultures, whereas the preserved fowl did not manifest the least signs of illness and remained well up to date."

In explanation of these facts, Dr. Gamaleia furnishes a table of temperatures\* recorded during the course of the experiments at the first and second vaccinations, at the control by the same and by M. Pasteur's virus. The first vaccination was followed on the second day by an increase in the temperature of the fowl of 1.7° C. (from 42° to 43.7°); the second vaccination by an increase of 1.5° C. (from 41.7° to 43.2°). The control inoculation by the same and Pasteur's virus did not produce any essential change in the temperature of the preserved fowl, whereas the control fowl inoculated with Pasteur's virus, showed on the second day an increase in the temperature of 2° C. (from 42° to 44°) before it died, somewhat later.

"From this it follows that in regard to chicken-cholera, as well as anthrax, the vaccinal fever is an indispensable and sufficient condition for producing immunity.

"Returning to our main object, we are allowed to draw the conclusion that our chicken-cholera bacteria, which were obtained from the intestines of a healthy pigeon, protect not only against repeated infection by themselves, but also in regard to the undoubted bacteria of chicken-cholera from Pasteur's laboratory.

"Therefore our bacteria are in every respect identical with the genuine chicken-cholera bacteria, or in other words: *The chicken-cholera bacteria must be regarded as constant parasites of the intestinal canal of pigeons, perhaps also of other birds*, in a similar manner as the septic-vibrio is an inmate of mammals (Pasteur). Therefore I propose to strike out the altogether inappropriate designation "bacteria of chicken-cholera" to replace it by a scientific name "bird septicæmia" and to assign the microbes to the genus *coccobacillus*, with the species name *avicidus*.

"The explanation for *coccobacillus avicidus* being found in the intestines of a bird without doing any harm, is given by the form existing there *not* being virulent enough, and being able to produce a disease only in susceptible animals—rabbit and Ziesel. Repeatedly I inoculated the contents of the intestines of pigeons into other pigeons, but not once did these inoculations bring about a deadly infection (chicken-cholera).

"Usually they did not call forth any perceptible disturbances in the organism of the animals, and caused only in exceptional cases an increase in the temperature, drowsiness, and diarrhoeal evacuations, in which the typical *coccobacilli avicidi* could be recognised.

"This fact of the presence of non-virulent *coccobacilli avicidi* in the normal intestines of birds furnishes an easy and practical method for preparing their vaccine. For this it is sufficient to proceed in such a way as has been described in the first series of experiments, in which, for this very reason, have been given all details. By way of transmission through rabbits there is obtained a virus of such a strength that, by injection of one cem. into the pectoral muscle, it kills pigeons the next day, and fowls the fourth to fifth day. This virus may be used for vaccinating fowls according to the process explained by me in the third series of experiments.

"Then a most important question presents itself: under what conditions do the *coccobacilli avicidi*, harmless to their host, attain their dreaded epidemic virulence?

"In my experiments quoted at the beginning of this paper, the cause of such an increase was poisoning by potato *bacilli* and Naples *bacilli*. In those cases the occurrence of chicken-cholera may be explained, (1) By a general poisoning, by means of chemical products of the vital activity of non-pathogenic bacteria; (2) By gastro-enteritis, which can be produced by those bacteria; (3) By the removal from the intestinal canal of all mesoderm phagocytes, which must be engaged in the digesting of large quantities of the introduced saprophytes.

"Although, for the present, I cannot adduce in support of this presupposition any decisive experiments, I am inclined to adopt it in the face of the negative results yielded in regard to the first two points (artificial gastro-enteritis or poisoning), and I may be permitted to sum up as follows:—

"Microbes of chicken-cholera inhabit, in slightly virulent varieties, the normal intestinal canal of birds, and must be assigned to the entosaprophytes which are facultative parasites.

"Protective vaccinations against chicken-cholera are subject to the general principle of vaccinal fever."

Odessa, June, 1888.

The results obtained in the foregoing experiments by Dr. Gamaleia are interesting enough to recommend inquiries being made with a view to ascertaining whether similar results may be obtained with reference to birds on Australian soil. It would seem advisable to try the effect on rabbits (and not only on birds) of the inoculation (or otherwise) of the contents of the intestinal canal, not only of birds that have died under suspicious circumstances, but also of perfectly healthy birds. In this connection I may just as well mention an experiment, which, however, yielded a negative result. On September 13th, 1888, I received a dead young chicken sent from Mr. Jainsay Thompson, in Burwood. (The mortality amongst chickens there has been very great, according to information). It was kept in an ice-chest till September 14th, when (1) a microscopical examination of heart-blood was made, (2) a half-grown rabbit was inoculated at 11.30 a.m. with a portion of the contents of the intestines. Results: (1) micro-organisms resembling those of chicken-cholera absent, and (2) the rabbit died on September 15th, between 11 a.m. and 12.30 p.m., but on examination there was no proof of its having succumbed to infection by the microbe of chicken-cholera. (Another half-grown rabbit was inoculated with blood from the same chicken and died, also on the 15th September, between 9.20 a.m. and 11 a.m.; result of *post-mortem* examination also negative.)

REPORT

\* The normal temperature of fowls fluctuates, according to his inquiries, between 41.5° and 42.5° C. (O.K.)

## REPORT ON MISCELLANEOUS EXPERIMENTS WITH THE MICROBES OF CHICKEN-CHOLERA.

In Appendix D will be found details of miscellaneous experiments on—

- I. Hares.
- II. Tame rabbits.
- III. Wild rabbits.
  - (a) With fecal matter from an infected rabbit.
  - (b) With urine from an infected rabbit.
  - (c) With virulent blood allowed to putrefy.
- IV. On ferrets.

*ad* I. Hares are very liable to take the disease both by feeding and by inoculation.

*ad* II. One tame Angora rabbit was found to be proof against inoculation with a virulent culture of the bacterium of chicken-cholera after having been fed three successive times with  $1\frac{1}{2}$  ccm., 3 ccm., and  $4\frac{1}{2}$  ccm. of a virulent culture of this bacterium. This is, to my knowledge, the first recorded case of a rabbit having proved immune against inoculation, let this immunity be a natural or an acquired one. Although I cannot furnish any absolute proof, I am inclined to adopt the latter alternative. It is intended to inoculate this rabbit once more, this time with virulent blood, as soon as the healing of the abscess, which has formed at the place of inoculation, is completed.

*ad* III. These experiments and their results have already been alluded to in the summary of the first report (pages 145, 146).

- (a) The fecal matter of an infected rabbit was not able to infect a fresh rabbit by feeding with a small portion of this matter, whereas inoculation with a minute quantity into another rabbit caused the animal to succumb to "chicken-cholera."
- (b) Urine of infected rabbits is not infective (one experiment).
- (c) Blood containing the microbes and allowed to putrefy, retains its virulence for some considerable time.

*ad* IV. Ferrets are not liable to take "chicken-cholera," either by being inoculated or by feeding.

OSCAR KATZ.

## APPENDICES.

- A.—Details of experiments with the microbes of chicken-cholera on rabbits in artificial burrows.
- B.—Details of experiments with the microbes of chicken-cholera on rabbits in hutches.
- C.—Details of experiments on rabbits placed in boxes or hutches in which rabbits had died of infection by the microbes of chicken-cholera.
- D.—Details of miscellaneous experiments with the microbes of chicken-cholera:—
  - Series I.—On hares.
  - Series II.—On tame rabbits.
  - Series III.—On wild rabbits—
    - (a) With fecal matter from an infected rabbit.
    - (b) With urine from an infected rabbit.
    - (c) With virulent blood, allowed to putrefy.
  - Series IV.—On ferrets.
- E.—Explanation of Diagrams IV to VII, referred to in this Report.

## Appendix A.

## DETAILS of Experiments with the Microbes of Chicken-cholera on Rabbits in Artificial Burrows.

THE following is a short description of the burrows made use of in the experiments under consideration:—

From the loose sandy ground-surface of the roofed-in wire-gauze enclosure\* (Diag. IV), hereinafter referred to as "the main enclosure," a small trench was taken out, as nearly as possible 5 inches deep and  $4\frac{1}{2}$  inches wide. The trench was then covered with boards wide enough to prevent soil falling into it, the boards being thereafter covered with the soil taken out of the trench. Here and there the bottom of the burrows was directly formed of solid rock (hard sandstone), of which Rodd Island (where all experiments were conducted) is built up. The soil was quite dry when the burrows were made, and remained so, in the burrows, during the whole course of the experiments.

There were three burrows, each one being surrounded, at some distance, by a wire-netting fence preventing the rabbits therein from mixing with the rabbits in the other burrows. One of these three, however,—

Burrow A (Diag. V), was divided into three subdivisions (separated from one another by wire-netting), viz.,—

Subdivision AA,	containing in all about	16'	of burrow
" BB,	" "	16'	6" of burrow
" CC,	" "	13'	6" "

The other two, viz.,—

Burrow B (Diag. VI), containing in all about 58' of burrow, and

Burrow C (Diag. VII), " " 70' "

were without subdivisions.

The experiments were begun on

August 28, at 11 a.m., when eight rabbits were fed,† in separate compartments, upon cabbage leaves infected with  $2\frac{1}{2}$  ccm. (for each rabbit) of a virulent broth-culture of the microbe of chicken-cholera, of the 4th generation.‡

## Annotations:

- (a) These eight rabbits had been marked, before being fed on infected food, with a special mark for each rabbit, so that each one could be subsequently identified when in the burrow enclosures.
- (b) The eight rabbits had only received a small quantity of food on the night of the 27th, and were not given any on the morning of the 28th August until fed upon the infected food.
- (c) At 1 p.m. five of these rabbits had finished eating the portions of infected food given to them, whilst three had only about half finished their portions. At 3 p.m. all of the eight had finished their meal.
- (d) The hutches in which the eight rabbits were fed upon infected food were placed in such a position as to prevent the sun from shining into them.
- (e) The eight rabbits were selected as being especially vigorous and healthy.

At the same time,

Sixteen healthy-looking rabbits were fed, in separate compartments, on as nearly as possible the same quantity of uninfected cabbage leaves as given to the eight fed upon infected leaves.

Annotations

\* A description of this enclosure may be found on reference to section VIII. of the Report, p. 136, and to section X., Appendix F, on page 143, and Diagram III at end of Appendices.

† For control experiments, vide below.

‡ The history of this culture is as follows:—Colony from virulent blood of a rabbit, fed on culture, 29/VIII, 1888, = I generation; gelatine stick-culture, 14/VIII, = II generation; broth-culture, 23/VIII, = III generation; broth-culture, 29/VIII, = IV generation.

## 150 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

*Annotations :*

- (a) These sixteen rabbits had only received a small quantity of food on the night of the 27th, and were not given any on the morning of the 28th August until being fed as above described.
- (b) At 3 p.m. only three of the sixteen had finished eating all the leaves given to them, but all the others had eaten more or less of their portions.

At 3.20 p.m.,

The eight rabbits fed upon infected food were, with the sixteen fed upon uninfected food, distributed into the burrow enclosures as follows:—

To Burrow Enclosure A :

- To Subdivision AA. One infected and two (full-grown) uninfected.  
 BB. One infected and two (full-grown) uninfected.  
 CC. One infected and two uninfected (one full-grown and one half-grown).

To Burrow Enclosure B :

Two infected and four uninfected (two full-grown and two half-grown).

To Burrow Enclosure C :\*

Three infected and six uninfected (four full-grown and two half-grown).

*Annotations :*

- (a) At 3.45 p.m. all the twenty-four rabbits had found their way inside the burrows in their respective enclosures.
- (b) The rabbits referred to in these experiments were fed twice a day upon green food (barley and cabbage-leaves).

*Control Experiments :*(a) *Feeding :*

Aug. 28th, at 11 a.m.,

Two vigorous rabbits were fed (in separate compartments) under the same conditions as the eight infected distributed into the burrow enclosures. They remained in the compartments in which they were fed, and were given food as usual until death.

*Results :*

Aug. 29th.—One was found dead at 7 a.m. (i.e., about 20 hours after being fed). P.M., *Positive*.†

The other was found dead at 9 p.m., having died between 8 p.m. and that time (i.e., between 33 and 34 hours after being fed.) P.M., *Positive*.

A rabbit inoculated (at noon on the 29th August) with two small platinum loops full ( $=\frac{1}{25}\frac{1}{4}$  ccm.) of heart-blood from the rabbit found dead at 7 a.m., died between midnight, 29th, and 1 a.m., 30th August, (i.e., between 12 and 13 hours after being inoculated). P.M., *Positive*.

(b) *Inoculation :*

Aug. 28th, at noon,

Two rabbits (one full-grown and one half-grown) were inoculated with a small quantity each of the same culture.

*Results :*

Aug. 28th.—One (half-grown) found dead at 7.45 p.m. (i.e., about 7½ hours after being inoculated). P.M., *Positive*.

Aug. 29th.—The other (full-grown) found dead at 7 a.m. P.M., *Positive*.

*Results of Burrow Experiments :*

Burrow Enclosure A. (Diag. II),

Subdivision AA. One infected to two uninfected.

Aug. 29th.—Infected one found dead at 7 a.m.‡ (i.e., about 20 hours after being fed), lying right in the mouth of the burrow at (a). P.M., *Positive*.||

*Annotation :* The head of this rabbit was partly under the board-covering at the mouth of the burrow, so that, in entering and leaving the burrow, the two uninfected rabbits must, each time, have passed immediately over the dead body.

Sept. 1st.—The burrow was uncovered at 5.15 p.m., when the two uninfected were found alive. (The carcass of the infected one was removed and the burrow re-covered immediately).

Sept. 4th.—The burrow was again uncovered at 3.30 p.m., when the two uninfected were found alive and removed from the enclosure.

Subdivision BB. (One infected to two uninfected.)

Aug. 29th.—Infected one found dead at 7 a.m. (i.e. about 20 hours after being fed), about 3 feet from the mouth of the burrow, at (a). P.M., *Positive*.

Sept. 1st.—The burrow was uncovered at 5 p.m., when one of the two uninfected was found dead inside the burrow, at (b). P.M., *Negative*. The other uninfected was still alive. (The carcasses of the two dead rabbits were removed and the burrow re-covered immediately.)

Sept. 4th.—The burrow was uncovered again at 3.30 p.m., when the other uninfected rabbit was found dead inside the burrow, at (c). P.M., *Negative*.

*Annotation.*—At 3.45 p.m. on the 29th August, it was observed that the two surviving rabbits in subdivision AA had burrowed a hole at the end of the right branch of their burrow (which, as may be seen on reference to Diag. II, extended beneath the subdivision fence into subdivision BB), and had thus made communication between the two subdivisions possible. At 4.30 p.m., however, it was observed that two rabbits were outside the burrow in subdivision AA, and two outside the burrow in subdivision BB, and as they bore the marks showing that they belonged respectively to the enclosure in which they were then seen, the hole at the end of the burrow was closed up.

Subdivision CC. One infected to two uninfected.

August 29th to September 1st. Infected one not seen outside the burrow.

Sept. 1st.—The burrow was uncovered at 4.45 p.m., when the infected rabbit was found dead inside the burrow, at (a). P.M., *Positive*. The two uninfected were found alive. (The carcass of the infected rabbit was removed and the burrow re-covered immediately).

Sept. 4th.—The burrow was again uncovered at 3.30 p.m., when the two uninfected were found alive, and removed from the enclosure.

Burrow enclosure B (Diag. III). Two infected to four uninfected.

Aug. 29th.—One infected found dead at 7 a.m. (i.e. about 20 hours after being fed) lying about 9 feet from the mouth of the burrow, at (a). P.M., *Positive*.

Aug. 30th.—One uninfected (full-grown) found dead at 4.45 p.m., about 3 feet from the dead body of the infected one, at (b). (This rabbit was removed from the enclosure immediately.) P.M., *Negative*.

Sept. 1st.—The burrow was uncovered at 4.15 p.m., when the other infected rabbit was found dead inside the burrow, at (c). P.M., *Positive*. One uninfected (half-grown) was also found dead inside the burrow, at (d). P.M., *Negative*. The carcasses of the two last-mentioned rabbits were removed and the burrow re-covered immediately.

Sept. 4th.—At 3.30 p.m. the burrow was again uncovered, when the two remaining uninfected were found alive and removed from the enclosure.

Burrow enclosure C. (Diag. IV.) Three infected to six uninfected.

Aug. 29th.—One infected found dead at 7 a.m. (i.e., about 20 hours after being fed), about 6 feet from the mouth of the burrow, at (a). P.M., *Positive*. Another infected was observed to die at 7.10 a.m. (i.e. 20½ hours after being fed), at (b). It rushed out of the burrow against the wire-netting opposite the burrow's mouth, fell over on its side, struggling convulsively on the ground; the muscles of the neck contracting and expanding, and drawing the head spasmodically backwards and forwards three or four times. It died in about 15 seconds from the time it emerged from the burrow, lying about a foot from the mouth with its head towards the burrow and its body in a line with the entrance thereto. P.M., *Positive*.

\* For notes on the *Weather and Temperature* during the course of the experiments recorded in this Appendix, vide p. 151.

† Each time when death was due to infection caused by the microbes of chicken-cholera, the result of P.M. examination is noted as *Positive*; when death was due to causes other than infection by these microbes the result of P.M. examination is noted as *Negative*.

‡ Whenever infected rabbits referred to in these burrow experiments died, they were allowed to remain untouched for three clear days.

|| As will be seen P.M. examinations were made on all rabbits from the burrows so as not to leave the slightest doubt as to the cause of their death.

- Another infected found dead at 12:45 p.m. (i.e., about 25½ hours after being fed), about 6 feet from the mouth of the burrow at (c). P.M., *Positive*.
- Sept. 1st.—One uninfected (half-grown) found dead inside the burrow at 4 p.m., at (d). P.M., *Negative*. The burrow was uncovered at 4 p.m., when the five other uninfected were found alive. (The carcasses of the dead rabbits were removed and the burrow re-covered immediately).
- Sept. 4th.—Another uninfected (full-grown) was found dead at 7:15 a.m., in a side opening of the burrow, apparently jammed between the board-covering and the earth at the side of the burrow, at (e). P.M., *Negative*. At 3:30 p.m. the burrow was again uncovered, when the four remaining uninfected were found alive and were removed from the enclosure.

Notes on the *Weather* during the course of the experiments:—

- Aug. 28th.—Bright and calm all day.
- Aug. 29th.—Morning dull; strong southerly gale all day; night calm.
- Aug. 30th.—Calm and fine all day.
- Aug. 31st.—Calm and fine all day.
- Sept. 1st.—Morning dull, air damp, with light showers; afternoon light rain; evening calm and fine.
- Sept. 2nd.—Bright and calm.
- Sept. 3rd.—Bright, with light southerly breeze blowing.
- Sept. 4th.—Calm, sky overcast, air damp.

Notes on the *Temperature*, underground and in air (shaded), taken at the times stated during the course of the experiments:—  
To ascertain, approximately, the temperature in the artificial burrows a small trench was dug out in the main enclosure (close to burrow enclosure C) corresponding in depth and width to the size of the burrow trench. In this trench a thermometer was placed, having its bulb lightly covered with some of the loose earth at the bottom of the trench. This was then covered with a board similar to the boards over the burrows, this board being completely covered with loose earth. To ascertain the temperature in the shade a thermometer was suspended from a post in the centre of the main enclosure, and, by means of boards, completely shaded from the sun. The temperatures are given in the centigrade scale.\*

Underground.					In air (shaded.)				
August 28th			7:45 p.m. 30°		August 28th			4 p.m. 19°	7:45 p.m. 17½°
29th	7 a.m. 15½°	12:45 p.m. 15½°	5 p.m. 16½°	11:15 p.m. 15½°	29th	7 a.m. 13½°	12:45 p.m. 16°	5 p.m. 16½°	11:15 p.m. 14½°
30th	7 a.m. 14½°	3 p.m. 15½°	6 p.m. 15½°	11 p.m. 19°	30th	7 a.m. 13½°	3 p.m. 18°	6 p.m. 16°	11 p.m. 15½°
31st	7 a.m. 15½°	1:30 p.m. 16½°	6 p.m. 16½°	10:30 p.m. 16½°	31st	7 a.m. 13½°	1:30 p.m. 24½°	6 p.m. 20½°	10:30 p.m. 18½°
September 1st	7:15 a.m. 16½°	1 p.m. 16½°	5:15 p.m. 16°	10 p.m. 15½°	September 1st	7:15 a.m. 17°	1 p.m. 14°	5:15 p.m. 12½°	10 p.m. 12°
2nd	8 a.m. 14°	2:30 p.m. 16½°	5:15 p.m. 15½°	10 p.m. 14½°	2nd	8 a.m. 9½°	2:30 p.m. 14½°	5:15 p.m. 12½°	10 p.m. 8½°
3rd	7 a.m. 14°	1:45 p.m. 15°	6 p.m. 15°	10:30 p.m. 14½°	3rd	7 a.m. 7°	1:45 p.m. 16½°	6 p.m. 19½°	10:30 p.m. 10½°
4th	7:15 a.m. 14½°	1 p.m. 15°			4th	7:15 a.m. 10°	1 p.m. 15°		

## APPENDIX B.

DETAILS of experiments with the microbes of chicken-cholera on rabbits in *hutches*:—

### First Series.

The following is a short description and enumeration of the hutches used in the undernoted experiments. All the hutches were placed in the main enclosure. (Diag. IV.)

Hutches I, II, and III were made of boards with closely fitting *wooden-bottoms*, and with a hinged door of rabbit-proof wire-netting in front of each hutch. Each hutch measured in the clear inside 23" x 18" x 18" in depth, height, and width respectively.

Hutches IV, V, and VI were of the same size and material as hutches I, II, and III, save that each had a *rabbit-proof wire-netting* bottom, which rested on the ground so that the netting touched the loose soil of the main enclosure.

Hutch VII was a *wooden-bottomed* four-sided wooden enclosure, 2 feet deep, covering an area of one square metre, and having for its top a covering of rabbit-proof wire-netting.

Hutch VIII resembled hutch VII in all respects, save that it had a *rabbit-proof wire-netting* bottom, which rested on the ground of the main enclosure, and was lightly covered with loose earth.

### Annotations:

- The six first mentioned hutches were placed (in the main enclosure) in such a way that the sun was completely prevented from shining into them.
- The two last mentioned hutches were the same enclosures (with the addition of a wooden and wire bottom respectively) as were used in, and are referred to in the report upon the experiments conducted by M. Pasteur's representatives.
- For weather and temperature during the course of the experiments recorded in this Appendix, *vide* page 153.

The experiments were begun on

September 3rd, when, between 11:45 a.m. and noon, eight rabbits (specially marked) were fed (in separate compartments) upon cabbage leaves infected with 2½ ccm. for each rabbit of a virulent broth-culture of the microbe of the fourth generation.†

At noon, two rabbits (also specially marked) were fed in separate compartments, upon cabbage leaves infected with 1 ccm. of the same culture (for each rabbit).

### Annotations:

- These ten rabbits had not been fed on the night of the 2nd or on the morning of the 3rd September until the infected food was given to them.
- At 3 p.m. all but one of the ten had finished eating their portions of infected food. This one had only eaten about half its portion when it was removed from its compartment.
- The ten rabbits were selected as being especially vigorous and healthy.

Between 3:15 p.m. and 3:30 p.m., the ten infected rabbits were, with twenty uninfected rabbits, distributed into the hutches (described above), as follows:—

- Hutch I. { One infected (1 ccm.) to  
          { Two uninfected (one full-grown, one half-grown).
- Hutch II. { One infected (2½ ccm.) to  
           { Two uninfected (one full-grown, one half-grown).

Annotation: The infected one had only eaten half its portion of infected food when it was removed, from the compartment in which it had been fed, to this hutch.

\* 1° C. = (9° Fahr.) + 32. 15° C. (e.g.) = (15 × 9° F.) + 32.

† The history of this culture is as follows:—Colony from virulent blood of a rabbit (fed on culture) 10/VIII 88=I generation; gelatine stick culture 14/VIII=II generation; gelatine stick culture 18/VIII=III generation; broth culture 1/IX=IV generation.

- Hutch III. { One infected (2½ ccm.) to  
Two uninfected (full-grown).  
Hutch IV. { One infected (1 ccm.) to  
Two uninfected (one full-grown, one nearly full-grown).  
Hutch V. { One infected (2½ ccm.) to  
Two uninfected (full-grown).  
Hutch VI. { One infected (2½ ccm.) to  
Two uninfected (full-grown).  
Hutch VII. { Two infected (2½ ccm.) to  
Four uninfected (two full-grown, two half-grown).  
Hutch VIII. { Two infected (2½ ccm.) to  
Four uninfected (two full-grown, two half-grown).

*Annotation:* The rabbits referred to in these experiments were fed twice a day on green barley.

*Control experiments:*

- (a) A vigorous rabbit was fed upon cabbage leaves infected with 2½ ccm. of the same culture as used in feeding the eight rabbits referred to above, and was kept under the same conditions.

*Result:*

Sept. 4th. It was found dead at 2:40 p.m., having died between noon and that time, (i.e., between 24 and 26½ hours after being fed.) P.M., *Positive*.

- (b) A vigorous rabbit was fed upon cabbage leaves infected with 1 ccm. of the same culture, and kept under the same conditions as (a) above.

*Result:*

Sept. 4th. It was found dead at 2:40 p.m., having died between noon and that time, (i.e., between 24 and 26½ hours after being fed.) P.M., *Positive*.

*Results of the experiments in hutches:*

Hutch I. One infected to two uninfected.

Sept. 6th. The infected one was found dead at 7:15 a.m., and was removed from the box at 10 a.m. on the 9th Sept.\* P.M., *Negative*.

Sept. 10th. One uninfected (full-grown) was found dead at 9 a.m. P.M., *Negative*.

Sept. 10th. The other uninfected (half-grown) being alive at 4 p.m. (when the experiment was concluded) was removed from the hutch at that time.

Hutch II. One infected to two uninfected.

Sept. 4th. The infected one was found dead at 7:15 a.m. (i.e., about 19½ hours after being fed), and was removed from the hutch at 10 a.m., on the 7th Sept. P.M., *Positive*.

Sept. 9th. One uninfected (half-grown) was found dead at 7:30 a.m. P.M., *Negative*.

Sept. 9th. The other uninfected (full-grown) was found dead at 10:50 p.m. P.M., *Negative*.

Hutch III. One infected to two uninfected.

Sept. 4th. The infected one was found dead at 7:15 a.m. (i.e., about 19½ hours after being fed), and was removed from the hutch at 3 p.m., on the 7th September. P.M., *Positive*.

Sept. 7th. One uninfected (full-grown) was found dead at 10:20 p.m. (i.e., about 4 days and 7 hours after being placed in the hutch), and was removed from the hutch at once. P.M., *Positive*.

Sept. 8th. The other uninfected (half-grown) was found dead at noon. P.M., *Negative*.

Hutch IV. One infected to two uninfected.

Sept. 9th. One uninfected (half-grown) was found dead at 7:30 a.m. P.M., *Negative*.

Sept. 10th. The infected and the other uninfected being alive at 10:45 a.m., were removed from the hutch at that time. (For notes on the further treatment of these two rabbits, *vide* second series below, page 153).

Hutch V.—One infected to two uninfected.

Sept. 4th.—The infected one was found dead at 7:15 a.m. (i.e., about 19½ hours after being fed), and was removed from the hutch at 3 p.m. on the 7th Sept. P.M., *Positive*.

Sept. 6th.—One uninfected (nearly full-grown) was found dead at 2:30 p.m. (i.e., just about three days after being placed in the hutch), and was removed from the hutch at 3:30 p.m. P.M., *Positive*.

Sept. 7th.—The other uninfected (full-grown) was found dead at 12:15 p.m. (i.e., about 3 days and 21 hours after being placed in the hutch). P.M., *Positive*.

*Annotations:—*

(a) A broth-culture was prepared from a minute quantity of the heart blood of this rabbit.

(b) A rabbit inoculated with ½ ccm. of this culture at 11:30 a.m. on the 10th Sept. was found dead at 7:50 p.m. the same evening (i.e., a little more than 8 hours after being inoculated). [*Vide* Appendix D, Series IV, page 156.] P.M., *Positive*.

(c) A rabbit inoculated with ⅓ ccm. of heart-blood from the last-mentioned rabbit at 12:50 p.m. on the 11th Sept. was found dead at 7:30 a.m. the next morning (i.e., about 18½ hours after being inoculated). [*Vide* Appendix D, Series IV (b) (i), page 156.] P.M., *Positive*.

Hutch VI.—One infected to two uninfected.

Sept. 4th.—The infected one was found dead at 3 p.m., having died between 2:50 p.m. and that time (i.e., between 23½ and 24 hours after being fed). It was removed from the hutch at 3 p.m. on the 7th Sept. P.M., *Positive*.

Sept. 6th.—One uninfected (a vigorous pregnant female, in the end of the first or beginning of the second week of gestation) was found dead at 7:15 a.m. (i.e., about 2 days and 16 hours after being placed in the hutch), and was removed from the hutch at 10 a.m. P.M., *Positive*.

Sept. 10th.—The other uninfected being still alive at 4 p.m. (when the experiment was concluded) was removed from the hutch at that time.

Hutch VII.—Two infected to four uninfected.

Sept. 4th.—One infected was observed to die at 3 p.m. (i.e., 27 hours after being fed), and was removed from the hutch at 3 p.m. on the 7th Sept. P.M., *Positive*.

Sept. 5th.—The other infected was found dead at 7 a.m. (i.e., about 43 hours after being fed), and was removed from the hutch at noon on the 8th Sept. P.M., *Positive*.

Sept. 7th.—One uninfected (full-grown) was found dead at 7:30 a.m. P.M., *Negative*.

Another uninfected (full-grown) was found dead at 5 p.m. P.M., *Negative*.

Sept. 9th.—Another uninfected (half-grown) was found dead at 7:15 a.m. P.M., *Negative*.

Sept. 10th.—The other uninfected being still alive at 4 p.m. (when the experiment was concluded) was removed from the hutch at that time.

Hutch VIII.—Two infected to four uninfected.

Sept. 4th.—One infected was found dead at 7:15 a.m. (i.e., about 19½ hours after being fed), and was removed from the hutch at 3 p.m. on the 7th Sept. P.M., *Positive*.

Sept. 5th.—The other infected was found dead at 12:15 p.m., having died between 11 a.m. and that time (i.e., between 47 and 48½ hours after being fed). It was removed from the hutch at noon on the 8th Sept. P.M., *Positive*.

Sept. 7th.—One uninfected (full-grown) was found dead at 9 a.m. P.M., *Negative*.

Sept. 10th.—Another uninfected (half-grown) was found dead at 10:30 a.m. P.M., *Negative*.

The other two uninfected being still alive at 4 p.m., (when the experiment was concluded) were removed from the hutch at that time.

*Second*

\* Wherever infected rabbits, referred to in these hutches experiments died, they were allowed to remain untouched for three clear days.

Second Series.

THE two experiments, in which two rabbits were infected, each with 1 ccm. of a culture of the microbe, and placed with two uninfected rabbits for each of them into hutches I and IV, respectively, having failed altogether (*vide* above), two other experiments were carried out. The two hutches used for this purpose were hutches III and V (*vide* above), which had been disinfected by means of boiling hot water and allowed to dry. They may be designated as hutches IX (wooden-bottomed) and X (wire-bottomed).

Sept. 10th, at 11:45 a.m.,—

A rabbit (the surviving uninfected specimen from hutch IV, *vide* pages 151, 152) was fed upon green barley infected with 1 ccm. of a virulent broth-culture of the microbe of the first generation.

Annotation: This culture was derived directly from blood of a rabbit that had died on Sept. 7th, in hutch V, about four days after having been exposed to an infected rabbit in the same hutch (conf. *Annot.* to result of hutch V, above).

Having finished eating its portion of infected food at 12:30 p.m., it was placed, at 4 p.m., in hutch IX, with two uninfected rabbits (one full-grown, one half-grown) that had survived from the artificial burrow experiments.\*

Annotation: The infected rabbit had not been fed in the morning.

Hutch IX. One infected to two uninfected.

Result:

Sept. 11th.—The infected one was found dead at 9:10 a.m., having died between 8:30 a.m. and that time, (*i.e.*, between 20½ and 20¾ hours after being fed). It was removed from the hutch at 9:30 a.m., on the 14th Sept. P.M., Positive.

One uninfected (half-grown) was found dead at 11 a.m. P.M., Negative.

Sept. 17th. The other uninfected being still alive at 5 p.m. (when the experiment was concluded) was removed from the hutch at that time.

Sept. 10th, at 11:45 a.m.

A rabbit (the surviving infected from hutch IV (1 ccm. of culture) *vide* pages 151, 152) was fed upon green barley infected with 2 ccm. of the same culture as used in feeding the rabbit placed in hutch IX. Having finished eating its portion of infected food, at 12:30 p.m., it was placed, at 4 p.m., with two uninfected (one full-grown, one half-grown), that had survived from the artificial burrow experiments, in

Hutch X. One infected to two uninfected.

Result:

Sept. 11th. The infected one was found dead at 1:15 p.m. (*i.e.*, about 25½ hours after being fed), and was removed from the hutch at 10 a.m. on the 13th Sept. P.M., Positive.

Sept. 12th. One uninfected (half-grown) was found dead at 11:15 a.m. P.M., Negative.

Sept. 13th. The other uninfected (full-grown) was found dead at 7:30 a.m. P.M., Negative.

NOTES on the Weather during the course of these experiments:—

Sept. 3rd.—Bright and calm all day.

Sept. 4th.—Morning, calm, sky overcast, air damp. Afternoon and evening—calm and fine, air dry.

Sept. 5th.—Fine, with strong easterly wind in afternoon.

Sept. 6th.—Fine until 5 p.m., when light rain fell for about an hour. Heavy rain set in about 6 p.m., lasting an hour or so; after that the night was fine.

Sept. 7th.—Fine morning. Afternoon showery, with southerly wind. Evening calm and fine.

Sept. 8th.—Calm and fine all day.

Sept. 9th.—Fine morning; at midday a few light showers fell, lasting off and on for two hours or so; thereafter calm and fine.

Sept. 10th.—Calm and fine.

Sept. 11th.—Early morning, fine; thunder-shower and downpour of rain from 9:30 a.m. to about 2 p.m.; light rain fell till about 3 p.m.; thereafter calm and fine.

Sept. 12th and 13th.—Calm and fine.

Sept. 14th.—Morning, dense fog, air very damp till about 10 a.m.; thereafter calm and bright.

Sept. 15th, 16th, and 17th.—Calm and fine.

NOTES on the Temperature (in the shade) taken during the course of the experiments. The temperatures are given in the centigrade scale.

September 3rd.	7 a.m. 7°	1:45 p.m. 16¼°	6 p.m. 13¼°	10:30 p.m. 10¼°	September 11th.	7:15 a.m. 10¾°	2 p.m. 12¼°	5 p.m. 11¾°	10:15 p.m. 12°
4th.	7:15 a.m. 16°	1:30 p.m. 18°	5 p.m. 14¼°	9:30 p.m. 10¼°	12th.	7:30 a.m. 9¼°	1:45 p.m. 16¼°	.....	Midnight. 14¼°
5th.	7 a.m. 7¼°	1 p.m. 20°	5:30 p.m. 16°	10:15 p.m. 12¼°	13th.	7:30 a.m. 9°	1 p.m. 21¾°	5 p.m. 16¾°	10 p.m. 12¼°
6th.	7:15 a.m. 8¾°	1:30 p.m. 24°	5:15 p.m. 18°	10:45 p.m. 14¼°	14th.	7:30 a.m. 10¼°	1:30 p.m. 21°	5 p.m. 16¼°	10:30 p.m. 9¼°
7th.	7:30 a.m. 12°	1:45 p.m. 15°	5 p.m. 14¼°	10:20 p.m. 10°	15th.	7:30 a.m. 9¾°	2 p.m. 19¾°	5 p.m. 16¾°	11 p.m. 13°
8th.	7:15 a.m. 8¾°	2 p.m. 16°	5:30 p.m. 13¾°	10 p.m. 9¼°	16th.	8 a.m. 12¼°	2 p.m. 21¾°	5:30 p.m. 19°	10:30 p.m. 15¼°
9th.	7:30 a.m. 9¼°	1:30 p.m. 14¼°	.....	11 p.m. 9°	17th.	7:30 a.m. 16¼°	1:30 p.m. 19¼°	5 p.m. 17¾°	.....
10th.	7:15 a.m. 8°	1:45 p.m. 16¼°	5:30 p.m. 14¾°	10:45 p.m. 12¼°					

APPENDIX C.

DETAILS of Experiments on Rabbits placed in Boxes or Hutches in which Rabbits had died of Infection by the Microbes of Chicken-cholera.

(a) August 29th, at 9:30 a.m.,—

A rabbit was placed in a box† in which two rabbits, that had been inoculated with a portion of a virulent broth-culture of the microbe, were found dead at 7:45 p.m. on the 28th and 7 a.m. on the 29th August respectively, and from which they were removed immediately thereafter.

Annotations: (a) The inoculated rabbits referred to were control animals to the burrow experiments (*vide* Appendix A, page 150).

(b) In this box there was a considerable amount of normal-looking faeces when the healthy rabbit was put in, and a large portion of the (uninfected) food given to the two inoculated rabbits on the evening of the 28th August.

Result:

September 6th.—It was still alive at noon (*i.e.*, after about eight days), and was then removed from the box. (b)

\* These rabbits had to be taken from want of fresh rabbits at the time.

† The boxes or hutches alluded to in this Appendix were placed (in the main enclosure) in such a way that their insides were almost completely sheltered from the rays of the sun. For temperature and weather during the experiments noted in these Appendices, *vide* Appendix A, pages 151 and 153.

## 154 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

(b) August 29th, at 9.30 a.m.,—

A half-grown rabbit was placed in a hutch in which a rabbit, that had been *fed* on the 28th upon cabbage leaves infected with 2½ ccm. of a virulent broth-culture of the microbe, was found dead at 7 a.m. on the 29th August, and from which it was removed immediately thereafter.

*Annotations:* (a) The infected rabbit referred to was control to the burrow experiments (*vide* Appendix A page 150).

(b) In this hutch there was only a small quantity of normal-looking faeces, but part of the hutch floor was damp with urine. All food left over by the rabbit fed on infected food was removed from the hutch before the healthy rabbit was placed therein.

*Result:*

September 3rd.—It was found dead at 7 a.m. P.M., *Negative*.

(c) August 30th, at 10.15 a.m.,—

A half-grown rabbit was placed in a hutch in which a rabbit, that had been *fed* on the 28th upon cabbage leaves infected with 2½ ccm. of a virulent broth-culture of the microbe, was found dead at 9 p.m. on the 29th August, and from which it was removed immediately thereafter.

*Annotations:* (a) The infected rabbit referred to was control to the burrow experiments (*vide* Appendix A, page 150).

(b) In this hutch there was a considerable quantity of normal-looking faeces, and part of the hutch floor was damp with urine. All the infected food had been eaten by the rabbit fed thereon on the 28th August, but some of the (uninfected) food given it on the night of the 29th was still in the hutch when the healthy rabbit was placed therein.

*Result:*

September 6th.—It was found dead at 7.15 a.m. P.M., *Negative*.

(d) September 4th, at 2.50 p.m.,—

A half-grown rabbit was placed in a hutch in which a rabbit, that had been *fed* on the 3rd upon cabbage leaves infected with 1 ccm. of a virulent broth-culture of the microbe, was found dead at 2.40 p.m. on the 4th September, and from which it was removed immediately thereafter.

*Annotations:* (a) The infected rabbit referred to was control to the experiments in hutches (*vide* Appendix B, p. 152).

(b) What has been said in *Annotation (b)* to 30th August, with reference to amount and appearance of faeces and food in the hutch, applies also to this experiment.

*Result:*

September 9th.—It was found dead at 9.15 a.m. P.M., *Negative*.

(e) September 4th, at 2.50 p.m.,—

A young rabbit was placed in a hutch in which a rabbit, that had been *fed* on the 3rd upon cabbage leaves infected with 2½ ccm. of a virulent broth-culture of the microbe, was found dead at 2.40 p.m. on the 4th September, and from which it was removed immediately thereafter.

*Annotations:* (a) The infected rabbit referred to was control to the experiments in hutches (*vide* Appendix B, page 152).

(b) What has been said in *Annotation (b)* to 30th August, with reference to amount and appearance of faeces and food in the hutch, applies also to this experiment.

*Result:*

September 9th.—It was found dead at 9.15 a.m. P.M., *Negative*.

## APPENDIX D.

DETAILS of Miscellaneous Experiments with the Microbes of Chicken-cholera.

## Series I.

Experiments on hares:—\*

(i) Aug. 11th.—At 3.30 p.m.

A hare was *inoculated* with five small platinum-loops full (about  $\frac{1}{5}$  ccm.) of virulent blood from a rabbit that had died after inoculation with a small quantity of a virulent broth-culture of the microbe.

*Control:*—A control rabbit (full-grown) was found dead at 9 a.m. on the 12th Aug. P.M., *Positive*.

*Result:*

Aug. 12th.—The hare was found dead at 9 a.m. (*i.e.*, about 17½ hours after being inoculated). P.M., *Positive*.

(ii) Aug. 11th.—At 4 p.m.

A hare was *fed* upon a few cabbage leaves infected, by means of a platinum-loop, with about  $\frac{1}{4}$  ccm. of blood from the same infected rabbit from which blood was taken for the inoculation of a hare this date [*vide* (i) above]. It was not until 10 p.m. (*i.e.*, six hours after the infected food had been placed in the box) that the hare was observed to have eaten all the infected food given to it.

*Control:*—A control rabbit, which had finished eating its portion of infected food shortly after the food was placed in its box, was found dead at 8.30 p.m. on the 12th Aug., having died between 5.30 p.m. and that time (*i.e.*, between 25½ and 28½ hours after being fed). P.M., *Positive*.

*Result:*

Aug. 16th.—The hare was still alive at 11.30 a.m. (*i.e.*, about 8 days after the feeding referred to above).

(iii) Aug. 16th.—At 11.30 a.m.

(a) The same hare was *fed* upon cabbage leaves infected with 1½ ccm. of a virulent broth-culture of the microbe.

(b) Another hare (which had survived from inoculation with some dried blood taken by Dr. Bancroft, of Brisbane, Qu., from a hare that had died in captivity) was *fed* upon cabbage leaves infected with 1½ ccm. of the same culture.

*Control:*—(a) Of two control rabbits, large vigorous animals (both *tame*†), *fed* together in the same box upon food infected with 3 ccm. of the same culture, one (a long-haired black specimen) was found dead at 8.45 p.m. on the 18th Aug. (*i.e.*, about 57½ hours after being fed). P.M., *Positive*.

The other (a long-haired albino) was still alive on the 20th Aug. (For further treatment of this particular rabbit *vide* Series II of this Appendix.)

(b) A control rabbit (a *tame* long-haired albino) *inoculated* with a small quantity of the same culture was found dead at 8 a.m. on the 17th Aug. (*i.e.*, about 20½ hours after being inoculated).

*Results:*

Aug. 17th.—Both hares were found dead at 8 a.m. (*i.e.*, about 20½ hours after being fed). P.M. (in each case), *Positive*.

## Series II.

Experiments on tame rabbits:

(a) Aug. 16th, at 11.30 a.m.

A tame rabbit (full-grown long-haired albino) was *fed*, together with another tame rabbit, upon cabbage leaves infected with 3 ccm. (*i.e.*, 1½ ccm. for each rabbit) of a virulent broth-culture of the microbe. [This experiment has already been mentioned in the foregoing Series I. (iii.) *Control*, when it was stated that the latter rabbit was found dead at 8.45 p.m. on the 18th Aug.]

*Result:*

Aug. 20th.—It was still alive at 9.30 a.m.

(b)

\* The hares mentioned in these experiments were among five full-grown hares received from the country, through Mr. H. C. Taylor, of the Rabbit Branch of the Lands Department.

† The tame rabbits mentioned in this report were received at Redd Island in June last, having been sent (according to information) from Adelaide, S.A., by Professor Watson.

## (b) Aug. 20th, at 9:30 a.m.

It was fed upon cabbage leaves infected with 3 ccm. of a virulent broth-culture of the microbe of the third generation.

## Control:

- (i) A control rabbit (fed under the same conditions as the tame rabbit) was found dead at 8 a.m. on the 21st Aug. (i.e., about 22½ hours after being fed). P.M., *Positive*.  
 (ii) Another control rabbit (half-grown), fed upon food infected with only half of the portion of culture (viz., 1½ ccm.), was found dead at 8 a.m. on the 21st Aug. (i.e., about 22½ hours after being fed). P.M., *Positive*.

## Result:

Aug. 25th.—It was still alive at 10:30 a.m.

## (c) Aug. 25th, at 10:30 a.m.

It was fed upon cabbage leaves infected with 4½ ccm. of a virulent broth-culture of the microbe, of the third generation.

Control: A vigorous (Tasmanian) rabbit was observed to die at 8:30 a.m. on the 26th Aug. (i.e., 22 hours after being fed). P.M., *Positive*.

## Result:

Sept. 1st.—It was still alive at 4 p.m.

## (d) Sept 1st, at 4 p.m.

It was inoculated with ½ ccm. (2 minims) of a virulent broth-culture of the microbe, taken directly from the blood of a rabbit dead after feeding with that microbe.

Control: A control rabbit was found dead at 8 a.m. on the 2nd Sept. (i.e., about 16 hours after being inoculated). P.M., *Positive*.

## Result:

It remained alive, but at the seat of inoculation was formed a large abscess, which was at first closed, but which was found to be opening five days after inoculation, discharging a sticky, yellowish, inodorous pus.

A platinum-loop full of this pus was inoculated into a rabbit at 12:45 p.m. on the 10th Sept. This animal was found dead at 7:30 a.m. on the 13th Sept., but the P.M. examination yielded a negative result, so far as infection by the virus in question was concerned.

The abscess began to heal, showing at the bottom a dry crust, but up to date (21st Sept.) the healing process is not yet complete.\*

## Series III.

## Experiments on wild rabbits:

## (a) With Faecal matter from an infected rabbit.†

## (i) Inoculation:

Sept. 2nd. At 11:35 a.m.

A rabbit was inoculated with a small portion (one platinum-loop full) of the soft green contents taken from the rectum of a rabbit dead about four days.

Annotations: (a) This last mentioned rabbit died in consequence of infection in burrow enclosure B. [Vide Appendix A; Diag. VI (c)].

(b) The faecal matter was obtained from the rectum by means of a glass tube carefully introduced into the anus.

## Result:

Sept. 3rd.—It was observed to die at 10:50 a.m., (i.e., 23½ hours after being inoculated). P.M., *Positive*.

## (ii) Feeding:

Sept. 3rd. At 8:15 p.m.,

A half-grown rabbit was fed upon cabbage leaves infected with about ½ ccm. of the same faecal matter, kept moist meanwhile under a bell-jar.

Annotation: This rabbit had not received any food since 9 a.m. on the same day; at 10 p.m. it had eaten all the infected food given to it.

## Result:

Sept. 10th.—It was still alive at 10:45 a.m. (i.e., about 4½ days after being fed), and was then removed from its hutch.

## (b) With Urine from an infected rabbit.

Sept. 11th. At 1:30 p.m.

Two rabbits were inoculated with about ½ ccm. each of urine taken from a rabbit dead of infection by the virus of chicken-cholera (after inoculation with ½ ccm. of culture).

Annotation: The bladder of this (infected) rabbit was much distended. The urine, in which was a large amount of corpuscular matter, presented a peculiar amber-yellow appearance. The urine used for inoculation was obtained by means of sucking a small portion into a fine glass tube through a wide hole made into the lifted and stretched vortex of the bladder by means of a heated glass rod.

## Results:

Sept. 13th.—One was found dead at 7:30 a.m., P.M., *Negative*.

Sept. 15th.—The other was still alive at 9:30 a.m., when it was removed from its box.

## (c) With virulent blood, allowed to putrefy.

At the examination, on the 2nd September, of a rabbit about four days after its death in one of the burrows [Appendix A, Burrow Enclosure B (c); the same rabbit mentioned in (b) of this Series], the coagulated blood of the right ventricle of the heart was removed and placed in a small clean glass (flask), which was stoppered and put aside in the laboratory. On microscopical examination on the date mentioned, only the microbes of chicken-cholera were present.

## (i) September 3rd, at 11:30 a.m.—

A half-grown rabbit inoculated with a small platinum-loop full of this blood (not yet putrid) was found dead at 7 a.m. on the 3rd September (i.e., about 19½ hours after being inoculated). P.M., *Positive*.

## (ii) September 10th, at 5 p.m.—

A rabbit inoculated with about the same quantity of the blood (now putrid) was found dead at 8:25 a.m. on the 11th September, having died between 7:15 a.m. and that time (i.e., between 14¼ and 15½ hours after being inoculated). P.M., *Positive*.

## (iii) September 17th, at 2:10 p.m.—

A rabbit inoculated with about the same quantity of the blood (putrid) was found dead at 7:40 a.m. on the 18th September (i.e., about 17½ hours after being inoculated). P.M., *Positive*.

## (iv) September 20th, at 10:40 a.m.—

A rabbit inoculated with about the same quantity of the blood (putrid) was still alive (midnight, 21st September).‡

## (v) September 24th, at 11:10 a.m.—

A rabbit inoculated with about the same quantity of blood was still alive after seven days (October 1st).

Series

\* For further history of this rabbit see Chief Expert's Report (No. 2) pp. 160-161.

† For further experiments with faecal matter see page 161.

‡ It was found dead at 5 p.m. on the 22nd September, having died between 1:50 p.m. and that time, i.e., between 51 and 54 hours after inoculation). P.M., *Positive*.

## 156 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

## Series IV.

## Experiments on ferrets :—\*

## (a) Inoculation.

## (i) With culture.

September 10th, at 11:30 a.m.—

Two ferrets (one male, one female) were inoculated with  $\frac{1}{2}$  ccm. of a virulent broth-culture of the microbe of chicken-cholera obtained directly from blood of a rabbit that had died of chicken-cholera (by transmitted infection in Hutch V—*vide* Appendix B, page 152).

Control: A control rabbit was found dead at 7:50 p.m. the same day (*i.e.*, about 8 $\frac{1}{2}$  hours after being inoculated) P.M., *Positive*.

## Results:

September 11th to 20th.—On being fed at 9 a.m. on the 11th September, the two ferrets appeared dull and feverish. Both drank water freely before touching the meat or porridge and milk given to them, and when they took up the pieces of meat did not tear at them ravenously, as was their wont before being inoculated. So they remained for some time. The seat of inoculation showed some special reaction, which in one (the female) subsided gradually (up to date), while the condition of the other (male) became worse and worse, till it succumbed on the 18th September.

P.M.—Extensive gangrene round the seat of inoculation; organs abnormal; absence of any micro-organisms in preparations from heart-blood and spleen.

Autolysis: A rabbit inoculated with a small quantity of heart-blood from this ferret died during the night in consequence of some injuries accidentally received in its hutch.

## (ii) With blood.

Sept. 11th.—At 12:50 p.m.

Two ferrets (one male, one female) were inoculated *each* with five platinum-loops full (=  $\frac{1}{2}$  ccm.) of heart-blood from a rabbit that had died of "chicken-cholera" (inoculation).

Control:—A control rabbit was found dead at 7:30 a.m. on the 12th Sept. (*i.e.*, about 18 $\frac{1}{2}$  hours after being inoculated). P.M., *Positive*.

## Results:

Sept. 11th to 20th.—The seat of inoculation did not show any special reaction. The two ferrets appeared somewhat sluggish at first, but very soon afterwards behaved as before.

## (b) Feeding:

## (i) Sept. 12th.—

Three ferrets (one male, two females) were fed together upon 30 grammes (= about 1.07 oz) of virulent liver taken from a rabbit newly dead of "chicken-cholera" (inoculation).

## Results:

Sept. 11th to 20th.—The ferrets did not appear to show any reaction whatever.

## (ii) Sept. 18th.—

Two ferrets (one male, one female) were fed together upon 45 grammes (= about 1.6 oz) of virulent liver from a rabbit newly dead of "chicken-cholera" (inoculation).

## Results:

Sept. 18th to 20th.—The ferrets did not appear to show any reaction.†

## APPENDIX E.

## EXPLANATION of Diagrams IV to VII referred to in this Report.

Diagram IV is a sketch of the main enclosure and part of the shed (with regard to the construction of which full particulars have been already given in section VIII. of the Report, pp. 136, 137, and in section X, Appendix F, page 143, and Diagram III at end of Appendices. The diagram shows (approximately) the relative sizes and positions in the main enclosure of,

A (AA, BB, CC), B, C, which represent the wire-netting enclosures encircling the artificial burrows referred to particularly in Appendix A

1,1,1,1, represent posts supporting the wire-gauze roof of the main enclosure.

Diagrams V, VI, VII show (approximately), on a scale of 5 feet to the inch the respective artificial burrows within the wire-netting enclosures referred to above. The small letters (*a, b, c, &c.*) show, approximately, the position of the rabbits as they died in the respective burrows or enclosures: the bodies of the rabbits being represented by two cross lines (+) in the case of rabbits dead of "chicken-cholera," and by a plain line (—) in the case of rabbits that died from other causes.

Diagram V shows also a sketch of a vertical section of the artificial burrows. This sketch applies also to the burrows figured in Diagrams VI and VII.

## PROGRESS REPORT (No. II.) ON EXPERIMENTS WITH THE MICROBES OF CHICKEN-CHOLERA.

To the Chairman, Experiment Committee, Rabbit Commission,—

Rodd Island, 2 November, 1888.

I BEG to report as follows:—

## A. Infecting Rabbits in successive series of twenty generations.

It being from a practical point of view—in case the microbes of chicken-cholera were to be employed as a means for the destruction of rabbits in Australasia—a matter of some importance to know whether these microbes, by passing through the bodies of rabbits in a number of continuous generations, become altered in their degree of virulence or not, the Experiment Committee of this Commission decided that such an experiment, with a view to obtaining the required information, should be made, extending to the number of twenty successive transmissions from rabbit to rabbit.

Let us suppose the virus under consideration is endowed with the faculty of becoming more virulent, or, in other words, of attaining a greater poisoning strength in its action on rabbits, by means of such successive transmissions, the consequence will naturally be that, under the same conditions, the period of incubation and actual disease, or the whole period from infection to death, becomes shorter, until a certain stationary point is reached; this period must, on the other hand, provided the conditions be the same, become longer, or infection with subsequent death may not follow at all, if there should be any decrease or attenuation of the virulence of the microbe. Should the latter preserve its degree of virulence uniformly from the first rabbit to the last, it stands to reason that the above period will remain about the same throughout, provided again the conditions be the same. The

\* The ferrets referred to in these experiments were sent to the Rabbit Commission by the Government of New Zealand, and were received at Rodd Island on the 31st August.

† The ferrets continued to be in good health (October 1st).

The experiment was carried out in the following manner:—A healthy pigeon was inoculated October 3rd, with a small quantity of the surface growth of a virulent stick-culture of the microbe of chicken-cholera (fourth generation, 32 days old). Not long after the death of this pigeon, which died of typical chicken-cholera within about twenty hours, two rabbits\* were inoculated each with five platinum loopsful, equal to  $\frac{1}{4}$  ccm., † of heart-blood from this pigeon. The blood of the *first* rabbit that died, or that was found dead, furnished the material for inoculation in like manner into two further rabbits; with the blood again of the *first* of these dead, two other rabbits were inoculated, and so on till the number of forty rabbits, or twenty generations, were arrived at, when the experiment was concluded.

Before directing your attention to the table of results of the experiments given below (Table I, page 162), I wish to state the following:—The rabbits used were, if not specially noted to the contrary, full-grown animals of normal appearance. If at the *post-mortem* examinations anything abnormal was found, it will be remarked in the table below. The rabbits for this experiment were taken irrespectively of the sex. From practical reasons it was not possible to employ either males or females from the beginning to the end.

Immediately after the inoculations the rabbits were placed in spacious clean hutches, separately, and food was given to them as usual. They were also, all of them, sheltered from rain and sun in like manner.

The blood used for the inoculations was in each case derived from the right *atrium* of the heart, near the *venae cavae*. The quantity of blood derived was pretty uniformly the same each time, viz.,  $\frac{1}{4}$  ccm. (*vide* above).

The time of inoculation of each new series lay within about *two* hours from the moment the first of the preceding series died. In cases where such rabbits were found dead, instead of being observed to die, the body-temperature then taken yielded a cue as to the approximate time when death occurred.

The seat of inoculation was always a corresponding area on the left side of the belly. After having shorn this area, a small fold of the skin, where there was no blood-vessel running, was cut across by means of a small pair of scissors. The wound thus produced was made the entrance into a small subcutaneous pouch, where the inoculation-material was easily and safely deposited by means of the platinum loop.

The quantity of bacteria thus inoculated into the different rabbits was, comparatively speaking, a limited one. The direct microscopical examination of uniformly obtained and stained samples of heart-blood of all the rabbits shortly after their death succeeded in showing only moderate numbers of individual bacteria.

In four cases I have tried to determine approximately the number administered, namely, in Inoculation Series X, XV, XIX, and XX, [Nos. 19, 29, 37, and 39 (*vide* table below)]. About 10 ccm. of 6 per cent. rabbit-broth-peptone-gelatine in a test-tube were liquefied, so as to have a temperature of between 30° and 40° C., mixed with one platinum loop full (one-fifth of the quantity for inoculation) of the heart-blood, and made to solidify, by means of iced water, in a homogeneous layer along the inner walls of the test-tubes (Esmarch's method). After having been in a thermostat at a suitable temperature for three or four days, the coating of gelatine in the tubes presented innumerable, as it seemed, whitish points of growth or colonies, the number of which, however, could without difficulty be calculated by counting the number of colonies at, usually, ten different spots each of the area of one-sixteenth of a square cm., area cut out of a piece of black paper. The total number of colonies which were calculated as being contained in the four tubes amounted to 67,023, 71,887, 65,367, 48,593, *i.e.*, in the mean, 63,368. This figure multiplied by five yields 316,840, and, if we are permitted to make use of this average number, we may well say that the quantity of microbes transmitted into the rabbits along with blood was not very far off this number. We are, however, well justified in taking it somewhat higher, from the fact that a portion of the bacteria in the blood are occurring in twos, which will not be easily separated by mixing with gelatine, in which, on beginning to multiply, they will give rise to but one colony.

This relative scarcity of the micro-organisms of chicken-cholera in the heart-blood of rabbits *newly* dead, stood in a sharp contrast to the relative abundance of these microbes in samples of the same blood taken from rabbits *which had been left* where they died untouched (say) for *twelve, twenty-four, thirty-six, or more hours*. In each case where such a comparison was made—for that purpose one portion of the rabbits as used for the inoculations were examined soon after their death, and the other corresponding portion at some time after their death; but also on other occasions, when I had an opportunity of thus comparing, I could not fail to be struck with the disparity of the heart-blood alluded to.

On the other hand it was repeatedly noticed that the capillary-blood derived from cut surfaces of the liver, soon after the death of rabbits, contained incomparably more numerous bacteria than the heart-blood derived from the same subject and at the same time.

I must add that all the samples for microscopical examination were derived in like quantities, and spread and stained on cover-glasses in like fashion. From this it is evident that in rabbits dead of "chicken-cholera," at the time of death or shortly after it, the blood of the heart and main vessels carries only a relatively small number of the bacteria, and that their relatively plentiful occurrence there some such time after death as noted above, can only be declared by their having multiplied there after the death of their hosts.

The table, the arrangement of which will, I think, be easily understood, contains the results of this experiment. I may at once remark that, for the sake of convenience, those rabbits which as having died first were used for the successive inoculations of the different series (column one) are designated uniformly by the first (odd) number (column two) of each series:—

[See Table I, page 162.]

In looking over the figures in this table, we cannot help arriving at the conclusion that by transmitting the virus of chicken-cholera from rabbit to rabbit to the extent of twenty generations, neither an increase nor a decrease in its virulence is attained—that, rather, its virulence does not exhibit any striking differences throughout the whole series. It is true that in four cases out of the forty the figures regarding time of death are a little lower than usual (Nos. 1, 21, 29, 33), that in three other cases they are somewhat higher (Nos. 4, 14, 28), and that in one case (No. 34) the figure is very high. But these exceptions may be declared to arise from certain individual properties of the rabbits employed. It was, as a matter of fact, not possible to take exclusively only such rabbits as were like one another in every respect (age, size, weight, sex, and health). That

\* The rabbits used in this and other experiments recorded in this Report were, with one exception when special notice will be given, wild rabbits from Carrathool, near Hay, N.S.W.

† One cubic centimetre (ccm.) is equal to sixteen minims.

‡ 1° C. = (2° Fahr.) + 32; 15° C. (e.g.) = (15 ×  $\frac{9}{5}$  F) + 32.

§ 2.515 cm. = 1 inch.

That the rabbit No. 34, Series XVII—a light-grey female, with a white streak running longitudinally from the back of the head over the middle of the head down to the under side of the neck (mammary glands fully developed, containing milk)—did not succumb until two days after inoculation, which had been performed in the usual manner, is very remarkable. Seeing it outlive the first day, I thought of having hit upon another, but somewhat different, example of immunity in rabbits (*vide* page 154, Appendix D, series II). The *post-mortem* examination later on left no doubt as to its having died of "chicken-cholera." I may, however, mention that the seat of inoculation differed from that in all rabbits inoculated, in so far as there was a yellowish-white membranous formation adhering to the under surface of the cutis, of about the size of a sixpence. This appearance was not unlike that which is noticed at the seat of inoculation with the virus of chicken-cholera in the case of fowls and pigeons; but while the substance of the yellowish subcutaneous masses forming after inoculation in fowls and pigeons are found to be crowded with chicken-cholera bacteria, in the corresponding case of the rabbit these bacteria were exceedingly scarce.

The next table (II), page 163, contains the results of inoculations into fowls and pigeons with heart blood from the first-mentioned rabbits as used in the Inoculation Series, V, X, XV, XX of Table I. In reference to the first case which I denoted as inoculated from Inoculation Series I, I must state that, as the date, 16th October, implies, that particular rabbit was not exactly the first dead of the first generation as followed directly by the others; but this experiment was added later on, when, on 14th October, a pigeon was inoculated with a small quantity of the surface-growth of a gelatine stick-culture of the microbe (fifth generation, 17 days old), and after the death of the pigeon which died between 14 h. 15 m. and 17 h. 5 m., a rabbit was inoculated (15th October), in pretty much the same way as the two of the first series in Table I. From this rabbit, which died between 12 h. 30 m. and 15 h. 45 m., the fowl and pigeon of series I of the following table were inoculated. Therefore, I call Series No. I simply inoculated from Inoculation Series I. The conditions under which the five series were inoculated were, on the whole, corresponding to those stated for the rabbits (Table I); the seat of inoculation was an area under the skin which covers the pectoral muscle.

[See Table II, page 163.]

As evidenced by the data obtained and put together in this table, the virulence of the microbes of chicken-cholera neither increases nor decreases, perceptibly, in fowls and pigeons inoculated with virus descending from rabbits of the first, fifth, tenth, fifteenth, or twentieth Inoculation Series. The hours which it required to kill either fowls or pigeons did not show any considerable difference in either the one or the other case, so that we may say here, as we did before, that the degree of virulence was at the end of the experiment practically the same as at the beginning.

*Notes on the Body Temperatures of Rabbits inoculated with the microbes of chicken-cholera.*

In connection with the experiment conducted with a view to determining the degree of virulence of the bacteria of chicken-cholera, when made to pass through the bodies of rabbits in twenty generations of two rabbits for each, I have been able to make a series of observations regarding the body-temperatures of such rabbits.\*

In a number of cases the temperature was taken, at intervals, from the time of inoculation (immediately before it) until death (immediately after it); in several instances only up to some time before death.

These observations are put together in a table.

[See Table III, page 164.]

From the data given in this table we may reasonably conclude that—

1. As *a priori* intelligible, the septicæmia which is the result of transmitting virulent chicken-cholera bacteria into rabbits, is associated with a gradual increase in the body-temperature, which in its maximum was found to differ from the initial temperature by 2.5° C. in one case (No. 8), by 1.95° C. in another (No. 2), by 1.9° C. in a third (No. 7), by 1.8° C. in two others (Nos. 10 and 16), while in the remaining cases the difference was less.
2. This maximum, as a rule, is noticed some little time before death.

The difference between the initial body-temperatures (taken immediately before inoculation) and the ultimate body-temperatures (taken immediately after death) may also be seen, in the majority of cases, as noted in the aforementioned table. Apart from these I can offer several examples where only initial and ultimate temperatures were taken. All the examples that may thus be utilized number nineteen. The following are the figures as compared with one another in the different instances:—

40.0 — 39.6 : 39.2 — 39.67 : 39.6 — 40.6 : 39.3 — 41.0 :  
 38.9 — 39.6 : 39.1 — 40.2 : 39.2 — 39.15 : 39.4 — 40.0 :  
 39.05 — 39.45 : 38.85 — 40.0 : 39.1 — 40.9 : 39.8 — 39.6 :  
 39.8 — 41.25 : 39.0 — 39.9 : 38.8 — 39.65 : 39.9 — 41.7 :  
 39.8 — 40.2 : 39.6 — 41.2 : 40.0 — 38.4 :

In fifteen cases, then, out of nineteen the body-temperature was found to be higher at the end than at the beginning. Taking the mean out of each of these two series of fifteen observations, we arrive at the figures 39.3—40.355; the difference is thus 1.055° C. In four cases out of the above nineteen the end temperature was lower than the beginning. Taking, again, the mean out of each of the two series of four observations, we obtain the figures 39.75—39.19, that is a difference of .56° C. in favour of the initial temperature.

From this, therefore, we may deduce that, as a rule, the ultimate body-temperature is higher than the initial by about 1° C. on the average.

I may add the initial temperatures of eleven more cases, without any corresponding end temperature. They were 39.9, 39.85, 40.2, 40.0, 39.45, 39.3, 40.1, 39.4, 38.7, 39.0, 39.6. The end temperature in one case, without any initial temperature taken, was 41.25. †

Although

\* The observations were made by means of an efficacious clinical thermometer which, after having been oiled with *ol. amygd. dulc.*, was introduced into the nares to the length of between six and seven centimètres.

† Note on the Respiration.—The breathing shortly before death is very much accelerated. In one instance, two minutes before death, I have found it to be forty-six to  $\frac{1}{2}$  minute; in another instance, ten minutes before death, forty-four to  $\frac{1}{2}$  minute.

## OF RABBITS IN AUSTRALASIA—CHIEF EXPERT'S REPORT (NO. II). 159

Although the temperatures which the air showed during the course of the experiments recorded above (Table I) may be regarded as having only a secondary meaning in the judgment upon the results obtained, it is just as well to give a number of figures as they were noted.\* They show here and there marked differences:—

October 4th.	1.35 p.m. 25°	3.35 p.m. 25½°	5.35 p.m. 22½°	7.35 p.m. 20°	9.40 p.m. 18½°			
" 5th.	2.10 p.m. 21°	4.10 p.m. 19½°	6.45 p.m. 17½°	8.55 p.m. 16°	11 p.m. 14½°			
" 6th.	2.5 a.m. 11½°	5.40 a.m. 9½°	10 a.m. 19°	12.10 p.m. 22½°	2.15 p.m. 19½°	4.15 p.m. 18½°	7 p.m. 16½°	8.40 p.m. 15½°
" 7th.	9 a.m. 18½°	10.40 a.m. 21½°	12.40 p.m. 26½°	2.50 p.m. 24½°	4.50 p.m. 20½°	6.55 p.m. 19½°	9 p.m. 19°	11.10 p.m. 19°
" 8th.	1.30 a.m. 16½°	4 p.m. 13½°	5.5 p.m. 12°	7.30 p.m. 12°	8.55 p.m. 14°			
" 9th.	8 a.m. 14½°	10.55 a.m. 16°	1 p.m. 15½°	3.10 p.m. 16½°	5.10 p.m. 15½°	7.20 p.m. 14½°	9.20 p.m. 14°	11.31 p.m. 14½°
" 10th.	10.30 a.m. 17½°	12.50 p.m. 18½°	3.20 p.m. 17½°	5.55 p.m. 15½°	8 p.m. 15½°	10.15 p.m. 12½°		
" 11th.	12.55 a.m. 12½°	10 a.m. 19½°	12.15 p.m. 21½°	3.30 p.m. 21½°	8.20 p.m. 16½°	10.10 p.m. 15½°	11.43 p.m. 14°	
" 12th.	12.47 a.m. 12½°	7.45 p.m. 17½°						
" 13th.	8.10 a.m. 17½°	10.40 a.m. 21½°	1.5 p.m. 23½°	6.10 p.m. 18½°	8.10 p.m. 18°			
" 14th.	1.15 a.m. 15½°	12.50 p.m. 25½°	3.25 p.m. 23½°	6 p.m. 18°	8.10 p.m. 17½°	10.15 p.m. 17½°		
" 15th.	5.40 p.m. 18°	8.10 p.m. 17°	10.30 p.m. 15½°					
" 16th.	3.5 a.m. 12½°	7.20 a.m. 15°						

## B. Experiments on Indigenous Birds.

In the Table given below (IV, a, b, c) are put together seriatim the results of experiments with the microbes of chicken-cholera on a number of indigenous birds. These consisted of:—

- (1.) Two wekas, or Maori- or wood-hens (*Ocydromus australis*, Sparrm.). *Habitat*: South Island of N.Z.
- (2.) Two magpies (*Gymnorhina tibicen*, Lath.). *Hab.*: Q., N.S.W., V., S.A.
- (3.) Two laughing-jackasses (*Dacelo gigas*, Bodd.). *Hab.*: Q., N.S.W., V.
- (4.) Two butcher-birds (*Cyathicus torquatus*, Lath.). *Hab.*: Q., N.S.W., V., S.A.
- (5.) One blue-jay (*Graculus melanops*, Lath.). *Hab.*: Austral. (and New Guinea).
- (6.) Two gallahs, or rose-breasted cockatoos (*Cacatua roseicapilla*, Vieill.). *Hab.*: Austral.
- (7.) Two wonga-pigeons (*Leucosarcia picata*, Lath.). *Hab.*: Q., N.S.W., V.
- (8.) One bronze-wing pigeon (*Phaps chalcoptera*, Lath.). *Hab.*: Austral.
- (9.) Two common swamp-quail (*Synoicus australis*, Lath.). *Hab.*: Austral.†

[See Table IV, (a), (b), (c), pages 165, 166.]

From the results thus far obtained we see that the virus of chicken-cholera, derived as it was in the shape of blood from rabbits which died in consequence of infection by that virus, proved, when caused to gain entrance into the digestive organs in the noted quantities, fatal to the magpies, butcher-birds, and blue-jay (which are principally animal feeders), to the wonga- and bronze-wing pigeons, to the gallahs and quail (which are all of them vegetable feeders). One of the wonga-pigeons, however, and one of the quail, did not succumb until after having been fed a second time on somewhat larger portions of the virus than before. One of the gallahs, although surviving two experiments by feeding, perished quickly in consequence of inoculation, thus manifesting its ready susceptibility to inoculated "chicken-cholera."

Of two laughing jackasses (true animal-feeders) one died after the first experiment (feeding), but not of chicken-cholera, as shown by the result of the *post-mortem* examination. The other survived feeding on virulent material for two successive times; but when inoculated later on it succumbed, we are entitled to say, to this disease, in so far as evidenced by the occurrence of numerous bacteria of chicken-cholera in the blood, by their successful cultivation and inoculation into a healthy rabbit, which died as usual. The appearance of the organs was less characteristic than is usually the case with birds dead of the disease.

Two wekas (animal-feeders), of which one was once fed and twice inoculated, the other twice fed and once inoculated, remained alive. Whether their insusceptibility in this case arose from the fact of their having been possibly treated preventively, or whether birds of this description are naturally immune against chicken-cholera in any shape of application, can only be decided by further experiments.

That

\* These figures are also put down in connection with certain statements as to the relative quantity of bacteria in the blood of rabbits some time after their death of "chicken-cholera," *vide* above.

† All the specimens of birds mentioned were obtained, in an apparently good condition, from a dealer at the Sydney markets, on the 8th October. On the Island they were kept in spackus, airy boxes so as to be protected from any injurious effects of the weather. During the course of the experiments they were regularly fed on suitable feed material. However, when they were to be experimented upon (in case of feeding only) they were slightly starved beforehand, and their boxes emptied of all food except water.

That with regard to all the representatives of indigenous birds which, experimented upon, died, the cause of death must be regarded as due to chicken-cholera, as briefly noted in the quoted table by "P.M., Positive" (with the exception of one laughing-jackass, where the *post-mortem* was negative) was, I think, conclusively demonstrated by the presence, usually in immense numbers, of the typical bacteria in the blood; by cultivation of such material in suitable media, when they gave rise to typical cultures; and by the positive results of occasional inoculations of blood into normal rabbits. Besides, the appearance of the organs was nearly always such as to bear a close resemblance to that in the case of fowls and pigeons which succumb to the disease.

Certain results obtained in the foregoing experiments would seem to lead to the belief that indigenous birds, as exemplified by a few instances, may not always necessarily become affected or killed by taking up, along with food, certain small or minute quantities of the microbes, derived, we had better add, directly from the bodies of rabbits newly dead of chicken-cholera. On the other hand, inoculation with the virus taken from the same source may be looked upon as a far more dangerous, although naturally a more rarely occurring, mode of infection for such birds. Further below I shall mention a corresponding case in common pigeons.

How far there is danger for all the useful indigenous birds to take up the disease (chicken-cholera), should it be introduced into the country, cannot be precisely defined from the results of the above experiments. That such a danger, however slight it may be, does exist if the disease was wilfully spread and reared in the open, cannot be denied by the unbiassed mind; and that, even admitting that in the first instance only a minute fraction of wild birds may be carried off by the disease—an occurrence which in itself would be of little importance—these few birds, travelling as they may perhaps after having become infected, may transmit the germs hither and thither, ready to be taken up again by susceptible birds of the same or some other description.

### C. Miscellaneous Experiments.

(i) The following table (V, a, b, c, d) contains the results of some experiments on fowls and pigeons, whence it will be seen that one fowl (hen) proved insusceptible to taking chicken-cholera by feeding on a small portion of virulent material from a dead rabbit, while after a second feeding on a considerably larger portion it died, unfortunately, soon afterwards of some cause other than chicken-cholera. (The result of the *post-mortem* examination is denoted as *negative* in the table). Another fowl (rooster) was fed three consecutive times on successively always larger portions of virulent material (taken from rabbits) without harm to its health. Later on it was inoculated, but it remained alive.

The immunity in this instance was possibly due to the animal having been subjected to three previous and successive feeding experiments, which may have acted as a preventative. I say, they may; we are not warranted in adopting this view as the only correct one, since we are informed of instances in which fowls have withstood inoculation with virulent microbes of chicken-cholera from the very first (Salmon). On the other hand, two common pigeons, which were repeatedly fed (the one twice, the other three times) on infected food, succumbed promptly to the effects of inoculation later on, thus showing that they had not been rendered proof by the previous treatments. However, in the judgment of these results it should be borne in mind that, as the pigeons were too slow in eating (*vide* table), the previous treatments (feeding) cannot be regarded as exact. (The results of the *post-mortem* examinations in the table are simply denoted as *positive*.)

The virulence of the material used for the above experiments was out of question, although special control-experiments (on rabbits) were not made each time.

[See Table V, (a), (b), (c), (d), page 167.]

(ii) In my previous Report (Progress Report No. I, Appendix D, Series II, pp. 154, 155) I drew attention to a tame Angora-rabbit (albino), which was found to be insusceptible to "chicken-cholera" on inoculation, which had been preceded by feeding at intervals on successively increasing quantities of virulent cultures of the microbes of chicken-cholera (three times). Consequent on the inoculation it reacted as already stated, with a large abscess at the place where the virulent broth-culture ( $\frac{1}{8}$  ccm. = 2 minims) had been injected. This was on the 1st September.

On 10th October, when the abscess had completely healed, the rabbit received on a corresponding spot on the other side of the belly  $\frac{1}{8}$  ccm. (= 2 minims) of fresh virulent heart-blood from a rabbit out of the series of experiments as recorded in Table I (Series X, No. 19).

#### Controls:

The two rabbits from Series XI, Table I, which died in 14 h. 21 m., and between 7 h. 20 m. and 9 h. 20 m. after inoculation, respectively. (Quantity for inoculation only  $\frac{1}{10}$  ccm.)

The fowl and the pigeon from Series III, Table II, which died between 20 h. 15 m. and 21 h. 40 m., and between 14 h. 15 m. and 20 h. after inoculation, respectively. (Quantity for inoculation the same as before.)

#### Result:

It remained alive, although it reacted by the formation of an abscess, and a higher body-temperature for some time after inoculation.

#### Remarks on Body Temperatures, &c. :—

Oct. 10th.—At time of inoculation (noon) 40.4°C.  
5.55 p.m. 41.0°  
10.15 p.m. 41.2

Oct. 11th.—11 a.m. 40.47  
3.30 p.m. 40.2  
10.10 p.m. 40.86

On the morning of this day its appetite did not appear to be so keen as usual. The seat of inoculation began to show reaction by inflammation.

Oct. 12th.—3.15 p.m. 40.6  
Oct. 13th.—1.15 p.m. 40.05

Oct. 18th.—A distinct closed abscess, elastic to the touch, pink at surface, and of pear-shape.

Oct. 19th.—Abscess, still closed, measures 30 mm.\* in length (from apex to base), 23 mm. across the widest part—raised about 12 mm. above the level of the adjoining portions of the skin of the belly.

Oct. 22nd.—Abscess still closed, but apparently smaller.

Oct.

\* 25.15 mm. = 1 inch.

## OF RABBITS IN AUSTRALASIA—CHIEF EXPERT'S REPORT (NO. II). 161

Oct. 26th.—Pus was derived from the abscess by pressing. It was very thick, tenacious, and inodorous. The microscopical examination of preparations of a sample of this pus coloured with methylene-blue solution did not disclose any chicken-cholera bacteria. At the same time some blood, unmixed with pus, was obtained from the abscess at another place, and inoculated in the quantity of a platinum-loop full into a half-grown rabbit. This rabbit was found dead about nine hours afterwards, but "chicken-cholera" was not the cause of death. A half-grown rabbit was inoculated (Oct. 27th) with a similar platinum-loop full of blood from the latter. It was found dead the following day, but the P.M. was again negative so far as "chicken-cholera" was concerned.

Nov. 2nd.—Abscess considerably reduced. Rabbit appears quite normal.\*

(iii) Addendum to experiments of feeding rabbits on faecal matter from rabbit dead of "chicken cholera" by feeding.

In the previous Report (Appendix Series III, (ii), page 155), I recorded such an experiment with negative result. Since that time I have made a similar experiment yielding, likewise, a negative result.

On October 15th at 11.5 a.m., two half-grown rabbits (in one hutch) were fed upon cabbage leaves, to which had been added about 5 ccm. of a mixture, consisting half of a portion of the contents of the caecum from a young rabbit [control (b) to the feeding of indigenous birds], dead of "chicken-cholera," and half of a 0.6 per cent. sterile salt-solution.

- Annotations:* (a) These two rabbits had been removed from their hutch before feeding time on the morning of the 15th, and did not receive any food until at above time.  
 (b) They had eaten all but a few small pieces of the cabbage leaves by 12.30 p.m., and had eaten all by 2 p.m.  
 (c) The matter in the caecum was derived by carefully cutting the latter open to some length with a hot scalpel, and collecting that matter directly in a sterile test-tube.

*Results:*

Oct. 16th. One was observed to be dying at 8.10 p.m. As it was paralysed and evidently in pain, it was then killed. P. M. *Negative*.

Oct. 18th. The other was found dead at 9.15 p.m. P. M. *Negative*.

(iv) Two experiments made with a view to testing Dr. N. Gamaleia's supposition that the microbes of chicken-cholera are constantly present in the intestines of normal pigeons.

On pages 146-148, in Progress Report No. I, I produced a literal translation of Gamaleia's article, "Contribution to the Etiology of Chicken-cholera, &c.," in which he records, among other things, having been successful in obtaining bacteria of chicken-cholera out of the intestines of normal pigeons in only slightly virulent varieties which, in order to be able to kill pigeons or fowls, must first be transferred to susceptible animals, viz., rabbits and *Zieseln*. In connection with this subject I mentioned already one experiment with a negative result. The material for experiment was in that case derived from a dead young chick sent for examination. I now add two experiments, for which the material was derived from healthy pigeons. The results were also negative.

(1) Sept. 27th, at 3.50 p.m.—

A healthy pigeon† was killed by chloroform-narcosis. The contents of the small and large intestines and part of the contents of the stomach (the latter containing green food) were taken under antiseptic precautions. The whole was placed together in a test-tube and mixed and shaken with about 10 ccm. of sterile rabbit-broth. This tube was for a while placed in a water-bath of 37° C.

Of this mixture 1 ccm. was injected subcutaneously into each of two rabbits by means of a sterilized pointed glass-tube.

*Results:*

(a) Sept. 28th.—One rabbit was found dead at 6 p.m. P. M. *Negative*.

A pigeon inoculated at 10.30 a.m. on the 29th Sept. with a platinum-loop full of heart-blood from this rabbit was still alive at 10.45 a.m. on the 5th Oct., when it was removed from its cage. A half-grown rabbit inoculated at 10.45 a.m. with one platinum-loop full, and a full-grown rabbit, inoculated at 11.30 a.m. on the 29th Sept. with five platinum-loops full of the same heart-blood, were both alive at 4 p.m. on the 8th Oct., when they were removed from their hutch.

(b) Oct. 8th. The other was still alive at 4 p.m., when it was removed from its hutch.

(2) Oct. 3rd, at 10.40 a.m.—A healthy pigeon was killed by chloroform-narcosis. The contents of the intestines were collected under antiseptic precautions, mixed and shaken in a sterile glass-tube with sterile rabbit-broth, and warmed as before.

Of this mixture injections were made (analogously to the first experiment) into two rabbits.

At 11.10 a.m.—

A half-grown rabbit received  $\frac{1}{2}$  ccm. of the mixture.

A full-grown rabbit received 1 ccm. of the mixture.

*Results:*

Oct. 11th. Both of these rabbits were alive at 9 a.m., when they were removed from their hutch.

OSCAR KATZ.

\* So it does on November 25th.

† This pigeon and the next one were among a consignment of twelve purchased at the Sydney markets. The remaining pigeons did not show any signs of illness later on.

TABLE I.

TABLE I.  
TABLE showing Results of the Inoculation Series.

Series.	Distinctive number of rabbit.	Inoculated from	Inoculation.		Time from inoculation to death.		Temperature of body when found dead (centigrade).	Remarks.
			Date and time.	At. N.	When seen to die.	When found dead. Between		
I	{ 1 } { 2 }	A pigeon that died of chicken-cholera.	Oct. 4th, 11:30 a.m. Oct. 4th, 11:30 a.m.	H. M.	H. M.	H. M.	38.45	
II	{ 3 } { 4 }	The first rabbit of the preceding Series.	Oct. 4th, 10:15 p.m. Oct. 4th, 10:10 p.m.	35 30	18 30	14-10 "	14-50	
III	{ 5 } { 6 }	"	Oct. 5th, 2:15 p.m. Oct. 5th, 2:5 p.m.	1:10 1:0		12 0 "	14 50 17 35	
IV	{ 7 } { 8 }	"	Oct. 6th, 5:35 a.m. Oct. 6th, 5:25 a.m.	35 35	18 15 18 15			
V	{ 9 } { 10 }	"	Oct. 6th, 8:15 p.m. Oct. 6th, 8:5 p.m.	1:25 1:15	18 55 13 0			
VI	{ 11 } { 12 }	"	Oct. 7th, 10:47 a.m. Oct. 7th, 10:40 a.m.	1:37 1:30	18 38 14 2			
VII	{ 13 } { 14 }	"	Oct. 8th, 1:10 a.m. Oct. 8th, 1:50 a.m.	51 1:6	14 44 18 25			
VIII	{ 15 } { 16 }	"	Oct. 8th, 4:57 p.m. Oct. 8th, 5:5 p.m.	57 1:6	16 22			
LX	{ 17 } { 18 }	"	Oct. 9th, 8:15 a.m. Oct. 9th, 8:22 a.m.	1:30 1:27	11 5 16 9			No. 17.—Somewhat smaller specimen than usual. Seat of inoculation showing larger area of hemorrhagic gelatinous oedema than usual. In the liver a few coccidia abscesses.
X	{ 19 } { 20 }	"	Oct. 9th, 8:38 p.m. Oct. 9th, 8:30 p.m.	1:18 1:10				No. 19.—A few coccidia abscesses in the liver.
XI	{ 21 } { 22 }	"	Oct. 10th, 10:25 a.m. Oct. 10th, 10:34 a.m.	1:10 1:24	14 21			No. 21.—Specimen only about three-quarters grown; rather thin. Few coccidia abscesses in the liver.
XII	{ 23 } { 24 }	"	Oct. 10th, 8:50 p.m. Oct. 10th, 9:7 p.m.	1:0 1:12				
XIII	{ 25 } { 26 }	"	Oct. 11th, 10:8 a.m. Oct. 11th, 9:55 a.m.	1:48 1:38	13 55			
XIV	{ 27 } { 28 }	"	Oct. 12th, 12:40 a.m. Oct. 12th, 12:39 a.m.	1:3 50				
XV	{ 29 } { 30 }	"	Oct. 12th, 7:40 p.m. Oct. 12th, 7:53 p.m.	1:8 1:21	10 17			No. 29.—A doe which had dropped seven fully developed young, some of which were found alive the next morning. The microscopical examination of heart-blood in the case of two out of these seven did not exhibit any micro-organisms.
XVI	{ 31 } { 32 }	"	Oct. 13th, 8:15 a.m. Oct. 13th, 8:7 a.m.	2:18 2 10	15 41			No. 31. A doe in the beginning of gestation. On microscopical examination of the liver of two of the fetuses taken from the uterus, micro-organisms were not observed.
XVII	{ 33 } { 34 }	"	Oct. 14th, 1:10 a.m. Oct. 14th, 1:20 a.m.	1:14 1:24				No. 34.—A doe, about which something more on page 158.
XVIII	{ 35 } { 36 }	"	Oct. 14th, 12:54 p.m. Oct. 14th, 12:45 p.m.	1:17 1 8	13 10			
XIX	{ 37 } { 38 }	"	Oct. 16th, 1:41 a.m. Oct. 16th, 1:32 a.m.	1:11 1 2	14 57			No. 38.—A doe in about the end of the second week of gestation. The microscopical examination of the liver of a fetus did not show any micro-organisms.
XX	{ 39 } { 40 }	"	Oct. 16th, 5:45 p.m. Oct. 16th, 5:38 p.m.	1 7 1 0	13 42			

TABLE II.

TABLE showing results of inoculation of fowls and pigeons with the virus of chicken-cholera taken from certain cases out of the Inoculation Series of Rabbits (Table I).

Series.	Fowl or pigeon.	Inoculated from virulent blood of rabbit of	Inoculation.			Time from inoculation to death.			Remarks.
			Date and time.	Time from death of rabbit to inoculation of fowl or pigeon.		Death, date and time.	When seen to die.	When found dead. Between	
				From time of death	From time of being found dead.				
I {	Fowl Pigeon	Inoculation Series I.	Oct. 16th, 2 40 a.m. " 2 50 a.m.	H. M. 45*	55	Oct. 16th, 11-30 p.m. " 9-20 p.m.	H. M. 20-50	H. M. H. M. 17-25 and 18-30	*Body when found was cold. Fowl must have died between 12 h. 30 m and 15 h. 45 m. after inoculation.
II {	Fowl Pigeon	Inoculation Series V.	Oct. 7th, 11 a.m. " 10-52 a.m.	1-50 1-42		Oct. 8th, 7-35 a.m. " 7-35 a.m.		14-30 " 20-35 14-38 " 20-43	
III {	Fowl Pigeon	Inoculation Series X.	Oct. 10th, 10-45 a.m. " 10-50 a.m.		1-35† 1-40	Oct. 11th, 8-25 a.m. " 6-50 a.m.		20-15 " 21-40 14-15 " 20-0	† Temperature when found dead 37.1° C. This fowl had laid an egg between 7 a.m. and 8-25 a.m., which appeared perfectly normal as regards both the exterior and interior. On microscopical examination of the yolk micro-organisms could not be detected.
IV {	Fowl Pigeon	Inoculation Series XV.	Oct. 13th, 8-25 a.m. " 8-33 a.m.	2-28 2-36		Oct. 14th, 8-30 a.m. " 13th, 11-10 p.m.		23-20 " 24-5 13-57 " 14-37	
V {	Fowl Pigeon	Inoculation Series XX.	Oct. 16th, 10-5 a.m. " 10-10 a.m.		3-0‡ 3-5	Oct. 17th, 5-45 a.m. " 5-45 a.m.		17-20 " 19-40 17-15 " 19-35	‡ Temperature when found dead 35.6° C.



TABLE IV (a).  
SHOWING results of experiments (by feeding) on indigenous Birds.

Names of birds.	Date and time of feeding.	Infected food as placed in each cage.		Results.	Remarks.
		Description of infected food.	Quantity of such liver and heart-blood for each cage.		
Two Wekas..... (in one cage)	Oct. 12th, 11.5 a.m....	Liver and heart blood from rabbit No. 22 of Inoculation Series XI, Table I, page 162	10 g.*	Both were still alive on October 19th .....	They ate all the food at once.
Two Magpies .....	„ 11.10 a.m....	do do do	10 g.	One was found dead at 6.35 a.m. on October 13th (i.e., between 18 h. 50 m. and 19 h. 25 m. after being fed). P.M., <i>Positive</i> .† The other was found dead at 1 p.m. on the same day (i.e., between 25 h. 25 m. and 25 h. 50 m. after being fed). P.M., <i>Positive</i> .	They ate all the food at once.
Two Laughing Jackasses (in one cage)	„ 11.15 a.m....	do do do	10 g.	One was found dead at 3.5 p.m. on October 17th (i.e., between 122 h. 45 m. and 124 h. 50 m. after being fed). P.M., <i>Negative</i> . The other was still alive on October 19th.	They had eaten all the food in five minutes.
Two Butcher-birds and one Blue Jay. (in one cage)	„ 11.20 a.m....	do do do	10 g.	One Butcher-bird was found dead at 6 a.m. on October 13th (i.e., between 10 h. 30 m. and 18 h. 40 m. after being fed). P.M., <i>Positive</i> . The other Butcher-bird was found dead at 9.20 a.m. on the same day (i.e., between 21 h. 10 m. and 22 h. after being fed). P.M., <i>Positive</i> . The Blue Jay was found dead at 2.10 p.m. on the same day (i.e., between 26 h. 30 m. and 26 h. 50 m. after being fed). P.M., <i>Positive</i> .	They had eaten all the food in a quarter of an hour.
Two Gallahs .....	„ noon.....	do do do (mixed with 0.6 p.c. salt-solution and mashed up with crushed maize)	1 g.	One was found dead at 7.30 a.m. on October 14th (i.e., between 37 h. and 43 h. 30 m. after being fed). P.M., <i>Positive</i> . The other was still alive on October 19th.	They had eaten about half in 2½ hours, and in 5 hours had eaten all.
Two Wonga Pigeons and one Bronze-wing Pigeon. (in one cage)	12.20 p.m....	do do do	1½ g.	One Wonga Pigeon was found dead at 12.48 a.m. on October 14th (i.e., between 35 h. 36 m. and 36 h. 28 m. after being fed). P.M., <i>Positive</i> . The Bronze-wing Pigeon was found dead at 12.30 p.m. on October 13th (i.e., between 23 h. 10 m. and 24 h. 10 m. after being fed). P.M., <i>Positive</i> . The other Wonga Pigeon was still alive on October 19th.	They had eaten about half in 2 hours, and in 4½ hours had eaten all.
Two Quail .....	12.25 p.m....	do do do (a similar mixture mashed up with bread crumbs)	½ g.	One was found dead at 6 a.m. on October 13th (i.e., between 9 h. 30 m. and 17 h. 35 m. after being fed). P.M., <i>Positive</i> . The other was still alive on October 19th.	They had eaten all in an hour.

Controls : A full-grown rabbit fed upon cabbage-leaves infected with 1 g. of the same material as above (mixed with 0.6 p.c. salt-solution) died 33 h. 50 m. after being fed. P.M., *Positive*.  
A half-grown rabbit fed upon cabbage-leaves infected with ½ g. of the same mixture, died between 37 h. and 42 h. 50 m. after being fed. P.M., *Positive*.

\* 28.35 grammes (g) = 1 ounce; 1½ grammes = 1 dram.

† Each time when death was due to infection caused by the microbes of chicken-cholera, the result of P.M. examination is noted as *Positive*; when death was due to causes other than infection by these microbes, the result of P.M. examination is noted as *Negative*.

TABLE IV. (b).

SHOWING results of further experiments (by feeding and inoculation) on the indigenous Birds surviving from the experiments as detailed in Table IV (a).—

Names of birds.	Date and time of further treatment.	Nature of further treatment.	Quantity of liver or liver-blood in each case.	Results.	Remarks.
Two Wekas (kept, after treatment, in one cage).	Oct. 19th, 9.45 a.m. " 10.10 a.m.	One was inoculated with liver-blood from rabbit No. 34. Inoculation Series XVII, Table 1, page 162. The other was fed upon liver from the same rabbit.	1 platinum loopful (about $\frac{1}{200}$ ccm.) 10 g.	Both were still alive on October 29th.	The one which was fed (separately from the inoculated one) ate all at once.
One Laughing Jackass ..	" 10.20 a.m.	Fed on the same material .. . . . . .	7½ g.	Was still alive on October 29th.....	In half-an-hour it had eaten all but a small piece, and in 3½ hours it had eaten all.
One Wonga Pigeon .....	" 10.40 a.m.	Do do do (mixed with 0.6 p.c. salt-solution and mashed up with crushed maize).	1 g.	Was found dead at 7.15 a.m. on October 22nd (i.e., between 59 h. 20 m. and 68 h. 35 m. after being fed). P.M., Positive.	It had eaten all in half-an-hour.
One Gallah .....	" 10.50 a.m.	Do do do .. . . . . .	1 g.	Was still alive on October 29th .. . . . . .	In an hour it had eaten more than half, and in 3½ hours it had eaten all.
One Quail .. . . . . .	" 10.55 a.m.	Do do do (a similar mixture mashed up with bread crumbs).	½ g.	Was found dead at 12.25 p.m. on October 20th (i.e., between 25 h. 5 m. and 25 h. 30 m. after being fed). P.M., Positive.	In an hour it had eaten nearly all, and in 2 hours had finished all.

Controls: (a). Two half-grown rabbits, in one hutch, were fed upon cabbage leaves infected with 1½ g. of the same material as above (mixed with 0.6 p.c. salt-solution) for the two. One died between 22 h. 45 m. and 24 h. 40 m. after being fed. P.M., Positive. The other died between 94 h. 25 m. and 98 h. 35 m. after being fed. P.M., Negative.

(b). A half-grown rabbit inoculated with one platinum loopful (= about  $\frac{1}{200}$  ccm.) of the liver-blood (as used above) died between 13 h. 20 m. and 21 h. 35 m. after being fed. P.M., Positive.

TABLE IV (c).

SHOWING results of further experiments (by inoculation) on the indigenous Birds surviving from the experiments as detailed in Table IV (b).

Names of Birds.	Date and time of inoculation.	Inoculated (by way of injection) with	Results.	Remarks.
Two Wekas (in one cage)	Oct. 29th, 10.45 a.m. " 29th, 10.50 a.m.	$\frac{1}{10}$ ccm. (= 1 minim) of heart-blood from a rabbit dead between 9 h. 5 m. and 17 h. 15 m. after inoculation with a virulent broth-culture of the microbe of chicken-cholera. do do do	Both were still alive on November 2nd.*	The firstmentioned was the one that had been inoculated before, as recorded in Table IV (b).
One Laughing Jackass ..	" 29th, 10.40 a.m.	do do do	It was found dead at 2.5 p.m. on November 1st (i.e., between 71 h. 20 m. and 75 h. 25 m. after inoculation). P.M., Positive.	A half-grown rabbit inoculated with a good platinum loopful of heart-blood from this jackass died between 11 h. 15 m. and 12 h. 35 m. after inoculation. P.M., Positive.
One Gallah .. . . . . .	" 29th, 11.5 a.m.	do do do	It was found dead at 7.15 a.m. on October 30th (i.e., between 11 h. 40 m. and 20 h. 10 m. after inoculation). P.M., Positive.	

Control: A full-grown rabbit inoculated with a like quantity of the same material died between 11 h. 15 m. and 19 h. 40 m. after inoculation. P.M., Positive.

\* Both were still alive on November 25th.

TABLE V.

SHOWING Results of certain Experiments on Fowls and Pigeons.

## (a) FIRST EXPERIMENT (feeding).

Fowl or pigeon.	Date and time of feeding.	Description of food.	Quantity of such food.	Results.	Remarks.
Fowl (No. 1) (Rooster)	Oct. 5th, 10.10 a.m.	Bread infected with (coagulated) heart-blood from Rabbit No. 2, Inoculation Series I., Table I., page 162.	½ g.	Still alive on Oct. 14th. For further treatment <i>vide (b)</i> .	It ate all the food at once.
Fowl (No. 2) (Hen)	Oct. 5th, 10.30 a.m.	Do. do.	1 g.	Do. do.	It had eaten all but a few crumbs in 3½ hours.
Pigeon (No. 1)	Oct. 5th, 10.55 a.m.	Do. do. (heart-blood mixed with 0.6 p.c. salt-solution and mashed up with crushed maize).	½ g.	Do. do.	The exact time after which this pigeon had eaten or nearly eaten the food was not specially noted. It was, however, observed to be very slow in proceeding to eat.
Pigeon (No. 2)	Oct. 5th, 11.10 a.m.	Do. do.	½ g.	Do. do.	Do. do.

## (b) SECOND EXPERIMENT (feeding).

Fowl or pigeon.	Date and time of feeding.	Description of food.	Quantity of such liver.	Results.	Remarks.
Fowl (No. 1) (Rooster)	Oct. 14th, 11.10 a.m.	Liver from Rabbit No. 31, Inoculation Series XVI., Table I., page 162.	5 g.	Still alive on Oct. 19th. For further treatment <i>vide (c)</i> .	It ate all the food at once.
Fowl (No. 2) (Hen)	Oct. 14th, 11.15 a.m.	Do. do.	2½ g.	Was found dead at 2 p.m. on Oct. 15th P.M., <i>Negative</i> .	Do. do.
Pigeon (No. 1)	Oct. 14th, 11.30 a.m.	Do. do. (mixed with 0.6 p.c. salt-solution and mashed up with crushed maize).	½ g.	Still alive on Oct. 20th. For further treatment <i>vide (d)</i> .	It had eaten nearly all in 2 hours, and in 6½ hours had eaten all.
Pigeon (No. 2)	Oct. 14th, 11.35 a.m.	Do. do.	½ g.	Still alive on Oct. 19th. For further treatment <i>vide (c)</i> .	It had eaten about half in 2 hours, and in 5½ hours had eaten all.

## (c) THIRD EXPERIMENT (feeding).

Fowl or pigeon.	Date and time of feeding.	Description of food.	Quantity of such liver.	Results.	Remarks.
Fowl (No. 1) (Rooster)	Oct. 19th, 10.15 a.m.	Liver from Rabbit No. 34 of Inoculation Series XVII., Table I., page 162.	10 g.	Still alive on Oct. 20th. For further treatment <i>vide (d)</i> .	It ate all the food at once.
Pigeon (No. 1)					Not experimented upon this date. For further treatment <i>vide (d)</i> .
Pigeon (No. 2)	Oct. 19th, 11.5 a.m.	Do. do. (mixed with 0.6 p.c. salt-solution and mashed up with crushed maize).	1 g.	Do. do.	It had eaten very little in 2 hours, and in 3 hours had eaten about half. It was not until the following morning (say after 20 hours) that it was observed to have eaten all.

## (d) FOURTH EXPERIMENT (inoculation).

Fowl or pigeon.	Date and time of inoculation.	Inoculated (by way of injection) with—	Results.	Remarks.
Fowl (No. 1) (Rooster)	Oct. 29th, 11.10 a.m.	½ ccm. (= 1 minin) of heart-blood from a Rabbit dead between 9h. 5m. and 17h. 15m. after inoculation with a virulent broth-culture of the microbe of chicken-choleera.	Still alive on Nov. 2nd.*	
Pigeon (No. 1)	Oct. 29th, 11.20 a.m.	Do. do.	Was found dead at 7.15 a.m. on Oct. 30th (i.e., between 11h. 10m. and 10h. 55m. after inoculation). P.M., <i>Positive</i> .	
Pigeon (No. 2)	Oct. 29th, 11.30 a.m.	Do. do.	Was found dead at 7.15 a.m. on Oct. 30th (i.e., between 11h. and 10h. 45m. after inoculation). P.M., <i>Positive</i> .	

\* Still alive on November 26th.

## 163 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

## PROGRESS REPORT (No. III) ON EXPERIMENTS WITH THE MICROBES OF CHICKEN CHOLERA.

To the Chairman, Experiment Committee, Rabbit Commission.

Rodd Island, 5 December, 1888.

At the Meeting held in Melbourne on the 15th October last, the Commission resolved to have the following experiment carried out at Rodd Island:—

“That the Rodd Island enclosure be divided into two equal parts, A and B, by rabbit-proof netting, the two divisions to be separated by a clear space of 1 yard. Division A to include, as far as possible, existing burrows; new burrows to be formed in Division B. That fifty healthy rabbits be turned loose in each division; that the rabbits in each division be fed and sheltered in like fashion; that five rabbits, specially marked, be separately fed with green stuff, to which, in the case of each rabbit, 2 ccm. of broth containing chicken-cholera microbes have been added, and that, after the meal, these rabbits be placed in Division A; that at the close of another week the process be repeated; that at the close of another week the experiment be terminated.

“That the five rabbits first fed with microbes, if they should die, be left in the enclosure; that other rabbits, subsequently dying in either enclosure, be also left, provided that great nuisance does not arise; that as soon as possible after the death of any rabbit in either enclosure, some blood be obtained from it with as little disturbance of the body as possible, and be examined so as to determine whether death was due to chicken-cholera; that, subject to the general intent of these experiments, Dr. Katz be authorized to exercise his discretion in matters of detail.”

I subsequently suggested that the whole enclosure (exclusively of the shed and stable adjoining it)\* had better be utilized with a view to the above experiment, in so far as the “control” experiment with fifty rabbits did not appear to be necessary. The experiment should then be carried out with double the number of rabbits specified in the foregoing communication. This modification being afterwards approved of, and a sufficiently large number of rabbits having been received since the 27th October last, I was able to proceed with the experiment on the 7th November.

Up to this date 174 rabbits had been sent, fresh from the country, through the Rabbit Branch, Lands Department, Sydney. They were, however, in such a poor condition that some forty had died before the 6th November, and it looked, indeed, as if not many of the different consignments would be left over for some time thence. So it proved to be afterwards; and in view of such a state of affairs, which were anything but encouraging, I applied at once for more rabbits which, however, were received rather too late.†

In the following I make first some general remarks with regard to this experiment; next I give the history of the infected rabbits, *i.e.*, those which were treated with the microbes of chicken-cholera as prescribed; and lastly, the history of the uninfected rabbits, *i.e.*, those which were not treated as the former, but with which they were kept together.

#### General Remarks.

The enclosure used is known from previous reports. In it there was a number of artificial burrows which were mostly old ones, formerly used, only here and there slightly altered (*vide* Diagram VIII, A1, 2, 3, B, C), added to which was D (*vide* Diagram VIII). A description of the arrangement of these burrows (there were about 185 running feet of burrow), of their depth, width and coverings, has been given previously (*vide* Progress Report No. I) to which I may, therefore, refer.

In the enclosure were two feeding places and two tins for water near those feeding places (*vide* Diagram VIII). Near one of the posts supporting the roof of the enclosure was a small space shaded off by means of boards, and in this space was hung a thermometer for taking the temperature of the shaded air. (*vide* Diagram, *sh*). Out of the ground near it, a small trench was dug and covered in the same way as the burrows; in addition it was covered with a piece of rabbit-proof netting fixed so as to prevent the rabbits from interfering. In this trench was placed a thermometer for taking the underground temperature (*vide* Diagram *tr.*, *vide* also the appended table of temperatures).

The rabbits were fed regularly twice a day, morning and evening, on dry lucerne and some green stuff, usually barley.

The burrows were uncovered from time to time, in all eight times, as will be mentioned again later on, and re-covered each time soon afterwards.

I may add that the enclosure was all over accessible to the rays of the sun for from seven to eight hours a day.

#### History of the Infected Rabbits.

The plan of the experiment was to feed three batches of rabbits of ten specimens each, in three times, at intervals of a week, on green stuff infected with 2 ccm.‡ of broth-culture of the microbes of chicken-cholera for each rabbit. That would have been in all thirty rabbits to be infected and to be turned loose in the enclosure; but instead of this I was enabled for the first time only to place ten infected rabbits in the enclosure, for the second and third times only six were turned loose each time. This was in consequence of partly not having enough fresh rabbits on hand, partly because the hundred uninfected (of which more will be said further below) were gradually dying off to such an extent from some external cause, that the number of infected and uninfected would have been quite out of proportion, had ten been added the second and third times. Before giving an account of the fate of these infected rabbits I must mention what follows.

The broth-cultures used each time for the sprinkling of the food (green cabbage leaves) intended to be given to the rabbits, were derived from the blood of rabbits which died consequently on inoculation with the virus of chicken-cholera in the shape of broth-cultures. I adopted this course as a convenient and at the same time practical one.||

The rabbit-broth used for the cultivation of microbes has been described in Progress Report No. I. The tubes containing the infected broth were placed in the thermostat for twenty-four hours at a temperature of

\* *Vide* previous reports on experiments conducted on the Island.

† It should be acknowledged here that the Rabbit Branch of the Lands Department did their utmost as regards the supply of rabbits; but for the lamentable condition of the rabbits forwarded at the end of October and beginning of November, there would have been more than enough for the intended purpose.

‡ One cubic centimetre (ccm.)=sixteen minims.

|| On this occasion I may also mention that a culture of the microbes of chicken-cholera of the seventh and eighth generations which was in the first instance obtained about three months ago, proved just as efficacious or virulent as cultures derived directly from blood.

## OF RABBITS IN AUSTRALASIA—CHIEF EXPERT'S REPORT (NO. III). 169

of between 39½°C. and 40°C. (between 103° and 104° Fahr.) and were taken out immediately before being used. The way in which the broth-culture (2 ccm. for each rabbit) was sprinkled on the cabbage-leaves, has been detailed in the report referred to above.

The rabbits were placed in separate hutches, without food, in the afternoon preceding the day on which they were fed. The rabbits used for that purpose were full-grown animals.

## Section I.

November 7th :—

The first lot of ten rabbits fed at 10.30 a.m., and turned into the enclosure at 3.30 p.m.

Annotations :—

- (a) Three of the ten had not quite finished their portions of infected food when placed in the enclosure; the other seven had finished eating between 1 and 2 p.m.
- (b) Besides these ten, three rabbits were fed in a similar manner. Of these three, two were found dead at 7.30 a.m., November 8th, P.M., on the one *positive*, on the other *negative*.\* The third was found dead at 7.30 a.m., November 10th, P.M., *positive*.
- (c) The above three were left as having eaten more slowly, and less of the infected food than any of the ten placed in the enclosure, and this occurrence may account for the negative result of the P.M. examination in the one case.

November 8th :—

Eight of these ten found dead, of which five (*vide* Diagram a, b, c, d, e) were found at 7.30 a.m., and one (*h*) at noon, all outside the burrows; one (*b*) at mouth of Burrow A3, and another (*d*) at mouth of Burrow C.

Two of the eight (*f, g*) in Burrow B in the afternoon, when all the burrows were uncovered.

November 10th :—

One (*i*) found dead at 7.30 a.m., outside burrows.

November 12th :—

The last (*k*) found dead inside Burrow C, in the afternoon, when the burrows were uncovered.

From four of the nine first mentioned (*a* to *i*) blood was derived,† when, on microscopical examination, the typical bacteria of chicken-cholera could easily be traced; the tenth (*k*), which must have been in the burrow for some time was removed. The P.M. examination yielded a *positive* result.

## Section II.

November 14th :—

Six rabbits fed at 10.10 a.m., and placed in the enclosure at 2.10 p.m.

Annotations :—

- (a) Among these six rabbits were three Tasmanian ones, the last of five which had been received on the Island on 20th July last. These three specimens, which were in excellent condition, had to be used from want of other rabbits.
- (b) In addition to these six, two others were fed, intended also for the enclosure, but they must have died suddenly, as they were found dead in their hutches at 1 p.m. the same day, having scarcely touched their portions of infected food.
- (c) Of the six rabbits thus remaining, four had quite finished at 1 p.m.; two had nearly finished eating at 1 p.m., and quite at 2 p.m.

November 15th :—

Two (*l, m*) found dead outside burrows at 7.30 a.m.

One (*n*) Tasmanian dead outside burrows at 2.45 p.m.

November 16th :—

Two (*o, p*) Tasmanian dead inside Burrows A1 and D respectively, in the afternoon, when the burrows were uncovered. Blood was derived from two (*m, o*). Result of microscopical examination, *positive*.

November 19th :—

The last of the six (*q*) found dead inside Burrow D, in the afternoon, when the burrows were uncovered. Blood was derived, but the result of microscopical examination *negative*. Consequently the rabbit was removed; the P.M. examination and a fresh microscopical test verified the former result.

## Section III.

November 22nd :—

Six rabbits fed at 10.30 a.m., and placed in the enclosure at 4 p.m.

Annotations :

- (a) The consignments of rabbits, of which these six formed part, had been received on the Island the previous day.
- (b) Of these six, two had quite finished eating the infected food at 2 p.m., and three had half finished; two of these three had quite finished at 4 p.m., when removed to the enclosure, the third had then not fully finished. The sixth had eaten only a little at 2 p.m., and had only a little left at 4 p.m., when put into the enclosure.

November 23rd :—

One (*r*) found dead outside burrows at 7 a.m.

November 24th :—

One (*s*) found dead, at noon, when burrows were uncovered.

November 25th :—

One (*t*) found dead outside burrows at 7 p.m. Blood was derived from two (*r* and *t*). Results : *Positive*.

November 29th (expiration of term of experiment) :—

Two (*u, v*) found dead inside Burrows A3 and C respectively, in the afternoon, when the burrows were uncovered; *u* and *v* removed, P.M. on one (*u*) *positive*; on the other (*v*) *negative*.

The last (*w*) of the above six was still alive on the 29th. (It died at 5 p.m., December 3rd, P.M. *negative*.)

From the foregoing account it will be seen that *twenty-two* rabbits in all were given food infected with the microbes of chicken-cholera, and placed in the enclosure as follows :—*Ten*, November 7th.—*Six*, November 14th.—*Six*, November 22nd. Of these *twenty-two* rabbits, *twenty-one* died, while the *twenty-second* was still alive on November 29th, when the experiment was terminated. Of the *twenty-one*, *three* were removed from the enclosure, *one* (*k*) found dead inside the burrow, belonging to the first lot (P.M. *positive*); *one* (*q*) from the second, *one* (*v*) from the third lot (P.M. in both cases *negative*).

Thus *eighteen* rabbits were left in the enclosure at the spot where they died, until the conclusion of the experiment. *Twelve* of these *eighteen* rabbits were found outside, the remaining *six* inside the burrows, as may be seen from the appended Diagram. That these *eighteen* rabbits did succumb to the effects of the infected meal given to them, was proved partly by the positive results of the direct microscopical examination of blood derived from a certain number which were picked out at random each time, partly by direct control experiment (first lot).

Footing on a great number of observations, I may state that it is nearly always an easy enough matter to tell from the mere touching and handling of a dead rabbit, whether it died of "chicken-cholera" or in consequence of some other indifferent cause. Not only in rabbits dead of "chicken-cholera" does

*rigor*

\* Each time when death was due to infection caused by the microbes of chicken-cholera, the result of P.M.—or microscopical examination, is noted as *positive*; when death was due to causes other than infection by these microbes, the result of the examination is noted as *negative*.

† This was done each time by means of a clean sterilised glass-tube, which had been drawn out in the flame into a fine end of some length. By pushing this fine end through a suitable spot at either the left or the right side of the thorax, from which spot the hair had been previously removed, a sample of liver was derived. The opening thus made into the body closed up again after the tube had been taken out, and in this way the body was not perceptibly disturbed.

## 170 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION.

*rigor mortis* set in sooner than is the case in animals dying off otherwise, as was only too frequently experienced among rabbits on the Island, where at the time no other experiments with diseases similar to this special septicæmia (chicken-cholera) were made, but also this *rigor mortis* is extremely well marked and lasting for a longer time than usual.

Besides, rabbits which are observed to die (as I had opportunity now and then to observe) as having partaken of food infected with the virus of chicken-cholera (or having been inoculated), exhibit by their behaviour some time before death such characteristic symptoms, that it is not well possible to mistake these symptoms for those manifested by rabbits which die otherwise as they did on the Island.

*History of the Uninfected Rabbits.*

November 7th, *one hundred* rabbits, mostly full-grown and only a few half or three-quarter grown, were turned loose in the enclosure at 2.30 p.m., shortly before the first lot of *ten* infected rabbits were placed in it. In the evening of the same day, and on the morning of the next day (November 8th), *five* in all were found dead. These were thereupon removed, and fresh ones put in their place. Rabbits subsequently dying were not substituted by fresh ones; even if such had been admissible, it would have been impossible, for the simple reason that there were not any fresh rabbits to spare.

From the afternoon of November 8th to November 14th, when the second lot of *six* infected rabbits were let loose, no less than *fifty-two* had died.

From November 15th to November 22nd, when the third lot of *six* infected rabbits were let loose, *seventeen* had died.

From November 23rd to November 29th (conclusion of the experiment) *ten* had died.

Thus out of *one hundred* uninfected rabbits in the enclosure, no less than *seventy-nine* died, partly inside and partly outside the burrows, from 8th to 29th November, leaving only *twenty-one* live rabbits. From these *twenty-one*, however, *one* has to be deducted as having escaped, somehow or other, from the enclosure into the adjoining stable, where it was found November 14th, and when it was used otherwise. So that at the close of the experiment only *twenty* out of the original *one hundred* were left over.

Of the *seventy-nine* rabbits which died, not one died in consequence of infection by the bacteria of chicken-cholera—neither did the *five* which died shortly after the beginning of the experiment, and which were replaced by others (*vide* above). I do not hesitate to say that I did not expect it to be otherwise, to go by what I had gleaned by previous experience. The dead (infected) rabbits were lying in the enclosure all the while; of course they began to putrefy; and for some time there was a swelling of the bodies in consequence of the accumulation of gas in the body cavities; but that was all. The carcasses could not, for the time being, be expected to break up so as to allow the blood, the carrier of infection, to be scattered about. The rabbits in the enclosure did not in any way gnaw at, or visibly interfere with the bodies of their dead companions; nor was there any necessity for them to do so, since they were well attended to as regards feeding, which was always done under the utmost precautions, so as not to introduce infectious material from without.

There being much space in the enclosure (which measures 100 ft. x 80 ft.) the living rabbits were not compelled to be in close proximity to the dead (infected) rabbits, except that one of the latter (*vide* Diagram e) lay at a very short distance from one of the feeding places and watering tins; another (*vide* Diagram n) not far from the feeding place at the stable-end of the enclosure.

Being almost certain that all the dead (uninfected) rabbits did not succumb to "chicken-cholera," to judge from the mere aspect which the carcasses offered, and from the behaviour of the rabbits some time before dying (as I often had an opportunity of seeing such rabbits die), taking also into consideration the skeleton-like appearance of most of them, and the analogous dying-off of rabbits kept in stock,—I had the rabbits removed from the enclosure as soon after their death as possible. In each case out of the seventy-nine (or eighty-four, if the five taken out at the beginning and substituted by others are counted), a *post-mortem* examination was made, that is to say, they were cut open, and their organs inspected. In more than one-half of these cases blood (taken from the liver or heart) was submitted to a careful microscopical examination. Neither the autopsy of the bodies themselves, nor the microscopical examination of the blood derived from them (in the majority of instances) proved that death was due to septicæmia ("chicken-cholera"), so far as is evidenced, on the one hand, by the anatomy of the organs, which failed to show any characteristic appearances; on the other hand, by the results of the microscopical examination of the blood, which was found free from the bacteria of chicken-cholera.

All this huge number of rabbits which died out of the hundred, must have died from causes other than chicken-cholera; most likely from the effects of the starvation which they had, no doubt, to undergo to a certain extent before they were sent to the Island from the then dry country round Hay, N.S.W.

Owing to such an unsuitable supply of rabbits, the experiment cannot by any means possess that value which it would have had if all the numerous rabbits received had been equal to the demands to be put on them.\* But even if the experiment had not suffered in the indicated manner, I doubt whether, under analogous conditions, any favourable results would have been obtained with regard to the question of the transmission of the virus from rabbits which die consequently on being fed on virulent material, to healthy rabbits mixed with the former. A satisfactory and decisive answer as to this point can, after all, only be given by experiments conducted under natural conditions: these, of course, can only be had in the rabbit-infested country itself.

As other experiments with the microbes of chicken-cholera are not yet quite completed, I will report on them separately, at a subsequent early date.

These experiments are:

- (1.) Experiments with a view to ascertaining whether rabbits, which having been infected with the microbes of "chicken-cholera" are allowed to die and to remain for some time at a place where poultry are kept, are dangerous to the same.
- (2.) Experiments on indigenous crows.
- (3.) Experiments with a view to ascertaining the effects of desiccation on the microbes of chicken-cholera.
- (4.) Further experiments having reference to Dr. Gamaleia's discovery of the constant occurrence of the microbes of chicken-cholera in the normal intestines of pigeons.

OSCAR KATZ.

TABLE

\*The fact that a small percentage of the rabbits which had been given infected food (*vide* above) did not succumb in consequence, may be attributed to their having eaten too small a proportion, and perhaps too late to be efficacious.

## OF RABBITS IN AUSTRALASIA—CHIEF EXPERT'S REPORT (NO. III). 171

TABLE of Temperatures, both in the shade and underground (bottom of burrows), in enclosure. The temperatures are given in the centigrade scale ( $+ 1^{\circ} \text{C.} = \frac{9}{5}^{\circ} \text{Fahr.} + 32 = 33\frac{1}{5}^{\circ} \text{Fahr.}$ ;  $+ 20^{\circ} \text{C.}$  (*e.g.*) = ( $\frac{9}{5}^{\circ} \text{Fahr.} \times 20$ ) + 32 =  $68^{\circ} \text{Fahr.}$ ). General remarks on the weather are found in the last column.

Date. 1898.	Temperatures.					General remarks on the weather.	
	In air (shaded), or underground.	At					
		7 a.m.	11 a.m.	3 p.m.	7 p.m.		10-30 p.m.
November 7th.	Air..... Underground..			19½ 21½	17½ 20½	16½ 19½	Noon: cool S. breeze. Calm in afternoon, until night.
" 8th.	Air..... Underground..	16 19½	19½ 20	19 20½	16½ 20	16½ 19½	Few light showers fell during last night. 7-30 a.m. cold S. breeze; fine. 11 a.m.: light breeze; fine. Light S. breeze all afternoon. Evening calm.
" 9th.	Air..... Underground..	17½ 19½	24½ 20	20½ 21½	17½ 20½	17 19½	Calm all day. Light E. breeze afternoon.
" 10th.	Air..... Underground..	21½ 19½	25½ 21	22½ 21½	20½ 21	18½ 21	7-30 a.m.: calm. Light E. breeze morning. Slight showers 1-30 p.m. to 2-10 p.m. Calm afternoon and evening.
" 11th.	Air..... Underground..	18½ 19½	24½ 21½	23 21½	19½ 21½	17½ 21½	Calm morning. Strong E. wind afternoon. Calm evening.
" 12th.	Air..... Underground..	21 20½	25½ 21½	25 22	24 22	18½ 21½	Calm morning. E. wind most of afternoon. Calm evening.
" 13th.	Air..... Underground..	23½ 20½	28 21½	29½ 22	25 24	18½ 22	Strong N.W. wind blowing all morning and most of afternoon. Calm evening.
" 14th.	Air..... Underground..	21½ 21½	27½ 21½	26 23½	23 22½	19½ 21½	Light E. breeze morning. Afternoon and evening calm.
" 15th.	Air..... Underground..	26½ 21½	28½ 21½	32½ 24	21½ 22½	20 22½	N.W. wind all morning and afternoon.
" 16th.	Air..... Underground..	19½ 21½	19 21½	18½ 21½	16 21½	17½ 20½	Calm, dull, sky overcast. Few drops of rain 6-30 a.m. 9-35 to 10 a.m.: light showers, calm. Noon: light E. breeze, dull. 3 p.m.: calm, dull. Light drizzling rain from 6 p.m. to about 7-15 p.m. Thereafter calm, sky cloudy.
" 17th.	Air..... Underground..	19 20½	21½ 20½	22½ 21½	20½ 21	20 20½	Morning: sky overcast, light E. breeze. Afternoon: E. wind. Evening calm.
" 18th.	Air..... Underground..	19½ 19½		22½ 20½	18½ 21½	18 20½	Light S.E. breeze until 11 a.m. S.E. wind until night. Calm night.
" 19th.	Air..... Underground..	17½ 20½	19½ 21	19½ 21½	17 21½	15½ 20½	Calm, dull all day.
" 20th.	Air..... Underground..	17½ 20½	20½ 21	21 22	18½ 21½	18 21	Calm, sky overcast until noon. Bright—N.E. breeze—afternoon. Calm night.
" 21st.	Air..... Underground..	18½ 20½	26 21½	23½ 23½	19½ 22	17½ 21	7 a.m.: calm, sky overcast. Bright, with N.E. wind, morning and afternoon. Calm night.
" 22nd.	Air..... Underground..	19 19½	27 23	26½ 25	21½ 23½	18½ 23½	7 a.m.: calm. N.E. breeze morning and afternoon. Calm night, sky overcast.
" 23rd.	Air..... Underground..	18 20½	29½ 23	29½ 22½	24 22	21½ 22	Bright—N.E. breeze—morning and afternoon. Night calm, sky overcast.
" 24th.	Air..... Underground..	20½ 20½	32½* 23	31½ 25½	22½ 25	20½ 22½	7 a.m.: calm. 8 a.m.: extraordinarily muggy and misty till 5-30 p.m., when strong S. wind set in till 7-30 p.m. Night calm, sky overcast.
" 25th.	Air..... Underground..	19½ 21	21½ 22½	21 23½	18½ 23½	16½ 23½	Bright—varying N.E. and S.W. breezes—morning and afternoon. Night calm, sky overcast.
" 26th.	Air..... Underground..	19 23	21½ 23½	24½ 23½	20½ 25	20½ 22½	Calm and dull all morning. Bright, with N.E. breeze, afternoon. Night calm, sky overcast.
" 27th.	Air..... Underground..	22½ 22½	27½ 24½	26½ 25½	23½ 24½	22 24½	Morning: bright; N.E. breeze. Afternoon dull and calm. Night: sky overcast; rain, 9-30 to 10 p.m.
" 28th.	Air..... Underground..	23 23	28½ 24½	27½ 26	22½ 24½	20½ 23½	7 a.m.: calm and dull. Forenoon and afternoon: light N.E. breeze. 4 p.m.: gloomy; S. and S.W. winds. 7 p.m. to 10-30 p.m.: showery.
" 29th.	Air..... Underground..	21½ 22½	22½ 22½	22 22½	20½ 21½		Dull, with S.W. breeze, all morning. Dull, calm evening. Night: raining.

\* 11-45 a.m., 34½; 1 p.m., 36½ (greatest heat).

## 172 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

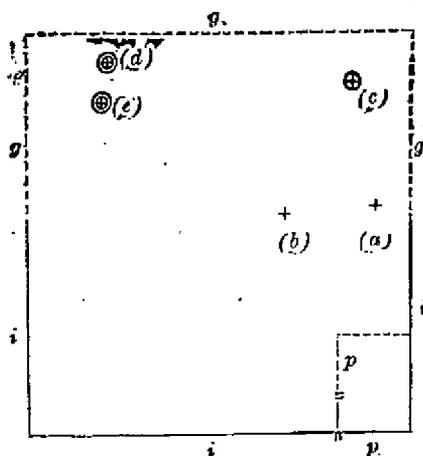
## PROGRESS REPORT (No. IV) ON EXPERIMENTS WITH THE MICROBES OF CHICKEN-CHOLERA.

To the Chairman, Experiment Committee, Rabbit Commission.

Rodd Island, 17 December, 1888.

- (1.) *Experiments with a view to ascertaining whether rabbits, which having been infected with the microbes of chicken-cholera are allowed to die, and to remain for some time at a place where poultry are kept, are dangerous to the same.*

At the Meeting held in Melbourne on October 15th last, the Commission resolved that, from time to time, rabbits infected with the microbes of chicken-cholera should be placed in the Aviary (on Rodd Island), containing some fowls and pigeons, or other birds. The rabbits should be allowed to die and remain there; in case of death of any birds the cause of death should be ascertained.



The aviary erected on the island, in the N.E. corner, is a light framework, the southern half of which is covered, on the roof and sides, with sheets of corrugated iron (Diagram, *i*; *p p* is the double door); the other, northern half, is covered with both wide-meshed netting and wire-gauze (Diagram, *g*). The floor is 15 ft. square, the height of the walls is 8 ft., the height from the floor to the summit of the gable end is 13 ft. The greater portion of the aviary was accessible to the sun for nearly all day.

At the beginning of the experiment the aviary contained nine fowls, of which three had been there for some time (left over from a former consignment of twelve), and six which had been received from the markets on November 8th. Besides, there were twelve pigeons, also obtained fresh from the markets. Neither the fowls nor the pigeons had so far come into contact with rabbits treated with "chicken-cholera." The experiment was begun November 9th and terminated December 14th. Within this period three batches of infected rabbits were turned into the aviary at different times, viz., on November 9th, on November 22nd, and on November 28th.

*History of the Rabbits placed in the Aviary.**Section I.*

November 9th, 10 a.m. —

Three rabbits, two full-grown and one not quite full-grown, were fed on cabbage-leaves sprinkled with 2 ccm. of a fresh virulent broth-culture of the microbes of chicken-cholera for each rabbit. Two having finished their portions of infected food at 12:15 p.m., were placed in the aviary at 12:30 p.m. on the same day.

*Results :*

November 10th.—One observed to die at 10 a.m. [Diagram, +] (*a*); the other observed to die at 12:7 p.m., under typical symptoms [Diagram, +] (*b*).

The third rabbit mentioned above was left in the hutch in which it was fed—it had quite finished eating its food at 1:30 p.m.—as control. It was found dead November 10th, at 7:30 a.m. P.M., *Positive*.

*Section II.*

November 22nd, 11 a.m. —

Three full-grown rabbits having besides others, arrived on the Island on the previous day, were given cabbage-leaves sprinkled with 2 ccm. of a fresh broth-culture for each rabbit (at the same time six other rabbits were similarly fed, as may be seen on p. 169 of Progress Report No. III).

The three rabbits, which were very slow in eating, although they had been left without food for some time, as was always done in analogous cases, were placed in the aviary at 7 p.m., the same day.

*Results :*

November 23rd.—One rabbit found dead 7 a.m. [Diagram, ⊕] (*c*). As "control" may be taken a rabbit, fed at the same time as being among the six turned loose into the main enclosure on November 22nd. The microscopical examination of blood derived from that particular rabbit, which was found dead at 7 a.m., November 23rd, yielded a *positive* result. (*Vide* p. 169, Progress Report No. III).

November 27th.—The two other rabbits being still alive were removed from the aviary.

*Section III.*

November 28th, 11 a.m. —

Three rabbits fed on green barley-leaves, sprinkled with 2 ccm. of a fresh broth-culture for each rabbit, were placed in the aviary at 3:15 p.m., the same day.

Two of these had eaten their portions of infected food at noon, the third at 1 p.m.

*Results :*

November 29th.—One found dead at 7:30 a.m. [Diagram, ⊕] (*d*). Microscopical examination of a sample of liver-blood, derived from the dead rabbit without much disturbing it, *Positive*. (Immense numbers of typical bacteria).

December 1st.—One found dead at 6 p.m.; seen alive an hour before. [Diagram, ⊕] (*e*). Microscopical examination of a sample of liver-blood, derived as before, *Positive*.

December 14th.—The third rabbit being still alive was taken out of the aviary.

Thus five rabbits, as having died of "chicken-cholera," were allowed to remain in the aviary; two since November 10th, one since November 23rd, two since November 29th and December 1st respectively, up to December 14th, when the experiment was terminated.

*History*

*History of the Fowls and Pigeons in the Aviary.*

November 10th.—Two pigeons, which were ailing some time, found dead at 7:30 a.m. P.M., *Negative*.

November 13th.—One hen found dead at 7:30 a.m. P.M., *Negative*.

November 17th.—One pigeon found dead. P.M., *Negative*.

November 29th.—One rooster found dead at 7:30 a.m. P.M., *Negative*.

December 7th.—One pigeon found dead at 8 a.m. P.M., *Negative*.

December 11th.—One pigeon found dead at 8:30 a.m. P.M., *Negative*.

December 14th.—One pigeon found dead at 8 a.m. P.M., *Positive*.

(Characteristic appearance of organs; immense numbers of bacteria in blood. Rabbit inoculated with small quantity of this blood, died of "chicken-cholera" in less than 10 hours after inoculation).

Thus, during the course of the experiment, in all six pigeons and two fowls died; but it was only once, viz., in the case of the pigeon\* of December 14th, that a positive result was obtained.

It must be mentioned that during the term of the experiment both fowls and pigeons were observed in the aviary to peck the dead rabbits lying about. When the latter were removed ultimately, the three rabbits which died first (*Vide* Diagram, *a, b, c*), presented only fragments scattered in different directions. The two that died last (*d, e*) were not dismembered, but they were pecked open and their flesh and entrails almost entirely missing.

*(2) Experiments on Indigenous Crows.*

Among the indigenous birds experimented upon some time ago [*Vide* Progress Report No. II], crows were not included; but being of opinion that it would not be superfluous to know, what effect the microbes of chicken-cholera had on them, I requested Mr. Taylor, of the Rabbit Branch, Lands Department, Sydney, to cause some to be caught near Hay, New South Wales, and to be forwarded to the Island. Accordingly, on the 8th and 10th November last, I received eight crows in all, of which, however, two died soon after arrival here. The remaining six appeared in good health, although at first they were a little sluggish. They belonged to the species *Corone australis*, Gould; found all over Australia, including Tasmania. I am told on good authority that there is very little difference between the two species of crows described from Australia; one is the above-mentioned, and the other is *Ceruus coronoides*, Vig. and Horsf., which is said not to occur in Tasmania.

I enumerate the experiments upon the six crows in chronological order:—

*(i) November 13th, 11 a.m. :—*

Two of the crows, kept in one box with plenty of space in it, were inoculated (under the skin over the pectoral muscle on one side) with fresh virulent liver-blood, taken from a rabbit which died of "chicken-cholera" on inoculation.

One received  $\frac{1}{10}$  ccm. = 1 minim } of such blood.  
The other received  $\frac{1}{2}$  ccm. =  $\frac{1}{2}$  minim }

*Results :*

November 15th.—The one which had been inoculated with 1 minim of blood, was found dead at 7:30 a.m. P.M., *Positive*. (Appearance of the organs resembling, to some extent, that of the organs of poultry dead of chicken-cholera. Immense numbers of typical bacteria in the blood).

December 1st.—The other which had received only  $\frac{1}{2}$  minim of blood, was still alive on this date, when it was used otherwise, as will be seen below.

*(ii) November 13th, 12:35 p.m. :—*

Four crows, which were accommodated in a commodious specially-fitted stall in the stable, and which had not been trouted so far, were fed on the livers of two rabbits which had succumbed to "chicken-cholera" on feeding.

*Annotations :*

(1) The crows, although not being fed as usual on the morning of that day, were very slow in eating the pieces of liver placed in their stall on a soup-plate.

(2) The feeding had, from want of rabbits at the time, to be discontinued until later (*vide* below).

*Result :*

December 1st.—The four crows were still alive.

*(iii) December 1st to 7th.—*

In the stall which contained the above four crows, and into which was turned the one which had been inoculated previously with  $\frac{1}{2}$  minim of virulent blood, were placed *seven* consecutive days, in the mornings, the carcasses, each time, of two rabbits which died of "chicken-cholera" on inoculation (in connection with the desiccation experiments *p.* 174 of this Report).

*Annotations :*

(1) The dead rabbits (*fourteen* in all), before being given to the crows, had been deprived of their entrails (the liver, heart, kidneys, and lungs were left), and as there were more on hand than were required at the time, they were kept in a cool place, so that the carcasses were still fresh when placed in the crows' stall, with the exception of one (out of the last feeding), in which putrefaction had already set in.

(2) During the above-mentioned period the crows did not receive any other food. Water, of course, was always provided.

*Results :*

December 4th.—One found dead at 9:30 a.m. (alive at 8:15 a.m.). P.M., *Positive*. (Carcass stiff; blood coagulated, and of a tarry appearance; hyperemia of intestines; contents of small intestines consisting of slimy, yellowish masses, stained here and there with extravasated blood; spleen apparently enlarged, cherry-coloured. Immense numbers of bacteria of chicken-cholera in the blood. A healthy rabbit inoculated with a small quantity of such blood, succumbed promptly. Cultures derived from blood of this rabbit were further tested so that with regard to this crow there cannot be any doubt as to the cause of its death).

December 9th.—One found dead at 8:30 a.m., P.M., *Positive*.

The three remaining crows, among them the previously inoculated one, were still alive on

*(iv) December 14th, when, at noon, they were inoculated with fresh virulent blood, derived from the liver of a rabbit that died of "chicken-cholera" on inoculation. Of these three crows, two, of which one was inoculated before, received 1 minim each of the blood; the third  $\frac{1}{2}$  minim.**Results :*

December 17th.—All three crows were still alive, three days after inoculation.†

To judge from the results of these experiments we may say, generally, that the microbes of chicken-cholera are only to a certain extent fatal to indigenous crows. Small doses of the virus, it appears, are not efficacious enough to be fatal; on the other hand, inoculation of larger quantities of virulent

\* After December 14th up to December 17th, one more death occurred, viz., that of a hen, which was found dead 7 a.m., December 15th. The P.M. examination and successful inoculation of some heart-blood of this hen into a healthy rabbit was undoubted proof of the cause of death having been chicken-cholera. It cannot, however, be decided whether this hen died in consequence of infection from the dead rabbits which were in the aviary up to the 14th, or infection from the droppings of the pigeon which, having been found dead December 14th, was shown to have succumbed to chicken-cholera.

† As all three were still alive some considerable time after the inoculation, it was evident that they proved altogether insusceptible to this treatment.

## 174 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

virulent material, or repeated feedings on such, say, for a week without interruption, become dangerous to them. The previous treatments of the crows mentioned under (iii) and (iv) of the above experiments, may have had something to do with the surviving of the greater portion of them (iii), or of all of them (iv).

(3.) *Experiments with a view to ascertaining the effects of desiccation on the microbes of chicken-cholera.*

In accordance with a desire expressed by the Commission at the Melbourne Meeting on October 15th last, I have carried out a number of experiments with a view to testing the influence of desiccation on the microbes of chicken-cholera.

It should be mentioned here that, as more than one observer tells us, the virus of chicken-cholera becomes innocuous by drying up, and that this peculiarity in the life-history of those microbes furnishes one of the easy and practical means of getting rid of them, wherever they are deposited in poultry-yards. The bacteria of chicken-cholera are not known to form spores or seeds (as, for instance, the anthrax-bacilli do), by means of which they are able to live under adverse circumstances.

I have to record three series of experiments.

The general plan of procedure was as follows:—A number of silk-threads—of the kind used in surgery—of 1 centimètre in length and  $\frac{1}{2}$  to  $\frac{3}{4}$  millimètre in thickness, were placed in a sterile cotton-wool-plugged test-tube, and after having been thoroughly moistened with distilled water, were exposed in the steam sterilizer to steam of 100° C. (212° Fahr.) for two hours. The moisture remaining in the silk-threads and in the tube, was got rid of by placing the latter in a copper-box heated up to 100–105° C. (212–221° Fahr.) as long as required.

The virulent material to be tested for its resistance to desiccation consisted, on the one hand, of blood taken from the liver of rabbits which died on inoculation, on the other hand, of fresh broth-cultures derived directly from blood of rabbits newly dead of "chicken-cholera" on inoculation.

The silk-threads referred to above were impregnated with either blood or culture.

In case they were to be impregnated with blood, they were placed on cut-surfaces of the liver, where they remained until they were completely soaked. The livers of all the rabbits used were, I may mention, not otherwise diseased.

In case the threads were to be charged with broth-culture, a small quantity of the latter was placed, by means of a sterile pipette, in a sterile watch-glass, where they remained for some time.

The silk-threads, thus treated either with blood or culture, were then transferred to different places where they could dry up, as will be seen from what follows below. Within certain intervals a silk-thread of both the one and the other description was inoculated into a rabbit each, whereby the virulence or non-virulence of the administered material was to be ascertained. The threads were in each case deposited in small pouches, produced under the skin of the rabbits on the left side of the belly.

I think it necessary to say that every detail of the experiments was managed under due precautions.

*Series I.*

Silk-threads saturated, Nov. 28th, 11 a.m., with fresh liver-blood (containing large numbers of bacteria), and others saturated with fresh broth-culture of the microbes (this culture had been in the thermostat for a day at 39–39½° C., and for another day in the room at a temperature up to 25° C.), were placed on a piece of sterilized brass-wire gauze in a desiccator over chloride of calcium. This desiccator was placed, immediately after the threads were put in, in the cupboard of a room, where the temperature kept pretty even.

The virulence of the material employed (blood and broth-culture) was controlled by means of inoculation of a silk-thread impregnated with either blood or culture into a rabbit each. Both rabbits died promptly of "chicken-cholera," ten and twelve hours, respectively, after inoculation.

Silk-threads were taken out of the desiccator and inoculated into rabbits after 2, 4, 6, 8, 10, 12, 24, 36, 48, 72, 96, 120, 144 hours from the beginning of the experiment.

Within this period of six days, from Nov. 29th to Dec. 5th, the temperature near where the desiccator stood fluctuated between 21½° C. and 18° C.

Details about temperatures are given in the following table:—

Date	Temperatures.	
November 29th	Between 11 a.m. and 11 p.m.:	Highest, 21½° C. Lowest, 21° C.
" 30th	" 11 a.m. " 11 p.m.:	" 20° C. " 19° C.
December 1st	" 11 a.m. " 10 p.m.:	" 18½° C. " 18° C.
" 2nd	" 10 a.m. " 5 p.m.:	" 19½° C. " 18° C.
" 3rd	" 10 a.m. " 10 p.m.:	" 20° C. " 18½° C.
" 4th	" 9 a.m. " 9 p.m.:	" 21½° C. " 19° C.
" 5th	At 11 a.m. ....	..... 21½° C.

The result was that the blood, which was under the influence of desiccation for three days at the above temperatures, was still able to infect a rabbit and cause it to perish of "chicken-cholera" (about twenty-one hours after inoculation), whereas after four, five, and six days from the beginning, the desiccated blood had lost its virulence.

On the other hand, the desiccated broth-culture preserved its virulence so far, that after two days from the beginning it was still able to kill a rabbit (about twenty-seven hours after inoculation), whereas it was not any longer efficacious when inoculated after three, four, five, and six days desiccation.

*Series II.*

Silk-threads saturated, December 7th, 10 a.m., with fresh liver-blood (containing large numbers of bacteria), and other saturated with fresh broth-culture (having been for twenty-four hours in the thermostat at 40° C.—37° C.), were placed on a thin layer of sterilized sandy soil at the bottom of a shallow basket, made of fine brass-wire netting. (The bottom of this dry basket had been bent up a little where the sandy soil was put on). The basket was then immediately after placed on a piece of wood, at a distance of about 2½ feet from the ground, in the main enclosure, at a spot which was shaded off by means of a wooden post and boards, so as to leave the spot only at the south side free and accessible. The basket was sheltered from rain by putting coverings over the top of the boards mentioned.

The virulence of the original material (blood and broth-culture) was tested by inoculating rabbits, one with silk-thread charged with blood, and the other with silk-thread containing broth-culture. Both rabbits died of "chicken-cholera," ten and twenty-one hours, respectively, after inoculation.

The effect of the drying-up of the silk-threads was ascertained by inoculating rabbits after 4, 8, 12, 24, 48, 72, 96, 120 hours from the beginning. Within this period, from December 7th, 10.15 a.m., to December 12th, 10.15 a.m., the thermometer in the shaded place registered temperatures of between 20½° C. (lowest) and 29½° C. (highest).

The

## OF RABBITS IN AUSTRALASIA—CHIEF EXPERT'S REPORT (NO. IV). 175

The following table contains details about the temperatures, and general remarks on the atmosphere during that time:—

Date.	Temperatures in the Shaded Place.		Remarks.
December 7th	Between 10.15 a.m. and 2.15 p.m.:	Highest 25° C.; lowest 23½° C.	Air dry. Light S. breeze all day.
	2.15 p.m. „ 6.15 p.m.:	24½° C.; „ 22° C.	
	6.15 p.m. „ 10.15 p.m.:	22° C.; „ 21° C.	
8th	9.40 a.m. „ 10.15 a.m.:	28½° C.; „ 27½° C.	Air dry. Very calm.
	10.15 a.m. „ 4.30 p.m.:	28½° C.; „ 25° C.	
	4.30 p.m. „ 9.50 p.m.:	25° C.; „ 22½° C.	
9th	9.30 a.m. „ 11.30 a.m.:	21½° C.; „ 21½° C.	Air dry. S. breeze all day.
	11.30 a.m. „ 10 p.m.:	22½° C.; „ 21° C.	
10th	8.15 a.m. „ 9.45 a.m.:	27½° C.; „ 26° C.	Air dry, until afternoon, when thunderstorm set in with rain for about half an hour.
	9.45 a.m. „ 2.15 p.m.:	29½° C.; „ 25½° C.	
	2.15 p.m. „ 10 p.m.:	25½° C.; „ 21° C.	
11th	8.30 a.m. „ 4 p.m.:	26½° C.; „ 25½° C.	S. breeze morning. E. breeze afternoon. Strong E. wind evening.
	4 p.m. „ 10 p.m.:	25½° C.; „ 21½° C.	
12th	8.30 a.m. „ 10.15 a.m.:	22½° C.; „ 20½° C.	Calm morning.

The result was this:—

The blood thus exposed to desiccation preserved its virulence when inoculated after four, eight, and twelve hours; when inoculated after twenty-four hours and more from the beginning, it had lost its efficacy on rabbits.

The desiccated broth-culture proved virulent only, when inoculated four hours after the beginning of the experiment. The rabbit succumbed to "chicken-cholera" twenty-six hours after inoculation. Subsequent inoculations, eight, twelve, and more hours after the beginning, were attended with negative results.

#### Series III.

Silk-threads saturated, December 7th, 10 a.m., with virulent material (blood and broth-culture) derived from the same sources as the material used in *Series II*, were placed on sterilized dry sandy soil, which in a thin layer covered the bottom of a small shallow wire-gauze basket, similar to that in *Series II*.

#### Annotation:

Control of virulence as in *Series II*.

At 10.10 a.m., same day, this basket was placed on some available spot on the Island; this spot was accessible to the sun's rays all day long. The bottom of the wire-basket was placed flat on the perfectly dry sandy surface of that spot. This latter was also accessible to the wind or breeze prevailing during the experiment.

The silk-threads remained there from 10.10 a.m. to 6.10 p.m., i.e., for eight hours. Within this period rabbits were inoculated 1, 2, 4, 6, and 8 hours from the time the silk-threads were exposed.

A thermometer was laid on the soil near where the basket with the silk-threads stood. Details about the temperatures at the surface of the soil during the course of the experiment are given in the accompanying table.

December 7th:—

10.15 a.m.,	45° C.;	10.45 a.m.,	50° C.—Sunshine for about ten minutes.
11.15 a.m.,	47° C.—Sunshine for about ten minutes since last observation.		
11.45 a.m.,	42½° C.—Few minutes sunshine.		
12 noon,	35° C.—Cloudy for about twelve of last fifteen minutes.		
12.15 p.m.,	38° C.—About five minutes sunshine.		
12.45 p.m.,	36° C.—About five minutes sunshine.		
1.10 p.m.,	39½° C.—A few minutes sunshine.		
1.45 p.m.,	42½° C.—About fifteen minutes sunshine.		
2.15 p.m.,	38½° C.—About twenty minutes sunshine.		
2.45 p.m.,	36½° C.—Two or three minutes sunshine.		
3.15 p.m.,	38½° C.—A little sunshine.		
3.45 p.m.,	33½° C.—Very cloudy.		
4.15 p.m.,	29½° C.—Very cloudy.		
4.45 p.m.,	30½° C.—Sunshine for about twenty minutes.		
5.15 p.m.,	28° C. }		
5.45 p.m.,	26° C. }		Sun completely obscured.

From this table there may be seen that the sun was often prevented from making his appearance, by clouds passing by. The day was free from rain, the air was dry, and a southerly breeze was blowing during the time of the experiment.

The result was: the blood exposed to desiccation in this manner proved infectious after one, two, six, and eight hours' exposure (when the experiment was terminated). The rabbits inoculated succumbed to "chicken-cholera" in, respectively, twenty-one, twenty, between thirty and forty, and twenty-eight hours after inoculation. But strange to say, the silk-thread inoculated after four hours' exposure, proved inefficacious in so far as the rabbit was still alive (December 17) ten days after inoculation.\*

On the other hand, the silk-threads soaked with broth-culture, exposed in exactly the same way, soon lost their efficacy. It was only the first time, after one hour's exposure of the silk-threads, that the inoculation of such a thread proved fatal to a rabbit. It died of undoubted "chicken-cholera," between fifty-nine and sixty-nine hours after inoculation. In all the remaining cases, two and more hours after the beginning of the experiment, the rabbits did not become infected.

From the results thus obtained, we learn again that desiccation in general is fatal to the microbes of chicken-cholera. The higher the temperature during the process of desiccation, the less time is required to kill the microbes.

Desiccation of virulent blood lying on, or impregnating small objects, such as the silk-threads used, cause the virus to die off less quickly than is the case with virulent broth-cultures exposed to desiccation under the same circumstances. The reason for this probably is that the superficial portions of the blood drying up, are able to protect the deeper portions for a longer time than is the case with broth-cultures attached to, or saturating small objects, where, by virtue of the composition of the broth, less protection can be afforded to the deeper portions by the superficial ones.

The fact that a virulent broth-culture of the microbes of chicken-cholera very soon ceases to be efficacious when exposed, in a thin layer, to desiccation at summer temperatures such as they exist here, must, in my opinion, to a large extent account for the surviving, now and then, of wild rabbits, which during

\* It died at about 5.30 p.m., December 18th. P.M., Negative.

## 176 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

during summer months were given (in shaded hutches) cabbage or barley leaves sprinkled with small portions of such a culture, but which were very slow in beginning to eat the infected food or in finishing it up, so that meanwhile the liquid spread on it was enabled to dry up.

(4.) *Further experiments having reference to Dr. Gamaleia's discovery of the constant occurrence of the microbes of chicken-cholera in the normal intestines of pigeons.*

In Progress Reports Nos. I and II, I have given notice of Dr. Gamaleia's discovery which, however, I had so far not been able to confirm. I give now a few additional experiments in connection with this subject, but the results were equally negative.

(i) November 23rd, 5 p.m.—

One of two pigeons, taken out of a consignment of twelve obtained from the Sydney markets, on 8th November—the remaining ten were with two others placed in the aviary, where they were used for the experiment recorded under (1) of this report—was killed by chloroform-narcosis. The contents of the intestines, including a portion of the contents of the stomach, were derived under proper precautions, and thoroughly mixed and shaken with about 10 ccm. of sterile, distinctly alkaline rabbit-broth in a test-tube.

- (a) Of this mixture 1 ccm. each was injected into a full-grown and a half-grown rabbit soon afterwards. (On microscopical examination, the heart-blood of the pigeon was found to be free from micro-organisms; the organs appeared normal.)

*Results :*

November 29th.—The half-grown rabbit observed lying dead at 7.30 a.m. P.M., *Negative* (both as regards appearance of organs and microscopical examination of liver-blood).

December 2nd.—The full-grown being still alive was removed from its hutch at 10 a.m.

- (b) The above mixture was, after the 2 ccm. had been taken out, put into the thermostat, where it remained for about 24 hours at 39½° C.

November 24th, 5.30 p.m.—

A full-grown rabbit received ¼ ccm. = 4 minims,

A half-grown rabbit received ¼ ccm. = 2 minims,

of the culture obtained from the mixture.

*Results :*

November 25th.—The half-grown rabbit observed to die at 7.30 a.m. P.M., *Negative*.

November 30th.—The full-grown died at 11.30 a.m. P.M., *Negative*.

(ii) December 11th, noon.—

The remaining of the two pigeons was killed by chloroform-narcosis. About half the contents of the intestines, including part of the contents of the stomach, were transferred to a spacious test-tube containing about 15 ccm. of sterile rabbit-broth, which was of a distinctly alkaline reaction.

The mixture after being well-shaken showed still a slightly alkaline reaction. The tube was at once placed in the thermostat at 38° C. to 38½° C., for about twenty-four hours.

- December 12th, 1 p.m.—Of the culture obtained (showing now a slightly acid reaction), a very vigorous full-grown doe received (subcutaneously) 1 ccm.; a rabbit not quite full-grown, ½ ccm.

*Results :*

December 17th.—Both rabbits were still alive.\*

OSCAR KATZ.

PROGRESS REPORT (No. V.) ON EXPERIMENTS WITH THE MICROBES OF CHICKEN-CHOLERA.

To the Chairman, Experiment Committee, Rabbit Commission.

Rodd Island, 9 March, 1889.

At a Meeting held in Melbourne, December, 1888, the Commission passed the following resolution:—

“That in the opinion of the Commission the large experiment recorded in Progress Report No. III by Dr. Katz is not satisfactory, owing to the great mortality which occurred among the rabbits under experiment, independently of chicken-cholera. The Commission, therefore, resolves that as soon as a sufficient supply of healthy rabbits be obtained, the Chairman of the Experiment Committee be authorized to make another large experiment, which shall be on the lines prescribed in Mr. Bell's resolution of 15th October last (already communicated to Dr. Katz); and that the half of the enclosure at Rodd Island, used for the control experiment, be carefully disinfected in the first instance.”

The experiment was begun on the 12th February last, as already communicated to the Secretary of the Commission in a letter of that date. It was terminated on the 5th instant, three weeks afterwards.

The reasons for its being thus delayed were, as already pointed out to the Secretary of the Commission in a letter of the 4th February last, on the one hand, the slow progress in the reparation of damages caused at the Island in consequence of a fire there on the 2nd January last; on the other hand, an insufficient number of rabbits.

On the 7th January the Rabbit Branch, Lands Department, Sydney, began to send rabbits in various consignments coming from Carrathool, near Hay, a distance of about 420 miles from Sydney. If they had remained all alive, there would have been at my disposal 161 rabbits at the end of that month; but, as it was, about half the number only were left over at that time, the others having died. So I had to wait till the 12th February, the date of beginning the experiment, and even then the control-division (see below) was short of several rabbits which were put in not until two days afterwards, as will be seen later on. The rabbits were sent in wooden boxes, in which they were nearly always fairly well accommodated, as far as space was concerned. The following account shows how many consignments were received, and at what dates, how many were found dead on arrival, where the rabbits were placed on the Island, and how many died up to the beginning of the experiment this year:—

1889.

- (1). January 7—Fourteen (14), all alive.
- (2). „ 10—Sixteen (16), all alive.
- (3). „ 12—Fifteen (15); of these 10 alive and 5 dead.
- (4). „ 17—Twenty three (23), all alive.
- (5). „ 18—Sixteen (16), all alive.
- (6). „ 19—Fifteen (15); of these 14 alive and 1 dead.
- (7). „ 21—Twenty-three (23); of these 6 alive and 17 dead.
- (8). „ 23—Sixteen (16), all alive.
- (9). „ 26—Fifteen (15), all alive.

These

\* The last-mentioned (having received ¼ ccm.) died January 1st, 1889.

These nine consignments of rabbits were placed under the verandah of the laboratory, in clean, spacious hutches, which were scrupulously kept free from any infective matter. The rabbits were mostly full-grown, but they were not all in such a condition as might have been desired. Up to the 12th February, the date of the beginning of the experiment, 88 had died, leaving only 42, of which 28 were placed in the control-division on that date. (*See below*).

- (10.) January 28—Thirteen (13), all alive.  
 (11.) „ 30—Eighteen (18), all alive.  
 (12.) February 9—Thirty-two (32), all alive.

Of these three consignments of 63 rabbits, which on arrival were placed in spacious boxes in the shed adjoining the main enclosure, 3 died up to the 12th February; on that date 50 were placed in the disease-division (*see below*), the remaining 10 in the control-division. (*See below*.)

- (13.) February 14—Twenty (20); of these 18 alive and 2 dead.

Immediately after their arrival 14 of them were placed in the control-division.

- (14.) February 18—Twenty (20), all alive. •  
 (15.) „ 20—Ten (10), all alive.  
 (16.) „ 25—Twelve (12); of these 4 alive and 8 dead.  
 (17.) „ 27—Twelve (12), all alive.

These were placed in the hutches under the verandah (*see above*), whence specimens were taken whenever required. The mortality among those left there was moderate.

I desire to have it clearly understood that the mortality among the rabbits before the beginning of the experiment was entirely independent of “chicken-cholera.”

In the following will be found first, general remarks of interest with reference to the arrangement of the experiment; next, the history of the rabbits in the two divisions of the enclosure, one of which may be called disease-division, the other, as already mentioned, control-division.

#### *General Remarks.*

The enclosure was divided into two portions by means of rabbit-netting, with a clear space of one yard between (*see Diagram IX*). The two portions were not exactly the same as regards size; the one, the disease-division, being somewhat larger than the control-division. Prior to the date of the experiment under consideration, there were, in what is now called disease-division, several artificial burrows which, except a few alterations here and there, are in the new experiment the same as before. They are named again A, 1, 2, 3, B, C. In order to save as far as possible the last mentioned one, the fence was drawn in the way shown in the Diagram, and not right across the width of the enclosure. There were about 136 feet of running burrow in this particular division. In the now control-division, which adjoins the shed (*Diagram IX*), is an old artificial burrow D, which is now hardly altered; a fresh burrow is E. The total of running feet of burrow in this division amounts to about 95. During the course of the experiment, the rabbits in both divisions disturbed the arrangement of the burrows slightly, in so far as they were burrowing sideways here and there in the artificial burrows, but only to a limited extent, and succeeded in burrowing out to the surface, thus creating new openings in those burrows.

Although the whole enclosure had been used, from the 7th to the 29th November last year, for the carrying out of the experiment recorded in Progress Report No. III, I did not think it necessary to specially disinfect it for the purpose of the new experiment. From the end of November, after the former experiment, some twenty rabbits were left there till the 24th January, without anyone contracting “chicken-cholera.” During the interval, sunshine and wind could act on, and must have proved disastrous to, any chicken-cholera microbes that might have been deposited there. Then again, one portion of the enclosure was, in view of the new experiment, reserved as control-division, stocked with a considerable number of rabbits; of these, I may just as well mention beforehand, not a single one died of “chicken-cholera.”

In each of the divisions was one feeding-place, one trough for water, and one similar trough for bran. The rabbits in both divisions were fed alike, morning and evening. The bulk of the food, which consisted of dry lucerne, green barley, now and then cabbage-leaves and bran, was given in the evening, as a large portion of the rabbits were, throughout nearly the whole experiment, in the burrows during the day.

Each of the divisions of the enclosure was accessible to the rays of the sun for fully eight hours a day.

The soil in the enclosure is, as already known, of a loose, sandy nature. I may add that a small proportion of the surface-area is taken up by rocks (sandstone) being partly on a level with the soil-surface, partly more or less projecting. They are in the neighbourhood of the burrows in the disease-division and near Burrow D in the control-division. At the beginning of the experiment there were a few spots, in either division, of fresh grass, but this disappeared quickly on the first day.

Temperatures were recorded at regular intervals during the term of experiment, viz.:—(1) of air shaded, as in the experiment, Progress Report No. III (*Diagram IX, sh.*); (2) underground, for which purpose served a trench, at about the same spot as before (*Diagram, tr.*); (3) of the surface of the soil; for this purpose a spot between the two fences was selected, where a thermometer was placed flat on the ground (*Diagram, th.*). There was hardly an object of significance which prevented the sun from shining right on to this spot nearly all day.

#### *History of the Rabbits in the Disease-division.*

The arrangement was to turn into this division fifty (50) healthy rabbits (uninfected), to which three batches of five rabbits for each were to be added, which had been fed on fresh cabbage-leaves infected with 2 ccm. of a virulent broth-culture of the microbe of chicken-cholera for each rabbit. These batches of rabbits, thus infected, to follow one another at intervals of one week.

#### *A.—Infected Rabbits.*

The rabbits used for this purpose were full-grown vigorous animals.

The cultures of the microbes were made in rabbit-broth, as before, which was charged with a small quantity of fresh heart-blood of rabbits which died of “chicken-cholera” consequent on inoculation with virulent culture of the microbes.

The tubes containing the infected broth were at once placed in the thermostat, where they remained for twenty-four (24) hours at a temperature of 38° C.\* After that time the rabbits were ready to receive the green food to be infected with the cultures. The

\* Throughout this experiment I employed cultures incubated at that temperature, which is lower than that employed on the occasion of the enclosure-experiment recorded in Progress Report No. III. The temperature then was 39–40° C. The reason for so doing is because the microbes appear to grow, in broth, better at a temperature of about 38° C. than at other temperatures. I cannot for the moment find the reference, but I think it is Hueppe, who says that the optimum of growth for the microbes of chicken-cholera is between 37–38° C.

## 178 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

The way in which the culture, 2 ccm. for each rabbit, was sprinkled over the leaves, has been described previously.

The rabbits were fed in separate hutches, in which they were placed in the afternoon of the preceding day. They were starved somewhat prior to the time of feeding on the infected meal.

All the infected rabbits let loose in the disease-division were, of course, specially marked; each batch receiving different marks. The marks were narrow stripes, produced on the flanks by clipping off some hair.

## Section I.

February 12th.

The first batch of *five* rabbits fed at and after 11.30 a.m., and turned into the disease-division at 2 p.m.

Annotation:—

The rabbits soon began to eat; when seen at 2 p.m. they had all finished their portions of infected food.

Control:—

Of *four* rabbits fed under the same conditions, *one* was found dead at 7 a.m., *one* died at 9.50 a.m., and *one* was found dead at 12 noon, 13th February; the *fourth* did not succumb until 10 a.m., 14th February. P.M., in all cases, *Positive*.

February 13th.

*One* found dead at 7 a.m., near mouth of Burrow C. [Diagram IX. (a)].

*One* died at 10 a.m., outside burrows [Diagram (b)].

*One* was seen in a dying state near mouth of Burrow B. at 12 noon, when it suddenly rushed into this burrow, where it was found lying dead the following day [Diagram (d)].

February 14th (Burrows uncovered 10 a.m.).

*One* found dead inside Burrow A<sub>2</sub> [Diagram (c)], about one foot from the mouth of this burrow.

*One*, the last, found dead inside Burrow C. [Diagram (e)].

## Section II.

February 19th.

The second batch of *five* rabbits fed at and after 12 noon, and placed in the disease-division at 2.30 p.m.

Annotation:—

All the rabbits had finished eating their portions of infected food when seen at 2 p.m.

Control:—

*Five* rabbits fed under the same conditions. Of these only *one* had finished eating at 2 p.m., a *second* at 3 p.m., *two* very nearly at 3 p.m., while the *fourth* was very slow in beginning to eat; it having not touched the food at 5.30 p.m., but this had nearly all disappeared at 7.30 p.m.

Of these *five* control-rabbits, *one* was found dead at 7 a.m.; *one* died at 10 a.m., 20th February. The *three* remaining ones were found dead on 21st February (*two* at 7.10 a.m., *one* at 10.30 p.m.) The last-mentioned was an exceedingly vigorous rabbit, the same which, as mentioned above, was very slow in eating the infected cabbage-leaves. P.M. in all *five* cases, *Positive*.

February 20th.

*One* found dead at 7 a.m. outside burrows, near mouth of Burrow C [Diagram (f)].

*One* found dead at 9 a.m. in the mouth of Burrow A<sub>1</sub>, its head being outside [Diagram (g)]. This rabbit must have died between 8 a.m. and that hour.

*One* found dead at 12.15 p.m. outside burrows [Diagram (h)].

*One* found dead at 4.45 p.m. outside burrows, in a shallow excavation of the soil, covered by a stone [Diagram (i)].

February 21st. (Burrows opened at 10 a.m.)

*One*, the last, found dead in Burrow B, about one foot from the mouth of it [Diagram (k)].

## Section III.

February 26th.

The third batch of *five* rabbits fed at and after 12 noon, and placed in the disease-division at 2.30 p.m.

Annotation:—

All the rabbits when seen at 2.15 p.m. had finished eating their portions of infected food.

Control:—

*Four* rabbits fed under the same conditions; a *fifth* not quite full-grown, received only about  $\frac{1}{2}$  ccm. of both-culture on a cabbage-leaf. This last-mentioned rabbit and *two* of the former were found dead at 7.10 a.m., 27th February; the *two* others were found dead the same day at 4.30 p.m. and 7 p.m., respectively.

P.M. made in *four* cases, *Positive*.

[The *one* last dead, was not examined, but put in place of one infected, that died in the disease-division: Diag. (m); see below.]

February 27th.

*Four* found dead at 7.10 a.m. outside burrows [Diag. (l), (m), (n), (o)]. (About rabbit (m) see further below.)

February 28th.

*One*, the last, found dead in Burrow A<sub>3</sub>, about one foot from the mouth of it [Diag. (p)].

From the foregoing account it will be seen that *fifteen* infected rabbits were placed in the disease-division:—*five* on February 12th, *five* on February 19th, *five* on February 26th.

They all died promptly; the majority of them must have died in less than twenty hours.

*Nine* out of the *fifteen* died outside, *five* inside the burrows, and *one* (g) half outside and half inside. Among the former (nine) is included one (i), which lay dead in a hollow covered over by a stone, and which was easily accessible.

With one exception, the carcasses of the rabbits remained on the spot, where they were found lying, until the end of the experiment, without any microscopical examination of their blood being made. The exception referred to is a rabbit (m), which forming one of the last batch of *five* rabbits placed in the disease-division on the 26th February, was found dead the following day. This rabbit was removed, and, on being cut open, showed on the left side of chest and belly extensive bruises, which must have accelerated its death, as putrefaction of the organs had already set in when it was examined, soon after having been found dead. However, the blood clearly showed the presence of numerous bacteria of chicken-cholera. An unusually vigorous buck, inoculated with a small quantity of this blood, succumbed to "chicken-cholera" somewhat less than twelve hours afterwards. On the following morning the intact carcass of one of the control-rabbits, which had died the previous evening, was put in its place (see above).

The above synopsis shows that other rabbits were treated in a similar manner as those used for the actual experiment. These control-animals died promptly without a single exception. After death they were carefully examined, when it was clearly proved that they had succumbed to "chicken-cholera."\*

In view of such control-examinations, it was not at all necessary to derive from the infected rabbits as they perished in the enclosure, samples of blood, and to examine them for chicken-cholera bacteria.

Besides,

\* The proof was given (1) by the appearance of the carcasses; (2) by the appearance of the organs at the P. M. examination; (3) by the presence of typical bacteria of chicken-cholera in every sample of blood; (4) by employing, in one case out of each batch of control-rabbits, such blood, and sowing rabbit broth with it, when cultures of these bacteria were obtained, which were successfully used for inoculating rabbits, thus securing fresh virulent blood for further cultures.

Besides, the fresh carcasses in the enclosure offered every appearance of what I may be permitted to term "chicken-cholera" carcasses: very stiff, nostrils often covered with froth. In addition, a few of the rabbits were observed to die under characteristic symptoms.

*B.—Uninfected Rabbits.*

February 12th.

*Fifty* (50) rabbits, with a few exceptions apparently well-conditioned, full-grown animals, were turned into the disease-division at 10 a.m., a few hours before the first batch of infected rabbits was placed in it.

February 14th (burrows uncovered).

*One* dead inside burrows: *Negative*.

February 16th (burrows uncovered).

*Three* dead inside burrows; *two* of these three, one in Burrow A<sub>1</sub> [Diag. (1); removed], another in Burrow B [Diag. (2) left]: *Positive*. The third: *Negative*.

February 18th (burrows uncovered).

*One* dead in Burrow B [Diagram (3); left]: *Positive*.

February 19th.

*Two* dead outside burrows: *Negative*.

February 21st (burrows uncovered).

No change.

February 22nd.

*Three* dead outside burrows: *Negative*.

One of these was killed because it was observed slowly dying without exhibiting "chicken-cholera" symptoms.

February 23rd (burrows uncovered).

*Seven* dead, of which *five* inside, *one* outside burrows, *one* killed (as above).

Of the seven, *one* in Burrow A<sub>2</sub> [Diagram (4); left]: *Positive*.

All the others: *Negative*.

February 24th.

*One* dead outside burrows: *Negative*.

February 25th (burrows uncovered).

*Nine* dead; of which *six* outside, *three* inside burrows: *Negative*.

February 27th.

*Two* dead outside (*one* killed, as above): *Negative*.

February 28th (burrows uncovered).

*Three* dead, of which *two* inside, *one* outside burrows: *Negative*.

March 1st.

*Two* dead outside burrows: *Negative*.

March 2nd (burrows uncovered).

*One* dead inside burrow: *Negative*.

March 5th (burrows uncovered).

*One* dead inside burrow: *Negative*.

There was thus a great mortality among the *fifty* rabbits described as uninfected, not less than *thirty-six* having died within the three weeks the experiment lasted.\* But of this huge number only *four* proved to have succumbed to "chicken-cholera," whereas the remaining *thirty-two* perished of causes which had nothing in common with "chicken-cholera."† This unfortunate mortality was somewhat surprising to me, because the bulk of the rabbits used, appeared to be able to hold out for the three weeks, provided they did not take up, meanwhile, the germs of "chicken-cholera." There were two exceptionally heavy losses (independently of "chicken-cholera"); one on the 23rd February, when six were recorded dead (leaving out a seventh which died of "chicken-cholera"); another, two days afterwards, on the 25th February, when not less than nine were found dead. Three were found dead on the 22nd, and three on the 28th. I cannot omit to state that at the time when, or immediately after these batches of rabbits died, the atmosphere was extremely oppressive, and the thermometer registered an excessive heat (see Table of Temperatures, &c., below). These factors had probably something to do with the mortality.

The way in which the thirty-six rabbits, which died out of the fifty, were examined, in order to see whether "chicken-cholera" bacteria had found their way into their bodies or not, was not the same each time. In fourteen cases a sample of liver-blood was derived by means of fine glass-tubing, as described in Progress Report No. III. This sample was stained on cover-glasses and carefully examined under the microscope. *Three* times out of the fourteen this examination yielded a *positive* result, inasmuch as the typical bacteria of chicken-cholera were seen to be present in large numbers. The three respective rabbits, which also by their outward appearance indicated death due to "chicken-cholera," were left where they died [Diag. (2), (3), (4)].

In eleven cases the result of a similar examination of liver-blood being a *negative* one, so far as microbes of chicken-cholera are concerned, the respective rabbits were thereupon cut open, when the result previously arrived at was confirmed, both by inspection of the organs and a repeated microscopical examination of blood (mostly from the liver), in the majority of instances (seven).

On the remaining twenty-two rabbits out of the thirty-six in all, a P.M. examination was made without any preliminary microscopical test, as mentioned before. The result was *negative* in all cases but *one*; this is the rabbit (1) in Burrow A<sub>1</sub>, Diagram IX. In sixteen cases liver-blood, in two cases liver and heart-blood, in two cases heart-blood only was examined, in the latter two instances the liver-blood being unsuitable for that purpose. The result of the microscopical examination of blood from two other rabbits, found dead inside Burrow C on the 28th February (see above), not being satisfactory, because the carcasses were already putrefying, a sample of coagulated blood was inoculated into a medium-sized rabbit for each case. One rabbit died fifteen hours after inoculation, but its death was not due to "chicken-cholera." The other rabbit remained alive.

In the synopsis given at the beginning, the results of the examination of the dead rabbits, no matter of what description this examination was, are noted briefly as either *negative* or *positive*, as the case may be. To

\* One day, shortly before the experiment terminated, the surviving rabbits were counted both in this and in the control-division, when it was discovered that there was one too much in the disease-division, and one missing in the control-division. One rabbit must have found its way from the one division into the other. The two divisions, as mentioned, were separated from each other by a double fence of rabbit-netting, and that it is not impossible for a wild vigorous rabbit to climb or jump over such fences, will be admitted by everyone who has seen wild rabbits climb or jump.

† At the examination of all the rabbits dying during the experiment, my chief task was, of course, to investigate whether they died of "chicken-cholera" or not. Time did not permit me to extend the investigation much further. However, I noticed that in quite a number of individuals the appearance of the entrails resembled that described by Dr. Wilkinson in Appendix VII of this Report; so they proved to be in anything but healthy condition. Others, again, showed the lungs distinctly pneumatic.

To return to the cases which, on examination, yielded a *positive* result.

As stated, *four* rabbits out of the *thirty-six* in all dead, must be put down as having died of "chicken-cholera." The germs of this disease could not have been supplied but by infected rabbits placed in the disease-division. Two of the originally uninfected rabbits were found dead (inside burrows; carcasses still well preserved) on the 16th February (*i.e.*, somewhat less than four days after the first batch of five infected rabbits was turned loose); one was found dead (inside burrow; carcass still fresh) two days afterwards, on the 18th; one (inside burrow; carcass still pretty fresh) on the 23rd, (*i.e.* somewhat less than four days after the second batch of five infected rabbits was turned loose in the disease-division). The probability, therefore, is that all those four rabbits became infected *after* the death of intentionally infected rabbits turned into the disease-division. The answer to the question, in what particular way this infection took place, is open to conjectures. Considering that the excreted feces of normal rabbits dead of "chicken-cholera," on either feeding or inoculation, do not, as a rule, exhibit anything abnormal in their appearance; considering also, that within the short time which it nearly always takes from the time of infection to death, feces originating from the infected meals can hardly be excreted; and lastly, in view of the negative result of two direct experiments made by me some time ago, [See p. 155, Series IIIa (ii)\*, p. 161 (iii.)] it is far from being proved that the excrements of the rabbits which died in the disease-division of "chicken-cholera," were or must have been the means of infection. On the other hand, it was frequently noticed that out of the nostrils in carcasses of infected rabbits lying undisturbed in the disease-division, some days after the death of the animals, a blood-stained liquid exuded which tainted the spot on the soil-surface underneath. Here and there it was also noticed that maggots and ants were at work about the carcasses. All that may have proved a means of transmitting the virus.

That the four rabbits did not die consequent on infection being carried into the disease-division along with food, or by means of flies coming from places where infectious material existed at the time on the Island, must be taken as granted, because, as already mentioned above, not a single death from "chicken-cholera" occurred among the rabbits in the adjacent control-division. These rabbits were, perhaps, more liable to infection from without, because their division was separated only by a plain fence of rabbit-netting from the shed in which the feeding of the different batches of rabbits, partly kept there in hutches as control, partly placed in the disease-division, was done.†

#### *History of the Rabbits in the Control-division.*

Thirty-eight (38) rabbits mostly full-grown, but, in the majority, not so well-conditioned as those placed in the disease-division, were turned loose here at 10:30 a.m., the 12th February. This number was twelve short of fifty, the intended number which was to have been placed there, but the remaining could not be placed with the others until two days afterwards, when a fresh supply of rabbits came to hand. Instead of twelve, however, fourteen were put in on that date, because two out of the original thirty-eight died a few hours after being put in the enclosure. Leaving these two out of the question altogether, I found that, at the conclusion of the experiment on the 5th inst., only *twenty-one* had been left over, twenty-nine having died, partly inside, partly outside the burrows,‡ during the time; most of them (twenty-three) within eleven days from the beginning of the experiment. There were six dead on one day, on the 14th, and nine on the 23rd.

All the dead rabbits out of this division were at once taken into the laboratory. Their outward appearance, as well as the autopsy, proved that death could not have been caused by "chicken-cholera" in any case. The microscopical examination of blood, nearly always derived from the liver, in seventeen cases taken out of the twenty-nine, yielded a *negative* result in each case.

The result of this experiment is thus different from that obtained a few months ago, as recorded in Progress Report No. III. In that experiment, where the arrangements were at variance with those of the last experiment, the result was throughout a *negative* one, that is to say, of fresh rabbits, exposed to others which were infected with, and died of "chicken-cholera," not one took the disease. That experiment was unsatisfactory also from another point of view, *viz.*, the fact that the rabbits used then were in anything but good condition; the mortality among them was equal to 80 per cent.

The mortality encountered in the experiment dealt with in this report was also great; of 50 rabbits in the disease-division, 36, or 72 per cent., having died. But among these 36 were 4 which it was shown had died of "chicken-cholera," so that, by deducting these 4, the mortality (irrespective of "chicken-cholera") was 64 per cent. (in the control-division 58 per cent.).

The question now arises: are we entitled to utilize the result of this experiment so as to draw from it definite conclusions as to the probable result of the application of "chicken-cholera" as a means of exterminating rabbits on a large scale? In my opinion only to a certain extent. From the result of the experiment under consideration, we may perhaps derive that, under conditions such as existed in this case, the disease may be transmitted, somehow or other, from one rabbit to another; but, as it appears, only in a very small degree. The conditions in the rabbit-infested districts certainly differ, not only from the abovementioned, but also from each other, so that without having the result of actual trials under the different conditions as the open country offers them, it is impossible to give a decisive answer. At all events, so far as the experiments on Rodd Island have gone, it cannot by any means be said that "chicken-cholera" of rabbits manifested itself as a disease readily communicable from rabbit to rabbit. From the mere reason, however, that wild rabbits exhibit an extraordinary susceptibility to the microbes of "chicken-cholera," and that, as I must agree with Pasteur, the susceptibility is greater in the case of rabbits than in that of birds, trials in the open, provided, of course, the arrangements be unobjectionable, would be at once interesting and instructive.

OSCAR KATZ.

TABLE

\* The inoculation proved successful, Series IIIa, (i).  
 † It should also be mentioned here that the feeding of the rabbits in the two divisions fell to the Handy Man at the Island who never touched or handled, or had anything to do with infectious material, as for instance chicken-cholera carcasses. He was instructed to use a special pair of goshies while in the disease division. When the divisions were inspected, that is to say when the burrows were uncovered and re-covered, the position of dead rabbits sketched, dead rabbits examined and taken away, goshies were worn by every one of us while in the disease-division, besides adopting ordinary precautions.  
 ‡ Burrows in this division were inspected always on the same day when those in the disease-division were examined.

## OF RABBITS IN AUSTRALASIA—CHIEF EXPERT'S REPORT (NO. V). 181

TABLE of Temperatures, of air (shaded), of the surface of the soil (not shaded), and underground (bottom of burrow), in enclosure. They are given in the centigrade scale. In the last column may be found general remarks on the weather during the course of the experiment.

Date. 1889.	Air (shaded), surface of soil, underground.	Temperatures					General remarks on the weather.
		At					
		7 a.m.	11 a.m.	3 p.m.	7 p.m.	10-30 p.m.	
February 12th.	Air ..... Surface of soil.. Underground ..			28 32 26	22½ 22½ 26	21½ 21 24	Afternoon: bright, N.E. wind, air dry. Night: calm.
" 13th.	Air ..... Surface of soil.. Underground ..	19 21 26	29 36½ 26	29½ 33½ 24	24½ 24 23½	22½ 22½ 24	7 a.m.: intensely foggy, air moist. 11 a.m.: bright, calm. 3 p.m.: bright, N.E. wind, air dry. 10-30 p.m.: calm, clear.
" 14th.	Air ..... Surface of soil.. Underground ..	21 22½ 22½	31½ 38½ 23	26 34½ 23½	23½ 24½ 24	22½ 23 24½	Morning: bright, close, moist. 11 a.m.: N.E. breeze. Afternoon: S. wind, sky overcast. Night: S. breeze, clear.
" 15th.	Air ..... Surface of soil.. Underground ..	23 24½ 23½	28 38½ 23½	26 31½ 24½	23½ 24½ 24½	22½ 23 24½	7 a.m.: dull, calm. Later on till evening: N.E. breeze, dull. 7 p.m.: calm, dull. 9 p.m.: W. breeze, thunder and lightning without rain.
" 16th.	Air ..... Surface of soil.. Underground ..	23 24 23½	25 32½ 24	24½ 29½ 24½	22 23½ 24½	22 22½ 24	7 a.m.: S. and S.E. winds, cloudy. Afternoon: S. and S.E. breezes, cloudy.
" 17th.	Air ..... Surface of soil.. Underground ..	23½ 25½ 24	28 38½ 24½	24½ 27½ 24½	22½ 23½ 24½	21½ 22½ 23½	Morning: bright. 3 p.m.: dull. Night: sky overcast. N.E. breeze all day.
" 18th.	Air ..... Surface of soil.. Underground ..	21½ 23 23½	30 40 24	30 36 25	24½ 25 25	23 23½ 25½	7 a.m.: calm, dull. Morning and evening: N.E. breeze, bright, but close. Night: calm, clear.
" 19th.	Air ..... Surface of soil.. Underground ..	22 22½ 24	22 24½ 24	21½ 24½ 24	20½ 21½ 23½	20½ 21½ 23½	7 a.m.: N.E. breeze, misty. Later: S. and S.E. breezes, sky overcast.
" 20th.	Air ..... Surface of soil.. Underground ..	19½ 20½ 23	21½ 23½ 23½	22½ 26 23½	21 21½ 23½	21 21½ 23½	All day: calm, sky overcast.
" 21st.	Air ..... Surface of soil.. Underground ..	19½ 21½ 23	25 28½ 23	27½ 34½ 24	24 24 24½	22½ 23 24½	7 a.m.: calm, hazy. Noon: N.E. wind; bright, clear. Night: calm, sky overcast.
" 22nd.	Air ..... Surface of soil.. Underground ..	22 24 23½	34½ 41 24	24 24½ 24½	23½ 23½ 24½	22 22 24½	All day: very calm, close, and oppressive. Afternoon: about 1½ hour's rain, with thunder. Night: calm, sky overcast.
" 23rd.	Air ..... Surface of soil.. Underground ..	22 22 24	22½ 24 23½	27 30½ 24	22½ 23 24½	22 22 24½	7 a.m.: N.E. breeze; sky overcast. 11 a.m.: light S. breeze. 3 p.m.: light N.E. breeze; bright. 7 p.m.: N.E. breeze; sky overcast. 10-30 p.m.: calm, sky overcast.
" 24th.	Air ..... Surface of soil.. Underground ..	22½ 23½ 23½	29½ 30 24	32½ 40 25	28½ 27½ 25½	25½ 24½ 25½	7 a.m.: calm; sky overcast. Later: N.E. breeze; bright. Sultry all day and night.
" 25th.	Air ..... Surface of soil.. Underground ..	22½ 23 24½	24½ 34½ 24½	25 32½ 25	22 23½ 25	21½ 23 24½	Morning and evening: S. and S.E. breezes; bright. Night: S. breeze; sky overcast.
" 26th.	Air ..... Surface of soil.. Underground ..	21½ 22½ 24	28 35½ 24	27½ 33½ 25	25 25½ 25	24½ 24½ 25½	7 a.m.: calm. 11 a.m.: N.E. breeze. 3 p.m.: strong N.E. wind; bright all day. 7 p.m.: light N.E. wind; threatening. Night: some thunder and lightning; close.
" 27th.	Air ..... Surface of soil.. Underground ..	23½ 24½ 24½	33 36½ 25	38 37½ 26	29½ 28½ 26	27½ 26½ 26	Morning: calm, oppressive. Later: N., N.W., and W. winds. Afternoon and night: calm, oppressive; a few drops of rain.
" 28th.	Air ..... Surface of soil.. Underground ..	20½ 21½ 24	22½ 27 24½	21 24 25	20½ 21½ 25	19½ 21 25½	7 a.m.: S. breeze; drizzling rain. Later: S. wind; cloudy.
March 1st.	Air ..... Surface of soil.. Underground ..	19½ 20 23	21½ 24 23½	21 23½ 23½	20 21½ 23½	19 19½ 23½	Morning: S. and S.E. breezes. Afternoon: calm. 7 p.m.: S. breeze. 10-30 p.m.: rain. Sky overcast all day.
" 2nd.	Air ..... Surface of soil.. Underground ..	19 20 22½	24½ 29½ 23	24½ 28½ 23½	22½ 22 24	22 21½ 23½	7 a.m.: calm, sky overcast. Later: N.E. breeze; bright. 7 p.m.: few drops of rain. 10-30 p.m.: calm, damp.
" 3rd.	Air ..... Surface of soil.. Underground ..	21 21½ 23	25½ 32 23½	27½ 33½ 24½	23½ 23½ 24½	21½ 21½ 24	Morning: calm, bright. Afternoon: N.E. breeze; bright. Night: calm, sky overcast.
" 4th.	Air ..... Surface of soil.. Underground ..	20½ 22½ 23½	27½ 33½ 24	28½ 34 25	24 23½ 25	23½ 23½ 24½	7 a.m.: calm, intensely hazy. Later: N.E. wind; bright. Night: calm, sky overcast.
" 5th.	Air ..... Surface of soil.. Underground ..	22 22½ 24	29½ 40 24½	28½ 34½ 25			7 a.m.: calm, bright. Later: strong N.E. wind; bright.

Rodd Island, 30 April, 1889.

*Additional Experiments with the Microbes of Chicken-Cholera.*

THE two wekas last mentioned in Table IV (c), page 166 of the Report, were inoculated on the 8th instant, one (hen) with 4 minims ( $\frac{1}{4}$  ccm.), the other (rooster) with about half that quantity of virulent liver-blood of a rabbit newly dead of chicken-cholera.

The rooster was found dead in the morning of the 10th instant; but although the heart-blood showed, besides other bacilli, moderate numbers of the microbes of chicken-cholera—a healthy rabbit inoculated with a small quantity of this heart-blood succumbed promptly to “chicken-cholera”—I am, to judge from the *post-mortem* appearances, inclined to consider the presence of chicken-cholera bacteria in the blood of this bird as not being due to an infection proper by these microbes.

The other weka (hen), although appearing somewhat distressed the first two or three days, is still alive and well.

The rooster—a very robust specimen—last mentioned in Table V (d), page 167 of the Report, was inoculated again on the 8th instant, this time with 4 minims ( $\frac{1}{4}$  ccm.) of virulent liver-blood as above. It died of “chicken-cholera” the following day, 27 hours after inoculation.

The three crows, last mentioned on page 173 of the Report, were inoculated again on the 8th instant, this time with 4 minims ( $\frac{1}{4}$  ccm.) each of virulent liver-blood as above. All perished of “chicken-cholera”; one the following day, 27 hours after inoculation; another found dead on the morning of the 10th; the third died between 6 p.m. and 7:30 p.m. on the 10th.

Other experiments, having for their object the question, how wild Australian rabbits which have been fed on *sterilised* cultures of the microbes of chicken-cholera, behave when subsequently fed on *active* or *virulent* cultures of these microbes, are not yet completed.

*Report on Cultures of Ribbert's Bacillus of Intestinal Diphtheria of Rabbits*

On the 11th instant I received three tubes containing agar-agar cultures of the bacillus of rabbit-diphtheria, sent by Professor Ribbert, of Bonn, through the Agent-General for New South Wales, in London.

Two of these tubes showed the culture-masses on the inclined surface of the agar-agar; all attempts to obtain fresh cultures from them proved futile. Nutrient gelatine and agar-agar differently sown with portions of them remained sterile throughout. From the contents of the third tube, in which the culture-material was visible not only at the surface but also in the depth of the agar-agar, not inclined, a *micrococcus* was obtained, and not the desired bacillus. This, therefore, had lost its vitality also in this case. The micrococcus in question grows in thick whitish layers on gelatine, which does not become liquified by it.

OSCAR KATZ.

## SECTION XII.

## INVESTIGATION into Fowl Diseases with a view to ascertain whether Fowl-cholera exists in the Australasian Colonies or not.

- (a) Report of inquiries in Victoria, conducted by Mr. A. N. Pearson.
- (b) Reports of supposed outbreaks in New South Wales.
- (c) Report of supposed outbreak on the North Grey Downs, New Zealand, by Dr. Symes.
- (d) Report on supposed outbreaks in Tasmania.
- (e) Report by Dr. Katz, Chief Expert to the Commission, on actual examination of fowls or blood of fowls, supposed to have died from fowl-cholera.

- (a) Report of inquiries in Victoria, conducted by Mr. A. N. Pearson.

Department of Agriculture, Agricultural Laboratory,

Dear Dr. Wilkinson:

19 and 21, Queen-street, Melbourne, 27 June, 1888.

The following tabulated list embodies the results of my inquiries in Victoria, relative to the occurrence of fowl-cholera. It will be seen that while there are several cases in which the symptoms described and the apparent presence of a highly infectious disease strongly suggest the identity of our colonial fowl-cholera with the European disease, yet the identity is not proved. Still I am by no means convinced that we have not here the true European fowl-cholera, or at any rate a disease closely similar to it; and I think the search should be carried on energetically. Dr. Salmon, of the United States Agricultural Department (*vide* U. S. Dept. of Agric. Report, 1880), when he turned his attention to the American fowl-cholera, was similarly unsuccessful at first in obtaining definite results, notwithstanding that a fatal contagious disease, resembling fowl-cholera, was widely distributed throughout the country; afterwards he was successful.

I think that if Dr. Katz were free to go to any locality in the colonies to examine outbreaks of the disease at their commencement, he would ere long obtain the much desired microbes.

Yours faithfully,

Dr. W. C. Wilkinson, M.L.A.,  
Chairman, Experiment Committee.

A. N. PEARSON.

RESULTS

## RESULTS of my inquiries in Victoria relative to the occurrence of Fowl-cholera.

F. W. Elsner, F.R.C.S.I., 189, Church-street, Richmond, Melbourne.—24 April, 1888.	Dr. Elsner states that an attack of chicken-cholera occurred amongst his fowls in October, 1887. He was not then aware that there were any doubts as to the existence of fowl-cholera wherever fowls were congregated; he recognized it as the disease known as chicken-cholera, in England, and did not therefore specially examine for chicken-cholera symptoms, but having searched for diphtheria symptoms destroyed the carcasses. Has now made all the arrangements for bacteriologically investigating any future outbreak. Owing, however, to the approach of winter, and the thoroughness with which the former outbreak was stamped out, he has been unable to get another case, and sporadic cases are not likely to occur until next hot weather.
James M. Nickinson, Shire Secretary, Shepparton.—2 May, 1888.	On 2nd October, some of the fowls were ill, passed large watery evacuations, stood or lay about the yard with gaping mouths, and when obliged to run let their wings droop and drag in the sand, generally falling over after running a little way. Next day one hen was found dead on nest, stretched and stiff, <i>rigor mortis</i> extremely well marked, arms relaxed and protruding, without marks of violence or evidence of diphtheria. Blood thick and tarry. During the same day, two more hens died, presenting the same appearances; during the following night, four hens were seen to drop off the roost dead; the next day three more hens died. The fowls were then turned out into the yard, the fowl-house cleaned out, white-washed, fumigated with sulphur; the fowls themselves at night being fumigated on their perches. The ducks which had formerly inhabited the fowl-house were turned out, as they kept the floor moist. The ducks and fowls had formerly been fed together; but were now fed separately. The ducks were not affected by the disease, nor were the geese, the horse, the mare in foal, the dogs, the cat, nor were a neighbour's goats and pet birds affected by the disease. All members of the household partook of eggs and fowls from the fowl-house, but no one was attacked by any disorder. Mr. Nickinson had a number of pure Cochins and Brahmas, and also some crosses between them. Three months ago these fowls were seized with some disease, which no one in the neighbourhood could identify. The fowls became "mopy," declined to leave the roost, and when off the roost soon returned; they refused food; no discharge from nostrils or beaks, excrement green and slimy. In most cases fowls are dead within 48 hours of beginning of attack; and generally to see a fowl "mopy," is to find it dead within 24 hours.
*Joseph Knight, J.P., Victoria, Member of Council of Agricultural Education, Mooroodna.—10 May, 1888. George Lee, Beulah Hill, Diamond Creek, near Melbourne.—4 May, 1888.	The best birds were penned up; but although the disease started in these pens, the greatest mortality has been outside. Has only six or seven fowls left, having lost over sixty. Mr. Knight stated that he had seen Mr. Nickinson's fowls at Shepparton. A disease having the same symptoms is very prevalent about Mooroodna. Mr. Lee states that about a fortnight ago, a disease broke out amongst his fowls and already more than fifty are dead, and nearly all the others are suffering from it. The symptoms are first:—A slight streak of yellow and white in the droppings, which increases rapidly until the motions sometimes change to green, at other times watery with small lumps. All is the same colour. The fowl squats about, the crop becomes large and hard, and the birds die in from one to six days. A few recover, but are very weak.
James Crawford, Canary Island, South.—23 May, 1888.	NOTE.—Subsequently two of these fowls were obtained from Mr. Lee; one was dead before being sent; the other died on the way. A hen was placed in the box in which they had been sent, and kept there for a week, its food being mixed with the old droppings of the dead fowls; but it did not contract the disease. Some blood and secretions were taken in vacuum tubes to Dr. Katz, who examined them with negative results. These two cases were the last of the outbreak, no more of Mr. Lee's fowls being afterwards attacked. Last spring, Mr. Crawford's poultry suffered greatly from the so-called fowl-cholera, a large number of the common fowls, and the whole of a fine flock of turkeys having been lost in consequence. The same disease is beginning to break out again.
John Wedd, Ravenswood Station.—17 May, 1888. H. R. Danforth, Allan's Flat.—22 May, 1888. ———, Lower Homebush.—27 May, 1888.	Many of his neighbours have lost nearly all their fowls through some disease never before seen in the vicinity. States that his valuable imported fowls are dying from chicken-cholera, causing him a loss of £20 a day. This correspondent, who does not wish his name published, states that since going to reside at Homebush has yearly lost many fowls from a disease; his neighbours also suffer in the same way. The symptoms are:—In January and February, the fowls mope about, will not eat, and are purged, with green or yellow droppings.
* R. B. Kerr, Rabbit Inspector, Bacchus Marsh.—25 April, 1888.	About a fortnight earlier could have procured lots of fowls which were suffering from a disease having the symptoms of fowl-cholera, but they are all now dead. A disease is breaking out among the fowls of the Manager of the National Bank at Bacchus Marsh. (Subsequently one of these fowls was obtained, and put in a box for despatch to Melbourne, but died during Mr. Kerr's absence.)
* G. W. Robinson, Shire Engineer, Berwick.—25 April, 1888.	States that fowl-cholera was reported to be very severe about a month ago on a neighbouring farm. The farmers endeavour to conceal the fact of their having the disease.
* Richard Mackay, Taralgon.—24 April, 1888. Marmaduke N. Richardson, Compton, Princes-street, Kew.—24 April, 1888. ———, Prahran.—25 April, 1888.	Last year thirty of his fowls died within a few days, and everyone showed the symptoms of fowl-cholera; diarrhoea and drowsiness being specially noticeable. Has frequently seen his fowls suffering from a fatal disease which he supposed to be diarrhoea. Has lost several birds.
S. A. Hutchinson, Booligal, N.S.W.—13 May, 1888.	This correspondent, who desires his name should not be published, states that he purchased the previous week a number of fowls from a dealer. Some of these birds are now taken with loud and difficult breathing, a kind of cough approaching suffocation, a discharge at the beak, and loss of appetite. The disease is infectious, and has spread to some fowls bred on the place. Forwards the last of four fowls which died quite suddenly, as if in a fit. While quietly feeding, they dropped suddenly, gave a faint flap of the wings and a caw, and were then dead. (This fowl arrived several days afterwards, in a high state of putrefaction, with 8s. carriage to be paid.)

\* These correspondents had previously received from me the following description of the symptoms of fowl-cholera:—Loss of appetite generally; diarrhoea, with yellow evacuations, sometimes changing to green, and sometimes slimy with streaks of blood; ruffling of the feathers and drooping of the wings; extreme drowsiness or "moping," weakness and staggering. Death generally in from two to four days.—A.N.P.

## 184 ROYAL COMMISSION OF INQUIRY INTO SCHEMES FOR THE EXTERMINATION

Abstract of letter from Dr. T. W. Elsner, F.R.C.S.I., 189, Church-street, Richmond, Melbourne, addressed to Mr. A. N. Pearson.

In October, 1887, Dr. Elsner had an attack of cholera amongst his fowls. At this time he was not aware that there was any doubt as to the existence of the malady wherever fowls were congregated, so that he did not make a particular examination of the dead fowls, believing that it was the same disease as the one called by the name of chicken-cholera in England. The question, however, having arisen as to the identity of the fowl-cholera in this country with that of Europe, he had made arrangements to submit any further specimens obtainable to the crucial test of cultivation experiments, for which he was fully provided, he himself having a Zeiss microscope with  $\frac{1}{2}$  inch oil immersion lens, &c., and Mr. Stone, of the Technological Laboratory, at the Technological Museum, having all the cultivation apparatus.

Unfortunately, he had so effectually stamped out the disease amongst his own fowls, by suitable sanitary measures, that up to the date of writing he had been unable to obtain a single case; nor was it likely that any sporadic case would occur until next hot weather.

The symptoms of the disease amongst his fowls were the passage of large watery evacuations. They stood about the yard with gaping mouths, and when obliged to run allowed their wings to droop and drag in the sand, generally falling over after running a little way. The next day one hen was found dead on the nest, stretched out stiff, *rigor mortis* being extremely well marked; arms relaxed and protruding, without marks of violence or evidence of diphtheria. The blood was found thick and tarry, and refused to run from the vessels. In the course of the day two more hens died with appearances in every way similar. At night four hens died and the next day three. Steps were then taken to stamp out the disease, by thoroughly cleaning and disinfecting the fowl-house. The ducks which lived in the same fowl-house were not attacked, nor were the geese attacked. A mare and foal in an adjoining stable were entirely without symptoms of disease.

Letter from John Nicholson, Esq., M.D., of Benalla, Victoria, in reference to fowl disease.

H. Mahon, Esq.,—

Dear Sir,

Benalla, 3 May, 1888.

As I have no personal experience of the appearance presented in chicken-cholera, I do not know whether the disease about which I telegraphed to you has any marked resemblance to it. I will therefore content myself by putting you in possession of the facts which induced me to communicate with you.

A patient of mine happened to mention that many of his fowls were dying from some disease which was very rapid in its course, and that a fowl apparently well one day might drop off its perch during the night. He said that he lost some nearly every night. I requested him to send me one which had recently died, and on the following morning he sent me a young rooster which had died the previous night. I made an examination of it, and found that *rigor mortis* had not set in, although it was cold; there were no signs of decomposition, as the flesh and internal organs were quite fresh; the mouth was normal, and there was no obstruction to trachea or gullet. The crop and gizzard contained a quantity of wheat in process of digestion. There was nothing abnormal about them. The heart was empty, as were also the blood-vessels generally. The liver was red, but apparently normal, possibly somewhat enlarged, as was also the spleen. Kidneys and lungs healthy. The intestines for their whole extent were somewhat congested, and contained blood-stained mucus, with streaks of blood, in some places of considerable extent, scattered through it. There was no feculent matter, except a small quantity of soft amber-coloured matter in the cloaca, and the caecal appendages. These latter also contained sanious fluid. The intestinal discharges before death had evidently been of a dark red-brown sanious character. Acting on this information I wired you, and went to the farm of my informant to look at his fowls. Two were pointed out to me as affected, and I brought them home with me. They looked dull, but there was no appearance of diarrhoea at the vent. The motions were greenish, but entirely soft, not like that seen in the cloaca of the dead fowl. These fowls have not died, and they continue to feed, but are still dull. There is no drooping of the wings or tail.

May 4th.—I had written so far last night, but have to add that these fowls died this morning, and I have sent you the intestines of one of them, also the spleen and a loop of intestine of the other one. The blood in the tubes was taken from the right cavity of the heart, the fowl being still warm. *Post-mortem* appearances were of a negative character, as there was no hemorrhage as in the one first examined. The pericardium contained a little serum. The intestine examined was not congested; contents pulsatious.

I shall be glad to hear how the experiment succeeds (I have inoculated one fowl) to-day. Any further information I shall be happy to give.

Yours, &c.,

JNO. NICHOLSON, M.D.

(b) Reports of supposed outbreaks in New South Wales.

Mr. Hugh Mahon,—

Sir,

Byng-street, Orange, 13 May, 1888.

I see by the local paper of yesterday that the Commission *re* the rabbit question, wish to get fowls suffering from cholera. My fowls are now dying from what we suppose to be that complaint. I will give you the full particulars of my experience this summer, which may be useful to the Commission, as it goes to prove that chicken-cholera is not taken from fowls by other birds and animals. Early in September I had six or seven clutches of chicks hatched. When from one to two weeks old they became ill from purging of the bowels, and all but three or four died. By this time several other clutches were out. I put these in a different building, but they died the same. I then sent to Sydney for a pair of Houdan fowls, which I put in a small yard, together with a few good hens of mixed breeds, and only set eggs laid in this pen. A larger proportion of these lived than before, but the complaint had taken another form: Instead of purging, the chickens chirped about for several days (getting ill when about five weeks old), their stomachs swelled and became black looking, then they died. I opened several and found the intestines swelled and inflamed; also the gizzard was very much larger than natural, and also inflamed. The purged chicks I gave sopped bread, with pepper and sulphur; to the swelled chicks I gave castor-oil, sulphur, pepper, salt, mixed in bread or oatmeal; but not one that took sick recovered. Out of 320 chicks I have only reared over 40. The general feed of the chicks and fowls was corn, wheat, dry and boiled potatoes, boiled and mashed, and cabbage cut up small and sprinkled about the yard. The last chicken came out about six weeks ago (as the weather is too cold here now), and nearly all are dead. The French, Spanish, and game chicks all died. A few common and the Houdan-crossed lived in the largest proportion. Thus for seven months we had this fowl disease in the yards, covering three-quarters of an acre of ground, pailed in. During this time one of my grand-children, between 3 and 4 years old, was always among the chickens, several grey-hound dogs, a ferrier, while she had young pups she was in an out-room where several clutches of chickens were dying; a number of guinea pigs, and doves in boxes with wire fronts, are about, and the ailing chicks stood about in the sun in front of these cages constantly; also a Rosehill parrot hangs outside. None of these animals have been affected in any way.

A fortnight ago a fresh outbreak came on the full-grown fowls, and they are dying daily since; the symptoms of this is purging, of a white and green colour, some yellow and brown, and some with a clot of light coloured blood in it. I have given the fowls wheat boiled with pepper and salt, and lime mixed into it when cold. A few are recovering. This morning two were dead, and two are ill. All the summer I had the fowl-houses swept every day, washed frequently with lime, and with carbolic acid in water, and sulphur burnt in them. The last fortnight I have had the places whitewashed every morning, floor and perches, so as to destroy the microbes, but apparently to no purpose.

If the French doctors, who seem to understand these complaints, would give the Government a recipe for the cure of chicken-cholera, and it was published in all the country papers, it would be as much a national benefit, as the destruction of the rabbits. The last twelve years this fowl disease comes every autumn, and clears off hundreds of poultry. I have made inquiries, and find that this summer this complaint has killed the chickens generally, both about the town and district, and it will be but a matter of time when there will be no fowls to send to market. Should the Commission think proper to send a competent, scientific person up at once, they can see my fowls and their surroundings, or, if they wish, you can telegraph to me, and I will send you a couple of dead fowls.

Yours respectfully,

MRS. C. E. McNEILLY,

Byng-street West, Orange.

Dear

## OF RABBITS IN AUSTRALASIA—INVESTIGATION INTO FOWL DISEASES. 185

Dear Sir,

4, Jesmond Place, Bourke-street, Surry Hills, Sydney.  
I have a few fowls suffering from what I suppose is chicken-cholera. They are dying quickly, so if you require them, you should send at once for them.

Yours truly,  
L. T. LOHR.

I went to see the diseased fowls, which suffered from what is generally termed "scab."

OSCAR KATZ.

Dear Sir,

I believe chicken-cholera has been amongst the fowls at Genrie for some years. We have lost a large number each year, generally after rain during the warm weather, but even now occasional ones die from the same symptoms. The liver swells to an enormous size, and the droppings of the birds dirties them greatly; they sicken and die very rapidly, as it seems too late to dose them when noticed sick, they are too far gone. Sheep have been for the last three years in paddocks of about 30 acres, and the fowls constantly wandering and feeding in those paddocks. The bodies of the fowls have been burnt or buried when found, but doubtless many have not been found. No sheep have died in these paddocks. If of any acceptance, I would send you either a sick fowl, if possible, or one as soon as found dead, or the inside if you desire.

Yours truly,  
E. W. SEVERNE.

Genrie, Ponto Railway Station, 11th May, 1888.

I wired to above address. Specimen of fowl received 31st May.—O.K.

Mrs. SEVERNE sends Dr. Katz a chicken fresh dead for his inspection, and should be very glad indeed to know the nature of the disease, as she has lost about 100 since last December, the most dying during the long hot weather of January and February. This disease has shown itself every year for the last four years during those months.  
Genrie, Ponto Railway Station, 30 May.

To the Secretary of the Royal Commission for the Extermination of Rabbits,—

Sir,

I have the chicken-cholera now raging among my poultry, and I can supply you with same. At present we have no rabbits here to try the experiment with.

Deep Creek, Narrabri, 8 May, 1888.

I remain, &c.,  
J. BRAKE.

This cholera kills my fowls in one day. They look to be healthy one day and die the next. I have no remedy to stop same.

To Oscar Katz, Esq.,—

Dear Sir,

I have forwarded to you two fowls. Died last night with the disease, and I hope you will receive the same.

Deep Creek, Narrabri, 3 June, 1888.

Yours respectfully,  
J. BRAKE.

They are packed in a biscuit tin. Shall I send any more on?

I wired to the above address. On 4th June one specimen of fowl received.—O.K.

(c) Report of supposed outbreak on the North Grey Downs, New Zealand, by Dr. Symes.

(Extract from the *N. Z. Country Journal*, March, 1888.)

THE existence in Canterbury of the fatal disease of poultry, known as chicken or fowl cholera, was made known by the interesting letter of Mr. J. Ronaldson in the *Press* of 23rd February last; and in view of the attention drawn to this disease by M. Pasteur as a remedy for the rabbit pest, I considered the matter of sufficient interest to call for special investigation. I accordingly visited the district on the 25th, 26th and 27th February, and made inquiries at a large number of farms, examining as closely as possible the localities and circumstances of the epidemic. I have not yet been able to ascertain the exact limits of the district over which the disease extends, but the information hitherto obtained appears to show that the disease commenced in the neighbourhood of Amberley, not less than three years ago, and that during the last two years it has extended over the farms near Balcairn, Sefton, and Leichfield. It will be of great assistance towards the further investigation of the disease, if persons noticing it in other places will kindly communicate with the writer, or with the editor of the journal. Nearly every farm in these districts has suffered from the epidemic; the exceptions being very few indeed. Whenever the disease appears in a poultry yard, it usually carries off from 50 to 90 or even 95 per cent. of the fowls and turkeys within a month or two and sometimes within a week, while the ducks and geese invariably escape. It appears to be a very uncommon disease, as I could not hear of any person in the district who had ever seen it before. This epidemic presents the leading features of fowl-cholera; thus, it is extremely fatal, at any rate in its earlier phases, killing almost every fowl attacked within twenty-four hours; and is characterized by diarrhoea with excessive thirst. The best description I can find of fowl-cholera is in the last edition of Wright's work on poultry, 1885, p. 187. He says:—"During the last few years American and Continental yards have been devastated by disease previously unknown, to which the name of chicken-cholera has been generally given, and of late some cases have occurred in England. In true chicken-cholera there is a sudden and violent accession of thirst, accompanied with diarrhoea; the droppings being at first of a greenish character, and by degrees becoming thin and whitish. Great weakness becomes rapidly manifested, the fowl falling about, usually by the water fountain; and in some cases cramps also supervene. The bird also presents a peculiar anxious look about the face.

It will be noticed in the symptoms described further on, that the droppings were generally yellow, instead of greenish, but this is of little importance, as in either case it implies excessive discharge of bile, which may be either green or yellow according to certain circumstances. I made many inquiries as to the supposed cause of the disease, but the great variety of opinions expressed was alone sufficient to show that there is no recognized cause. Having made some personal study of human cholera in its native home, India, the distribution of which is closely connected with water supply, I naturally devoted special attention to the conditions of water supply to the poultry affected, and I venture to suggest the following propositions, as at least worthy of more extended investigation:—

1. The disease occurs principally on farms which possess no stream of running water.
2. In nearly every case, ducks and geese are kept on the farm affected; and in the few exceptional cases they are kept on farms adjoining.
3. The water pumped into tins or troughs for the poultry is necessarily very limited in quantity, and is quickly polluted by the ducks and geese.

4. There is reason to believe that the fowls and turkeys are liable to be affected by polluted water which would not injure ducks and geese.

The obvious objection to this theory is that similar conditions as to water supply have prevailed for many years in this district, whereas the disease is only recent; but it must be borne in mind that the germs of disease take a certain period of time to develop; thus, at the German Medical Congress, held at Wiesbaden, in September, 1887, Dr. Hueppe, after alluding to the relationships existing between the epidemics of infectious diseases, and the depth of the water level below the surface of the ground, laid down the following conclusion as a fundamental basis of modern medicine:—

“That the excitants of infectious disease must be specific organisms, and this specificity may be either absolute or else evolved during long periods of time from local putrefactive process.” (*British Medical Journal*, Jan. 21, 1888.)

We do not know the period of time required to evolve the germs of fowl-cholera from local putrefactive processes, but assuming that the necessary conditions have been present on the Mount Grey Downs for twenty years, and that no infection has been introduced from elsewhere, the study of this outbreak may afford valuable information as to the origin and course of epidemic infectious disease. The experimental inoculation of rabbits with the fowl-cholera existing on the Mount Grey Downs will, subject to the approval of the Government, form the subject of a future article. I now proceed to give the notes taken at the time of a few of the more important visits made by me in the district. I desire to acknowledge the kind assistance rendered to me in this inquiry by Mr. Ensor, of Mount Grey, and by Mr. Vaughan, of Sefton, who both placed traps and horses at my disposal. I am also much indebted to Mr. Ronaldson, of Balcairn, for giving me the benefit of his local knowledge and introducing me to various farmers.

Case 1. Mrs. M'Ewen, near Sefton, visited on 26 February, 1888, states that she has kept fowls on this farm for about twenty years, and has never lost but one or two occasionally before this summer. In November last she had 150 fowls, divided into two sets. One set of fifty were at a cottage about 6 chains from the homestead. On the first Friday in November last she saw them all looking quite well. On the following Monday she noticed some of them were ill. The next morning six were dead. The following morning about a dozen more were dead; and so on, until the following Monday, by which time the whole flock of fifty fowls were dead, with the exception of a solitary rooster, which it was considered advisable to kill. The second flock of about 100 fowls were kept at the homestead. The same epidemic appeared amongst them a few weeks later in November. Although the two flocks were kept separate, it is probable that some communication may have existed. When the second flock began to die Mrs. M'Ewen disposed of them all except four, which are still alive and well. A fresh lot of fowls were obtained in January. The disease has not reappeared; and Mrs. M'Ewen has now about 100 fowls, all well.

The symptoms of the disease were the same as will be described later on.

The conditions relating to the disease are as follows:—

1. *Water*.—No running water exists there. Fresh water is pumped every day into iron vessels, and is used in common by fowls, ducks, geese, and turkeys. The well is 45 feet deep, and supplies excellent water. A good many ducks and geese are kept, and they dirty the drinking water provided for the poultry very quickly.

2. *Premises*.—The whole of the premises are kept scrupulously clean. Open fowl-houses are used, and the fowls are never shut up in them. The disease appeared equally early and equally virulent in the fowls roosting outside as in those roosting in the fowl-house.

3. *Infection*.—Mrs. M'Ewen cannot trace any source of infection from elsewhere. She has not bought any fresh fowls for twenty years, and it is three or four years since she has received a present of any. She has paid great attention to poultry, and never saw any disease resembling this before. The dead fowls were buried at once.

4. *Other Circumstances*.—The first flock of fifty were remarkably fine young fowls, of good but mixed breeds, fed mostly on wheat. It is worthy of note that the turkeys escaped the disease, which is quite exceptional. No other stock suffered. No milk was given to the poultry.

Case 2.—Mr. John Stuart, Balcairn, visited by me on 26 February, 1888. Has kept fowls here for twenty years, without any illness amongst them until last November, at which time he had 150 fowls, besides other poultry. The disease commenced in wet weather, and was very severe at first, carrying off about 100 fowls in the first month. Since then it has been gradually diminishing, the total mortality being now 120.

*Symptoms*.—Mr. Stuart has observed the fowls die in from six to twenty-four hours from the first appearance of illness, at the commencement of the epidemic; but now that the disease is disappearing, the fowls are longer ill, and often linger for a week. Also, many now recover, whereas at first none did. The first indication, is yellow droppings, like yolk of egg; the fowl drinks incessantly, refuses food, and is much purged; it appears stiff, the wings droop, the comb gets blue or black, and the bird mopes.

*Conditions*.—Water: There is no permanent stream of water, and that which is pumped for the poultry is soon polluted by the ducks and geese. Six ducks and twelve geese are there at present, but a larger number of ducks are usually kept. There is an open shed for the fowls, but they roost principally in the trees and fences. There are no turkeys. The farm-yard is occupied more or less constantly by three pet sheep, ten calves, six pigs, horses, dogs, cats, and poultry. Mr. Stuart does not know how the infection was introduced, as the disease having been prevalent in his neighbourhood for the past two years, he has carefully avoided bringing home any fresh fowls. He has not buried any of the dead fowls, because they are immediately devoured by the dogs and cats. He has noticed that the dogs and cats suffer no ill effects from eating the dead fowls; nor has any illness occurred amongst the other stock on the farm. Pure-bred fowls were the first affected, especially Houdans and Hamburgs, and the roosters were affected more quickly than the hens. The age made no difference. At the time the complaint commenced, the food had just been changed from wheat to oats; it was changed back to wheat, but it made no difference. Milk is fed to the poultry, and distributed in shallow holes made purposely in the stiff clay ground. Sulphur and castor oil have been tried as medicine without result. Infusion of blue-gum leaves is now being tried.

Case 3.—Mrs. Hugh M'Coll, Balcairn, visited by me on 27th February, 1888. Has kept fowls here about four years. Never saw any illness amongst the fowls until eighteen months ago, when she had eighty fowls

fowls, of which sixty died in two months, about September and October, 1886. The premises were cleaned and all rubbish burned. The disease did not reappear until January, 1888; since then she has lost twelve fowls. She always keeps about a dozen geese, but no ducks at present. There is no running water, and the geese use the water pumped for the fowls. In 1886 the old birds suffered most, and in 1888 the young birds. There is no fowl-house. The symptoms observed are the same as described by Mr. Stuart. The cats and dogs eat the dead fowls with impunity. There is no history of infection.

Case 4.—Mr. John Dron, Balcairn, visited by me on 26th February, 1888. Has been here twelve years, and never saw any special illness among the fowls until a year ago, when about fifty died in a few months. The disease seems to come and go, and after an interval of freedom three died last week. There is no running water, and ducks use the water which is pumped into a shallow tin for the fowls, and render it very dirty. Has not noticed any fowl ill over twenty-four hours.

Case 5.—Mr. Donald Cameron, Saltwater Creek, visited by me on 27th February. Is one of the oldest residents in the district, and has always kept a large quantity of ducks and geese, as well as fowls. Has never seen any illness among any of the poultry, although chicken-cholera has been very prevalent all round him for two years past. The Saltwater Creek runs through his premises.

Case 6.—Mrs. John Topp, near Saltwater Creek, visited on 27th February, 1888. Has kept fowls here for six months, and recently lost ten out of thirty. There is no running water, and the water pumped for the fowls is polluted by the ducks and geese. She had nine turkeys which all died of the same complaint just before the fowls commenced to die. Mrs. Topp was previously in Amberley, where, in November, 1885, she lost five turkeys and thirty fowls from the same complaint. Her sister, Mrs. Retallich, at Amberley, has recently lost all her turkeys and a number of fowls from this complaint. The symptoms are the same as described by Mr. Stuart.

Case 7.—Mrs. John Dick, near Saltwater Creek, visited 27th February, 1888. Has kept fowls here four or five years. Never saw any illness until spring of 1886, when she lost fifty-four out of sixty fowls in about two months. The disease has never returned. There were twenty-four ducks, but no geese nor turkeys.

Case 8.—Mr. Samuel D. Wilson, near Saltwater Creek. Lost about fifty out of one hundred fowls in June and July, 1886, and the disease has not since returned. He does not himself keep ducks or geese, but his neighbour Mrs. Dick's ducks often visit a small creek which runs through his farm and supplies his own fowls with drink. His fowls are not shut up.

Case 9.—Mrs. Fitz-Patrick, Sefton, visited 27th February, 1888. Has kept fowls here for twenty-five years and never saw any illness among them until February, 1886, when out of over one hundred fowls all but seven died in one month. The disease has not reappeared. She had then over fifty ducks, forty geese, six turkeys, four guinea-fowls, eight pigs, twelve calves, nine cows, nine horses. The water used by the fowls is dirtied by the other stock. All the turkeys died from the same complaint, and a pony died of scouring about three months later, after feeding on grass where the fowls had been running. The fowls generally died within twenty-four hours. The symptoms corresponded exactly with those previously described.

Case 10.—Mrs. Wornall, Leithfield Terrace, visited 27th February, 1888. Has kept fowls here twenty-eight years and never saw any illness among them until two years ago, when out of fifty-four fowls forty-seven died. She had not kept ducks nor geese for two or three years previously, but the disease had been prevalent among her neighbours for some time. There is no running water. Clean water or milk is put into the trough every morning for the fowls, and no other stock had access to the fowls' trough. The premises are particularly clean. The fowls were shut in a fowl-house at night, and were always loose in the day time. The fowls were a very fine well-bred lot. They exhibited the same symptoms as described, and dropped off their perches, three or four or seven at a time. All the pure-bred fowls died.

Case 11.—Mrs. Ashby, Leithfield Terrace, visited 27th February, 1888. Has kept fowls here ten years, and never had any illness among them until April, 1885, when she lost thirty out of fifty fowls in one month. The complaint did not return until July, 1887, when she lost twenty-three out of forty. She has only one duck and no geese. The water pumped for the fowls does not appear to be used by other stock. The fowls are shut up at night and run loose in the day time. The premises are clean. The complaint was prevalent in the neighbourhood before the fowls were attacked.

Case 12.—Mrs. Wilson, Sefton Road, visited 27th February, 1888. Has kept fowls here twenty years, and never saw any illness among them until July, 1886, when out of over one hundred fowls all but fourteen died in six weeks. No fowl-house is used. There is no running water, and the ducks and geese use the water pumped for the fowls. The disease has not returned.

Case 13.—Mrs. O'Connor, Balcairn, visited 27th February, 1888. Had fifty fowls last winter, of which all but eight died. In addition to the symptoms described, Mrs. O'Connor noticed some of the sick fowls run round in a circle and then drop, becoming at once as stiff as though dead for two days. There is no running water, and that used by the fowls is used by pigs and other stock; but the evidence as to ducks and geese is indefinite.

I visited many other farms with the result of confirming the above statements.

The perusal of these cases must tend to relieve any anxiety as to the danger of fowl-cholera affecting either cattle, sheep or human beings. Moreover, the study of fowl-cholera is of especial interest in assisting us to learn more of the nature and mode of origin of various other epidemic diseases, both of man and animals, and enabling us, in virtue of such knowledge, to prevent or cure such disease.

I will conclude this article with the following quotation from the *British Medical Journal* of 21st January, 1888:—

"Pasteur has shown that pathogenic (or disease producing) bacteria undergo modifications of virulence by transmission through susceptible animals, the lower grades of virulence protecting against the higher. Hensbe, who had previously argued that the four diseases—cattle plague, swine plague, rabbit septicæmia, and fowl-cholera, must be nearly related, has made a series of experiments, which not only support the idea, but show that the bacteria of these four diseases, when attenuated either by culture or by transmission, are mutually protective against each other."

(d) Report on supposed outbreaks in Tasmania. Letters from R. Travers Solly, Esq., Under Secretary, Tasmania, to the Secretary, Rabbit Commission:—

Dated 5th May and 10th June, 1888, and replying to letter from Secretary, Rabbit Commission, requesting that if possible tubes containing blood of fowls suffering from chicken-cholera might be supplied. Mr. Harrison, an officer under the Inspector of Stock states, that it is very difficult to get information concerning any present outbreak of the disease, as people are very reticent about the matter. But, in the spring of 1887 at Cambridge, the whole of Mr. T. Evans' fowls (some 70) died off rapidly, showing little previous symptoms of disease. Mr. W. J. J. Reynolds, of Sandy, also lost about forty in a similar manner; the fowls were previously, to all appearance, perfectly healthy, some of them laying; but each fowl died within a few hours of being attacked by the disease, whatever it was. Mr. Archibald Park, M.R.C.V.S., England, states, that from reliable sources he learns that some disease has completely destroyed every fowl in the yards; but that it has since died out, the poultry yards being again stocked. For many years he has heard of great mortality amongst poultry in different parts of the Colony, but nothing definite has come under his observation from which the causes of such mortality could be deduced.

(e) Reports by Dr. O. Katz, Chief Expert to the Commission, on actual examination of fowls or blood of fowls supposed to have died from fowl-cholera.

Case I.—From Dr. Jackson, of Homebush, near Sydney, 4th May, 1888.

Object—Dead fowl.

On microscopic examination of the liver bacilli were found much larger than the microbes of fowl-cholera, and only in small numbers.

Inoculation of material from the liver of the fowl into a mouse resulted in the death of the animal after three days; but organisms could not be found in the blood.

Cultivation experiment with liver-tissue of fowl yielded pure cultures of a bacillus, morphologically similar to that observed directly in the fresh liver; but the appearance of the bacterial cultures (colonies) did not correspond to that of the bacillus of fowl-cholera.

Case II.—From Dr. Nicholson, Benalla, Victoria, 7th May, 1888.

Object—Blood from fowls in capillary tubes.

On cultivation in nutritive gelatine colonies were obtained, in rather large numbers, of a bacillus, which had nothing to do with that of fowl-cholera.

The pure culture of this micro-organism (first generation) inoculated into the subcutaneous cellular tissue of the breast of a healthy young fowl did not infect it. The animal, however, died on the 27th May, ten and a-half days after inoculation, from some other cause.

Case III.—Through Mr. A. N. Pearson, from Melbourne, 16th May, 1888.

Object—Blood in capillary tube.

Inoculation of some of this blood into a healthy fowl had no infective power. The animal, however, also died on the 27th May, ten days after inoculation; but the microscopic examination of blood yielded negative results, so far as micro-organisms are concerned.

Case IV.—From Mrs. C. E. McNeilly, of Byng-street west, Orange, New South Wales, 17th May, 1888.

Object—Four dead fowls.

Post-mortem examination without any positive result.

Microscopic examination of blood of two of the above specimens showed a few bacteria.

Inoculation of blood from one of the two specimens into a healthy fowl yielded a negative result.

Case V.—From Mrs. Severne, Genrie, Ponto Railway Station, New South Wales, 31st May, 1888.

Object—Dead fowl.

Microscopic examination of blood without positive result.

Inoculation of blood into a healthy fowl had not the slightest effect.

Case VI.—From Mr. J. Brake, Deep Creek, Narrabri, New South Wales, 4th June, 1888.

Object—Dead fowl.

Post-mortem and microscopic examinations yielded negative results.

Inoculation of liver-tissue into a healthy fowl was without effect.

Case VII.—From Dr. Symes, New Zealand, through Sir James Hector; received from Mr. Hamlet, Government Analyst, Sydney, 13th June, 1888.

Object—A dozen capillary tubes containing blood from diseased fowl.

Microscopic examination of the blood failed to show presence of any bacteria.

Inoculation of the contents of two tubes into two healthy fowls remained without effect.

Culture experiment with above blood in nutritive gelatine (after Esmarch's method) likewise yielded a negative result, inasmuch as the gelatine was still sterile after about a week, with the exception only of one or two contaminations.

Case VIII.—From Mr. Lindsay Thompson, Burwood, near Sydney, 18th August, 1888.

Object—Two dead chickens.

Result of examination for fowl-cholera negative.

Case IX.—From the same, 13th September, 1888.

Object—One dead chick.

Result of examination (microscopically and inoculation of rabbits), negative.

Thus, in none of the above nine cases could the disorder of which the above fowls died be identified as fowl-cholera; but, in order to form a definite opinion as to whether this infectious disease exists in Australasia or not, further examinations are required and must be continued for some time.

## SECTION XIII.

DESCRIPTION of the Symptoms and Post-mortem Appearances caused by Fowl-cholera in Poultry; prepared by Dr. O. Katz.

Dr. F. A. Zürn, Professor of Veterinary Sciences at Leipzig University, in his work entitled "Die Krankheiten des Hausgeflügels" (Diseases of Domestic Poultry), Weimar, 1882, gives the following detailed account of what bears on the above subject:—

*Symptoms.*—After referring to the statement made by Salmon, that the first symptom of this devastating disease (fowl-cholera) is the depositing of an intensely yellow urine—in contradistinction to the normally lime-water-like urine—which, though voided from the cloaca along with fæces, can be distinguished from the latter, and that the urine is yellow also in the ureter and cloaca of birds dead of fowl-cholera, he says

says that he never noticed this peculiarity, and that also other observers as Semmer, Ferroncito, and Pasteur do not mention it. The Professor then continues: "The beginning of the disease is marked, as a rule, by sadness, apathy, and want of appetite; it is only in exceptional cases that the sick birds take food nearly until death. They isolate themselves from their healthy companions, drop their wings, and appear very dull and languid. Soon a severe diarrhœa sets in, the voided fœces are thin, but still soft and coherent, and of yellowish-white colour; later on they become watery, being of a greenish appearance and mixed with mucus; the feathers round the opening of the cloaca are much polluted with fœcal matter. As an exception, the patients vomit, throwing out quite thin greenish masses. Usually the sick poultry are extremely thirsty. The diarrhœa exhausts the sick considerably; their weakness soon becomes so great that they are scarcely any longer able to stand on their legs; therefore, they rest on the ground or soil, with their bellies closely attached to the cool surface; now and then they try to stand up, but, staggering as they are, they do not keep themselves upright for a long time; soon they sit down again, trembling, with their plumage ruffled in a high degree, and their eyelids closed as if in sleep; it is only occasionally that they utter a hoarse sound. The comb and the throat-lobes, which at the beginning showed a bluish-red tint, become violet by-and-by—before the death of the animal sometimes even bluish-black. The weakness is accompanied by a rapidly increasing emaciation. The body-temperature is raised by 1—1.5° C. (1½—2½° Fahr.), more rarely by 2° C. (3½° Fahr.), above the normal [up to 43.5° C. (110½° Fahr.)]. The death ensues under convulsions, more rarely without such; in the former case the animal's head becomes drawn down to the breast.

"The disease frequently takes only a short time, 1½—3 days, only occasionally weeks, before death follows. It occurs that seemingly quite healthy birds which were just eating, or which otherwise seemed normal, die almost suddenly; on the other hand a bird may linger for a week and longer before the misery reaches its end."

Such are, on the whole, the symptoms of domestic poultry which have contracted the disease in the natural way, or of poultry which prove themselves susceptible to experiments by way of feeding with the virus of fowl-cholera.

Inoculations of this virus, or of material carrying it, into normal birds are, as a rule, followed by quick death. It is only seldom that a week or more elapses until death. For instance, I inoculated a pigeon and a fowl, each with a small quantity of virulent gelatine-culture of the microbe of fowl-cholera. The pigeon died in less than twenty hours; the fowl did not succumb until after somewhat more than ten and a half days, within which period it failed to show any typical symptoms. That it died of veritable fowl-cholera was afterwards clearly proved.

*Post-mortem Appearances.*—"Fowls, geese, and ducks, which have been ill for some time before dying, are in a decidedly emaciated condition; birds which have been ill only for a short time show the flesh still well preserved, firm, and of normal colouration. The chief appearances, at the autopsy, are presented by the small intestines. Their contents represent thin, yellow masses, made up of mucus, *débris*, epithelia of intestines, and very small portions remaining from feeding; often they are stained with blood. The mucous membrane of the intestines is infiltrated with scrous masses, softened, turgid, with its blood-vessels gorged and offering a tree-like appearance."

Besides the intense intestinal inflammation, with numerous hæmorrhages, as a rule, and sometimes even ulcerations, the spleen and liver are usually enlarged, soft, and of darker colour than normal. The pericardium and the heart are mostly altered, inasmuch as the former is seen to have exuded a watery or fibrinous liquid, and the latter has at its surface numerous spots due to extravasated blood. The lungs are darker in colour than usual, very juicy, and rich in blood.

(It is, I think, out of place here to add a description of the appearances which are found at the spot where birds have been *inoculated* with the virus of fowl-cholera.)

Finally, it remains to say, in every case of fowl-cholera, the causal excitors of this disease, the microbes or bacteria of fowl-cholera, are present in the blood of the dead or sick subjects.

### SYMPTOMS and Post-mortem Appearances as described by M. Pasteur.

"L'ANIMAL en proie à cette affection est sans force, chancelant, les ailes tombantes. Les plumes du corps soulevées lui donnent la forme en boule. Une somnolence invincible l'accable. Si on l'oblige à ouvrir les yeux, il paraît sortir d'un profond sommeil et bientôt les paupières se referment, et le plus souvent la mort arrive sans que l'animal ait changé de place, après une muette agonie. C'est à peine si quelquefois il agite les ailes pendant quelques secondes. Les désordres intérieurs sont considérables.\*

"Le mal s'insinue soit par les premières voies digestives, soit, et le plus souvent, par les intestins, généralement très enflammés et quelquefois ulcérés sur une grande longueur, dans la portion d'ordinaire qui suit le gésier, rapelant par leurs lésions celles de la fièvre typhoïde.

"Le sang est rempli de microbes, et les organes internes sont couverts assez fréquemment de pus et de fausses membranes, principalement du côté des anses intestinales, par où le microbe paraît avoir visiblement pénétré."†

#### *Translation.*

The animal subjected to this affection is devoid of strength, tottering in its gait, and suffers its wings to fall. The feathers of the body being raised up give it a ball-like appearance. A somnolence which it is powerless to withstand takes possession of it. On being compelled to open its eyes, it seems as if awakening from a profound slumber, and the eyelids are soon closed again, and most often after a silent agony death supervenes without the animal having changed its position. Exceptionally it agitates its wings for some seconds. There are considerable internal disorders.

The disease affects an entrance either by the most anterior parts of the digestive tract, or (and this is usually the case) by the intestines, which are generally inflamed, and sometimes ulcerated throughout a large extent, commonly in the part following the gizzard, presenting lesions which call to mind those present in typhoid fever.

The blood is full of microbes, and the internal organs are very frequently covered with pus and with false membranes, principally on the side of the intestinal loops where the microbe seems to have visibly penetrated.

#### APPENDIX

\* *Comptes Rendus*, 1880, T. xc., p. 241.

† *Op. Cit.*, 1880, T. xc., p. 356.

## APPENDIX I.

## SCHEMES for the Extermination of Rabbits by Disease, as classified and reported on by the Correspondence Committee.\*

\* Omitted by direction of the Honorable the Colonial Secretary, on the ground that the particulars given might be said to be a "disclosure" within the meaning of the Proclamation of the Government of New South Wales, dated 31st August, 1887.—See the Final Report of the Commission, and Minutes of Proceedings attached thereto.

## APPENDIX II.

## EXPENDITURE by the Governments of the several Colonies in connection with Rabbit Destruction.

## NEW SOUTH WALES.

STATEMENT of Expenditure each year, under the Rabbit Act, from the passing of the Act to the 30th September, 1888.\*

Year.	Service	Amount.			Total.		
		£	s.	d.	£	s.	d.
1883	Salaries, &c. ... ..	10,467	8	11	40,673	17	9
	Subsidies ... ..	30,206	8	10			
1884	Salaries, &c. ... ..	30,321	1	7	127,029	2	9
	Subsidies ... ..	96,708	1	2			
1885	Salaries, &c. ... ..	34,988	2	9	84,078	5	5
	Subsidies ... ..	49,090	2	8			
1886	Salaries, &c. ... ..	43,873	3	11	140,063	7	2
	Subsidies ... ..	96,190	3	3			
1887	Salaries, &c. † ... ..	28,270	8	7	307,987	2	3
	Subsidies † ... ..	279,716	13	8			
To 30 Sept., 1888	Salaries, &c. † ... ..	29,255	3	0	32,404	12	4
	Subsidies † ... ..	3,149	9	4			
		£ 732,236			7	8	

The total cost of erecting the rabbit-proof fence from Narromine to Bourke, a distance of 202 miles 20 chains was ... .. £17,065 2 10½

The total cost of erecting the rabbit-proof fence from Bourke to the Queensland border, a distance of 84 miles, was ... .. 6,932 0 9

£23,997 3 7½

£756,233 11 3¼

\* Furnished by Henry C. Taylor, Esq., Superintendent, Rabbit Branch, Lands Department, Sydney.

† These amounts represent sums for which notices have been issued by this Department, but £58,000 of which has not yet been paid.

## VICTORIA.\*

AMOUNTS provided by Parliament for the destruction of Rabbits on unoccupied Crown Lands.

1879-80 (Financial Year) ... ..	£1,280
1880-81 " ... ..	2,600
1881-82 " ... ..	10,000
1882-83 " ... ..	12,000
1883-84 " ... ..	10,000
1884-85 " ... ..	12,000
1885-86 " ... ..	33,000
1886-87 " ... ..	25,422
1887-88 " ... ..	25,422

£131,724

The above amounts include all expenditure on supervision, travelling, poisons, materials, wages, cartage, &c., incurred in working the unoccupied Crown lands, but do not include the cost of erecting the rabbit and wild dog proof fencing between mallee blocks and allotments, and on the South Australian border.

In the Victorian Year-book, 1886-7, it is stated that in the ten years ending with 1886 close upon twenty-nine millions of rabbit-skins, valued at about £209,000, had been exported from Victoria, exclusive of

\* From information supplied by A. Morrah, Esq., Secretary for Lands, Melbourne.

## APPENDIX.

191

of those used in the Colony. The exports reached a maximim in 1882 of £37,538 ; in 1885 they commenced to show a rapid falling off, and in 1886 amounted only to £6,800. The following are the actual figures :—

## EXPORT of Rabbit-skins from Victoria, 1877-1886.

Year.	Skins Exported.		Year.	Skins Exported.	
	Number.	Value.		Number.	Value.
1877	700,565	£ 5,790	1883	4,245,596	£ 30,364
1878	711,844	6,206	1884	4,963,371	37,243
1879	1,036,372	7,322	1885	3,424,259	23,548
1880	3,309,108	21,674	1886	910,609	6,800
1881	4,473,108	32,217	Total	28,704,564	£208,702
1882	4,929,432	37,538			

During the twelve months ending 26th July, 1887, nearly three-quarters of a million (702,632) rabbits were sent to the Melbourne market.

It is also stated in the Year-book that a few years ago upwards of £15,000 were expended on one estate alone in efforts to clear the land of the pest. And it is estimated that, including the expenditure of private individuals, shire councils, and the Government, as well as the depreciation in the grazing value of the land, the loss to the Colony during the ten years 1877-87, owing to the depredations of the rabbits, has amounted to £3,000,000.

## SOUTH AUSTRALIA.

STATEMENT of Annual Expenditure by the South Australian Government on Rabbit Destruction, for the seven years ending 30th June, 1888.

1881-82	...	...	...	...	...	£21,555 14 10
1882-83	...	...	...	...	...	21,658 4 9
1883-84	...	...	...	...	...	5,991 18 5
1884-85	...	...	...	...	...	26,579 5 3
1885-86	...	...	...	...	...	19,653 0 8
1886-87	...	...	...	...	...	26,829 1 1
1887-88	...	...	...	...	...	6,327 13 2
Total	...	...	...	...	...	£128,594 18 2

J. W. GOYDER,

Surveyor-General.

This account is exclusively for expenditure incurred in the destruction of rabbits, to the exclusion of other vermin.—J.W.G.

## NEW ZEALAND.

THE Annual Expenditure for Destruction of Rabbits on Crown Lands was as follows :—

1882-83	...	...	...	...	...	£4,847 0 0
1883-84	...	...	...	...	...	3,886 5 6
1884-85	...	...	...	...	...	2,873 4 7
1885-86	...	...	...	...	...	2,057 17 10
1886-87	...	...	...	...	...	2,315 0 0
1887-88	...	...	...	...	...	2,473 10 8
						£18,452 17 7

The above sums do not include payment to agents, and for labour, material, natural enemies, and general contingencies. Nor do they include £12,530 voted for the South Canterbury rabbit-proof fence in 1887-88.

Up to August, 1886, the owners of private lands destroyed rabbits at their own expense, but since that date a subsidy, not to exceed £10,000 per annum, has been authorized for payment to local boards.

The rabbit skins exported were as follows :—

1882-83	...	...	...	...	...	8,922,756
1883-84	...	...	...	...	...	9,892,341
1884-85	...	...	...	...	...	9,869,065
1885-86	...	...	...	...	...	8,892,372
1886-87	...	...	...	...	...	9,900,692
1887-88	...	...	...	...	...	12,125,871
						59,603,097

There were thus close upon 60,000,000 rabbits killed, the skins of which were exported. Mr. A. Dillon Bell considers that an allowance of half as many, i.e., 30,000,000, must be made for those the skins of which were not exported; and reckoning the cost of obtaining a marketable skin at 3d., and of an unmarketable skin at 1½d., he estimates the direct expenditure on rabbit destruction during the six years at about £937,500. This of course is only an estimate, and it does not take into account the indirect loss due to the diminished grazing value of the land.

Mr. Lianca, a Member of the New Zealand Legislature, by another method of computation, estimated the direct loss at £250,000 per annum, and the indirect loss at an equal sum.

TASMANIA.

## TASMANIA.

From May 1883 to January 1888, the Government expenditure on rabbit destruction amounted to £82,882. Since the beginning of 1888 Government expenditure has been limited to the cost of destroying rabbits on unoccupied Crown lands, together with half the cost on occupied Crown lands.

The skins exported were as follows :—

1883	...	...	...	...	...	...	...	1,735,857
1884	...	...	...	...	...	...	...	1,730,620
1885	...	...	...	...	...	...	...	2,872,896
1886 (in part)	...	...	...	...	...	...	...	184,862

The official returns (which, of course, are necessarily incomplete) give a total of 3,700,526 rabbits destroyed in 1885, thus showing that there were about one-third more rabbits killed than skins exported.

## QUEENSLAND.

The expenditure in this Colony has been mainly limited to the construction of a rabbit-proof barrier fence along portions of the New South Wales and South Australian borders. The total expenditure up to December, 1887, was £59,736 15s.

## APPENDIX III.

LETTERS from M. Pasteur, extracted from Papers on Rabbit Destruction, submitted to the Legislative Assembly of New South Wales and ordered to be printed (March, 1888.)

[Translation.]

Sir,

Pasteur Institute, Paris, 8 January, 1888.

I have the honor to submit this communication, in reply to the official notification published by your direction in the *Temps*, of Paris, and in conformity with the accompanying cutting that I have extracted from that paper.

The delegates whom I am sending to Australia will leave Marseilles for Melbourne on the 8th of February next.

With the hope that they will be accorded a hearty welcome in Australia and that my scheme will answer all expectations in connection with the destruction of the rabbits that are devastating your fair land, I have the honor to request your acceptance of the assurance of my sincere regard.

The Hon. F. Abigail, &c.

L. PASTEUR.

To Sir Saul Samuel, K.C.M.G., Agent-General for New South Wales,—

Paris, 5 January, 1888.

Upon the destruction of rabbits in Australia and New Zealand.

THE *Revue des Deux-Mondes* in its issue of the 15th August, 1887, has published an article by Mons. C. de Varigny, from which I make the following extracts :—

“Suddenly enriched by the War of Secession in the United States, which enhanced the price of wool by checking its production in America, the Australian Colonies all at once found themselves in possession of considerable revenues.

“Zealous imitators of English customs, they conceived a passion for the chase, and founded Acclimatization Societies in Australia and New Zealand for the purpose of importing hares and rabbits from Europe. It became a perfect mania, a storm of madness that pervaded the whole Colony. \* \* \* Every large landed proprietor had but one idea, that of creating hunting preserves for his amusement. The soil and climate were both so admirably suited to the rabbits, which in England only have from four to six litters of three or four young ones in the course of the year, that in Australia they had as many as ten litters in the year with eight or ten young ones at a birth.

“Fruitless efforts were made to enclose the land with network, for they burrowed underneath it and gained the open to the intense chagrin of the landowners, whose redoubled endeavours and exertions only served to increase their numbers. They have been so successful that to-day this pest is making New Zealand and Australia desolate. Market gardens are laid waste; and districts, which a few years ago yielded 150 bushels of barley, and from 75 to 80 bushels of wheat per hectare (about 2½ acres) have been abandoned, all cultivation, except in certain localities, having become an impossibility.

“Mons. Crawford mentions the case of a large landowner who, after having expended £40,000 sterling (1,000,000 francs) in endeavouring to get rid of this scourge, was compelled to abandon the attempt. On certain holdings their number is estimated at hundreds of thousands, and every year the tax increases with their numbers. Possessed of marvellous voracity they eat the vegetation down to the very root, and convert enormous tracts of pasture lands, which would support from five and twenty to thirty sheep per hectare, into barren and dusty areas. The vineyards have been ruined, and up to the present time the methods employed for the destruction of these animals have achieved no perceptible results. They are hunted, slaughtered, and poisoned, and yet they swarm like ants.

“Mons. Williamson states, that during a journey that he made with a representative of the Government, they noticed that throughout the entire district the vegetation had disappeared. Enormous hordes of rabbits scoured the country, scarcely taking the trouble to move out of the way of their buggy. The ground riddled with burrows, would only admit of their travelling with extreme caution. The rabbits, says he, are everywhere, over the track, and over the plain; they gambol about in troops, and chase each other over the sandhills; and they are seen sitting in hundreds at the entrances of their burrows. Driven to bay in one direction they find refuge in another, and they increase with such rapidity that a universal deluge is the only thing that would give a satisfactory account of them.”

The following publication has recently confirmed the foregoing remarks.

On the 9th of November and 2nd of December, 1887, the paper *Le Temps*, of Paris, published the following official notice issued by the Government of New South Wales :—

[Here follows a literal version of the Gazette notice, offering a reward of £25,000 for a method of exterminating the rabbits.]

A very few days before this news was published by *Le Temps* I had received from a resident in New Zealand an account of the depredations that the rabbits were also committing in that island. On

On the 27th November, 1887, I wrote the following letter to *Le Temps*, which was published on the 29th of that month.

Copy of letter attached herewith :—

“To the Editor of *Le Temps*.

“Paris, 27 November.

“YOUR paper announced a few days ago that the Government of New South Wales was so powerless to contend with a plague of a peculiar nature—the rapid increase of rabbits—that it was offering a reward of 625,000 francs for the discovery of a process that would ensure their extermination. Considerable portions of New Zealand, as badly devastated as Australia, have been abandoned by the owners, who have given up the breeding of sheep through their inability to feed them. Every winter the rabbits are killed by millions, but this wholesale slaughter appears to have no effect so far as any diminution in their number is concerned. Will you permit me through the medium of *Le Temps*, to convey some suggestions to those distant lands, which if given effect to may be attended by a certain amount of success.

“Up to the present time mineral substances, especially preparations of phosphorus, have been used for the destruction of this pest. In having recourse to these means has not a wrong course been pursued? What can such mineral poisons avail in the destruction of animals whose propagation is characterized by such alarming vitality? They certainly prove fatal in the locality where they are laid; but to cope with living creatures is it not essential, if I dare say so, that a poison should be employed endowed with a vitality similar to their own, and like it, able to increase with the same marvellous fecundity? I would like an attempt to be made to carry death into the burrows of New South Wales and New Zealand by communicating a disease to the rabbits that would become epidemic. One such exists which is known by the name of ‘chicken-cholera,’ and has engrossed my closest attention while engaged in the studies of my laboratory. This disease is equally suitable for rabbits. Now, among the experiments that I have made, I find the following :—I collected a certain number of fowls within a limited space, and by administering food soiled with the microbe, which is the cause of the chicken-cholera, they were not long in dying. Poultry-yards are sometimes depopulated by epidemics of this disorder, the propagation of which is undoubtedly ascribable to the excretions of the first sick fowls that pollute the ground and the food. I am of opinion that the same thing would happen with the rabbits, and that they, upon returning to their burrows to die there, would communicate the disease to others, who in their turn would assist to spread the contagion. But how are the first rabbits to introduce the destroying disease into their systems? Nothing is easier.

“Around a burrow I would erect a light fence, enclosing a certain spot to which the rabbits resort in search of food. Experiments have taught us that it is easy to cultivate the microbe of chicken-cholera in a state of perfect purity, and on as large a scale as may be desired, in the broth of any kind of meat. With this broth of microbes the food of the rabbits should be sprinkled, and they dying here and there would spread the disease in all directions.

“I may add that the parasite of the disease that I have just spoken about is harmless to farm-yard animals, except, of course, fowls; but there is no necessity for the latter to feed in the open country.

“I have no doubt that there are persons in the infested districts who are quite prepared to make use of the method proposed, a most simple one, and, in every respect worthy of a trial.

“Kindly accept, Mr. Editor, this assurance of my most sincere respect.

“PASTEUR.”

Immediately after the despatch of this letter I had the curiosity to make experiments on the rabbits themselves. I remembered that chicken-cholera is very easily communicable to rabbits, though I had never made a special study of the rodents. I had often seen them die in cages that had not been disinfected after fowls had succumbed to cholera in them. It is an open question, and one which has been answered in the affirmative by many, whether chicken-cholera is not simply the septicæmia of rabbits, formerly diagnosed by Dr. Davaine.

I was very soon convinced of the facility with which the least meal given to rabbits, after the food has been tainted with the germ of the microbe of chicken-cholera, will speedily entail the death of the rodents.

I recapitulate some of the experiments that were made by Mons. Loir, a student attached to my laboratory, at my instigation :—

On the 27th November five rabbits were put into a box; they remained there without food until 6 o'clock in the evening. At that hour 100 centigrammes of a virulent growth of chicken-cholera were placed in a small basin where the leaves of a cabbage were soaking. These leaves were allowed to drain, and were then given to the five rabbits to be eaten, and in 5 minutes they had finished their meal. At midnight three fresh uninfected rabbits are placed with the others.

At 8 o'clock in the morning of the 28th November the five infected rabbits seemed ill. At 11 o'clock, that is to say, seventeen hours after their meal, two of them were dead. The remaining three died at 3 o'clock in the afternoon, twenty hours after their meal.

On the 28th of November, at 7 in the evening, one of the rabbits that had been confined on the previous day at midnight with those that had eaten the tainted food was found to be dead. The two other rabbits did not become sick.

At 5 o'clock on the evening of Saturday, the 3rd of December, some cabbage leaves—upon which 10 centigrammes of virulent growth of chicken-cholera had been spread, diluted with 100 centigrammes of sterilized water—were given to four rabbits. At midnight all the food had disappeared some hours before, and four fresh rabbits were placed with the others.

At 8 o'clock in the morning of the 4th of December, two of the rabbits seemed unwell. At 11 o'clock one of them was dead; at 2 o'clock two others died, and at 4 o'clock the last of those that had eaten was dead.

The carcasses were left in the box with the fresh rabbits that were put there at midnight on the previous day.

On the 5th of December one of the rabbits was found to be dead; one on the 6th; a third on the 7th; and the fourth died on the 9th of December. All of these were tame rabbits.

On the 17th of December 10 centigrammes of the growth of chicken-cholera were administered to a wild rabbit on a cabbage leaf. On the 18th it was dead.

In all the foregoing instances it has been placed beyond doubt that death was owing to the microbe of chicken-cholera.

On the 3rd of December and succeeding days experiments were made on the following animals:—Swine, dogs, goats, sheep, rats, and always by the infection of their food: not one of these animals became indisposed.

What is more, its operation on the rabbits is so rapid that there is little or no necessity to increase their supply of food; and, on resuming my previous experiments with fowls, I am convinced that they even would not succumb if allowed to remain on ground which the rabbit food had only partly succeeded in contaminating. Fowls are far less susceptible to the disease than rabbits.

Chicken cholera soon dies upon exposure to the atmosphere. It loses its intensity at 51° centigrade a temperature by no means uncommon, so I am informed, during the summer in Australia; but it would never be necessary to devote attention to the rabbits during the heat of the day.

The preservation of the microbe of chicken-cholera, on the other hand, is attended with no difficulty, and when not exposed to the atmosphere it will last for years; so that the most powerful germs will always be procurable. The experiments that I have already reported on to the Academy of Sciences furnish sufficient evidence of the fact.

The cultivation of chicken-cholera may be made from the broth obtained from many different animals. One of the cheapest might undoubtedly be prepared from the flesh of rabbits.

It follows, from the foregoing experiments, that not only do the rabbits that have taken the food impregnated with the microbe die off very quickly—in less than four and twenty hours—but also that the companions of such rabbits, though they have not eaten the infected food, died off in great numbers.

I reserve the question of the mode of contagion—it is a point that I will inquire into later on. Is it true that the rabbits inhabiting one burrow do not consort with the denizens of adjacent burrows?

One may look forward without any misgiving to the success of the method in the case where the rabbits belonging to one burrow do not come in contact with those from neighbouring burrows, and do not spread the contagion after they have become infected.

The disease is so easily communicable through the instrumentality of their food that even if the possibility of contagion from the infected to the non-infected rabbits did not exist the destruction of these animals would be none the less easy.

In my letter to *Le Temps* I refer to the erection of light network around the burrows. This contrivance would now be unnecessary.

I picture to myself an experiment on a large scale in the following manner:—Around one or more burrows I would have a certain quantity of the grass mowed down, which would be gathered together by rakes within reach of the rabbits before they went out in the evening. This grass, tainted with the microbe germ, would be devoured by the rabbits as soon as they came across it in their way. A fence would be powerless to stop them and compel them to eat. There would thus be a repetition to a certain extent of the Reims experiment, which I am about to narrate.

It was most desirable that an experiment on a large scale should be made.

An opportunity for the accomplishment of this desideratum under particularly favourable circumstances soon presented itself.

The widow Pommery, proprietress of the great Champagne establishment that bears her name, has sent me the following letter, after the perusal of mine that appeared in *Le Temps*:—

“Sir,

“Reims, 3 December, 1887.

I have a paddock at Reims, over my cellars, 8 hectares in extent, which is entirely surrounded by walls. I conceived the foolish idea of placing rabbits there for the purpose of providing some town hunting for my grandchildren.

“These creatures have increased to such an extent, and undermine the ground to that degree, that I am anxious to destroy them. Ferrets are unable to dislodge them from the large mounds of chalk in which they have taken refuge.

“If it will be convenient for you to make an experiment of the process that you recommend for the destruction of rabbits in Australia I offer you an easy means of doing so.

“EVE POMMERY.”

Very soon afterwards I learned from my clever correspondent that through fear of seeing the rabbits in her paddock by force of hunger endeavouring to extend their subterranean galleries to an illimitable extent, and endanger the stability of the arches of the cellars, she had for some considerable time thought that they might be confined to their burrows near the surface by giving them a daily meal of lucerne or hay sprinkled about in the vicinity of their burrows. It will be readily understood, therefore, what an easy matter it would be to try and exterminate the rabbits in Madame Pommery's paddock.

On Friday, the 23rd December, I despatched Mons. Loir to Reims for the purpose of sprinkling the day's food with a fresh growth of the microbe of chicken-cholera.

As usual, the food was consumed in a few minutes. The result was something marvellous.

On the 26th of December Madame Pommery wrote to me in the following terms:—“On Saturday morning (consequently the day after the fatal meal) nineteen dead rabbits were counted outside the burrows. No one visited the paddock on Sunday. On Monday morning thirteen more dead rabbits were counted, and since Saturday not a single rabbit has been seen on the ground. Moreover, as a light fall of snow took place during the night, no traces of their footmarks have been discernible in the neighbourhood of the chalk mounds.”

As a rule, rabbits die in their burrows. The thirty-two dead bodies that were found on the ground in the paddock represent but a very small minority of the dead, as will be seen later on.

In another letter, dated Tuesday, the 27th of December, Madame Pommery writes:—“The lucerne (that which was scattered round the burrows on Monday evening) has not been touched, and, moreover, no footprints have been seen in the snow. Everyone of them is dead.”

And Madame Pommery, alluding to the English papers which had freely criticised my scheme, copies of which she courteously forwarded to me, adds:—“What becomes of the English critiques in the face of such a result? A paddock of eight hectares, swarming with rabbits, has become a field of death. Mons. Pasteur poisons one ordinary meal for the rabbits, and a few days afterwards nothing lives; every one is put an end to—every one is dead.”

How many rabbits are dead in the burrows? It is difficult to determine exactly. Nevertheless, Madame Pommery informs me, in a letter that I have received to-day, the 5th of January, “That the work-

men

men estimate the number of rabbits that used each day to come and eat the eight enormous trusses of hay that were daily scattered about their burrows at much more than a thousand."

Madame Pomery adds further, that wherever the least trace of the chalk mounds is visible, the usual resort of the rabbits, heaps of carcasses of two, three, four, and five rabbits may be seen.

In concluding this article, I have the honor to state, for the information of the Agent-General, that it is my intention to despatch two experts to Australia and New Zealand for the purpose of putting into practice in those remote countries the process that I have just explained.

Finally, I express the hope that my labour may be permitted to compete for the reward of £25,000 sterling that has been lately offered by the Government of New South Wales for the extermination of rabbits in Australia.

Kindly accept, Mr. Agent-General, the expression of my sincere regard.

L. PASTEUR,

Of the Institute of France, and of the Royal Society of London.

45, rue d'Ulm, à Paris.

In order to prevent any misconception the original text of M. Pasteur's communications is subjoined:—

“ Paris, le 5 janvier 1888.

“ Sur la destruction des lapins en Australie et dans la Nouvelle-Zélande.

“ *La Revue des Deux-Mondes* a publié, dans son numéro du 15 août 1887, un article de M. C. de Varigny, dont j'extraits les passages suivants :

“ Enrichis subitement par la guerre de Sécession aux États-Unis qui fit hausser le prix des laines, en arrêtant la production américaine, les colons de l'Australie se trouvèrent tout à coup disposer de revenus considérables.

“ Imitateurs zélés des coutumes anglaises, ils se prirent de passion pour la chasse, et fondèrent en Australie et à la Nouvelle-Zélande des Sociétés d'acclimatation pour importer d'Europe des lièvres et des lapins. Ce fut une véritable rage, un vent de folie qui souffla sur la colonie. . . . Tout grand propriétaire n'eut plus qu'une idée : se créer une chasse réservée. Le sol et le climat convenaient si merveilleusement aux lapins, qui en Angleterre ont de quatre à six portées par an, de trois à quatre petits, qu'en Australie ils eurent jusqu'à dix portées par an, de huit à dix petits chacune.

“ Vainement on tenta d'enclore les terrains de treillis, ils creusaient par-dessous et gagnaient le large, au grand désespoir des propriétaires qui redoublaient d'efforts et de soins pour en accroître le nombre. Ils ont si bien réussi que, aujourd'hui, cette peste désole la Nouvelle-Zélande et l'Australie. Les jardins maraichers sont dévastés ; les terrains qui produisaient, il y a quelques années, 150 boisseaux d'orge et de 75 à 80 de blé, à l'hectare, durent être abandonnés, toute culture, dans certains districts, étant devenue impossible.

“ M. Crawford cite l'exemple d'un grand propriétaire qui, après avoir dépensé 40,000 livres sterling (1 million de francs) pour se débarrasser de ce fléau d'un nouveau genre, fût obligé d'y renoncer. Sur certaines fermes, on évalue leur nombre à des centaines de mille, et, chaque année, leur taille augmente avec leur nombre. D'une voracité extraordinaire, ils mangent l'herbe jusqu'à la racine et convertissent d'immenses pâturages, qui nourrissaient vingt-cinq à trente moutons à l'hectare, en terrains dénudés et poussiéreux. Les vignobles ont été ruinés et, jusqu'ici, les moyens employés pour détruire ces animaux n'ont abouti à aucun résultat appréciable. On les chasse, on les tue, on les empoisonne, et ils fourmillent.

“ M. Williamson dépose que, dans une excursion qu'il fit avec un Délégué du Gouvernement, ils reconnurent que dans tout le district l'herbe avait disparu. Des bandes d'énormes lapins parcouraient le pays, s'écartant à peine pour faire place à leur voiture.

“ Le sol, raviné de terriers, ne permettait d'avancer qu'avec précaution. ‘ Partout des lapins, ’ dit-il, ‘ sur la route et dans la plaine ; ils gambadent en troupe, se poursuivent dans les sables ; on les voit assis par centaines à l'entrée de leurs terriers. . . . Traqués sur un point, ils se réfugient sur un autre, et ils se multiplient avec une rapidité telle qu'un cataclysme de la nature pourra seul en avoir raison.’ ”

“ La publication suivante vint donner récemment une confirmation aux récits qui précèdent.

“ Le 9 novembre et le 2 décembre 1887, le journal *le Temps*, de Paris, publiait l'avis officiel suivant, émané du Gouvernement de la Nouvelle-Galles du Sud :—

“ Direction des Mines, Sydney, le 31 août 1887.

“ Il est donné avis, par la présente, que le Gouvernement de la Nouvelle-Galles du Sud payera la somme de 625,000 fr. (£25,000) à quiconque fera connaître et démontrera, à ses frais, une méthode ou un procédé encore inconnu dans la colonie, pour exterminer d'une manière efficace les lapins, procédé assujéti aux conditions suivantes :

“ 1° Que cette méthode ou ce procédé recevra, après un essai d'une année, l'approbation d'une Commission nommée à cet effet par le Gouvernement, avec l'avis du Conseil exécutif ;

“ 2° Que telle méthode ou tel procédé sera, d'après l'opinion de la dite Commission, inoffensif aux chevaux, moutons, chameaux, chèvres, porcs et chiens, et ne présentera pas l'emploi de matières ou substances qui pourraient leur nuire.

“ 3° La Commission sera tenue de ne pas divulguer les détails de ces méthodes ou de ces procédés, à moins que cette Commission ne décide d'expérimenter la dite méthode ou le dit procédé.

“ Toutes les Communications relatives à ce qui précède doivent être adressées à the Honorable F. Abigail, Secretary for Mines, Sydney (Nouvelle-Galles du Sud). ”

“ Très peu de jours avant que cette nouvelle fût publiée par le journal *le Temps*, j'avais reçu d'un habitant de la Nouvelle-Zélande le récit des désastres que les lapins occasionnent également dans cette île.

“ Le 27 novembre 1887, j'écrivis au journal *le Temps* la lettre suivante, qui fût insérée le 29 novembre :

“ Paris, 27 novembre.

“ A Monsieur le Directeur du *Temps*.

“ Votre journal annonçait, il y a peu de jours, que le Gouvernement de la Nouvelle-Galles du Sud était tellement impuissant à lutter contre un fléau d'un genre particulier—la pullulation des lapins—qu'il proposait un prix de 625,000 fr. pour la découverte d'un procédé destiné à leur extermination. Des portions

portions considérables de la Nouvelle-Zélande, non moins ravagées que l'Australie, sont abandonnées par les fermiers, qui renoncent à l'élevage des moutons par l'impossibilité de les nourrir. Chaque hiver on tue les lapins par millions, sans que ce carnage paraisse en diminuer le nombre. Voulez-vous me permettre de faire parvenir dans ces lointains pays, par l'organe du *Temps*, certaines idées dont l'application pourrait peut-être avoir quelque succès ?

« On a employé jusqu'à présent, pour la destruction de ce fléau, des substances minérales, notamment des combinaisons phosphorées. En s'adressant à de tels moyens, n'a-t-on pas fait fausse route ? Pour détruire des êtres qui se propagent selon les lois d'une progression de vie effrayante, que peuvent de tels poisons minéraux ? Ceux-ci tuent sur place là où on les dépose ; mais, en vérité, pour atteindre des êtres vivants, ne faut-il pas plutôt, si j'ose le dire, un poison comme eux doué de vie, et, comme eux, pouvant se multiplier avec une surprenante fécondité ?

« Je voudrais donc que l'on cherchât à porter la mort dans les terriers de la Nouvelle-Galles du Sud et de la Nouvelle-Zélande, en essayant de communiquer aux lapins une maladie pouvant devenir épidémique.

« Il en existe une que l'on désigne sous le nom de *choléra des poules* et qui a fait l'objet d'études très suivies dans mon laboratoire. Cette maladie est également propre aux lapins. Or, parmi les expériences que j'avais instituées, ce trouve celle-ci : je rassemblais dans un espace limité un certain nombre de poules, et, en leur donnant une nourriture souillée par le microbe qui est la cause du choléra des poules, elles ne tardaient pas à périr. Les basses-cours sont quelquefois ravagées par de véritables épidémies de ce mal, dont la propagation est due, sans nul doute, aux déjections des premières poules malades qui souillent le sol et les aliments.

« J'imagine que la même chose arriverait pour les lapins, et que, rentrant dans leurs terriers pour y mourir, ils communiqueraient la maladie à d'autres, qui pourraient la propager à leur tour. Mais comment faire pour que les premiers lapins ingèrent dans leur corps le mal destructeur ? Rien n'est plus facile.

« Autour d'un terrier, je placerais une barrière volante entourant un certain espace où les lapins viendraient chercher leur nourriture. Des expériences nous ont appris qu'il est facile de cultiver, en état de pureté parfaite et sur une échelle aussi grande qu'on peut le désirer, le microbe du choléra des poules, dans des bouillons de viandes quelconques. De ces liquides pleins de microbes, on arroserait la nourriture des lapins qui, bientôt, iraient périr ici et là et répandre le mal partout.

« J'ajoute que le parasite de la maladie dont je viens de parler est inoffensif pour les animaux des fermes, excepté, bien entendu, pour les poules ; mais celles-ci n'ont pas besoin de vivre en pleine campagne.

« Je ne doute pas qu'il n'y ait, dans les pays infestés, des personnes toutes prêtes à appliquer le moyen que je propose, moyen très simple, qui, en tous cas, vaut la peine d'être tenté.

« Veuillez recevoir, Monsieur le Directeur, l'assurance de ma considération la plus distinguée.

« Signé : PASTEUR. »

« Aussitôt après l'envoi de cette lettre, j'eus la curiosité de faire des expériences directes sur les lapins. Je me rappelais que le choléra des poules se communique facilement aux lapins ; mais je n'avais pas fait d'étude suivie sur ces rongeurs ; souvent j'avais vu mourir des lapins qui avaient été placés dans des cages non désinfectées où des poules avaient succombé du choléra. C'est une question de savoir, question résolue affirmativement par plusieurs, si le choléra des poules n'est pas simplement la septicémie des lapins, étudiée autrefois par le Dr. Davaine.

« Je fus bientôt assuré de la facilité avec laquelle le moindre repas donné aux lapins, après avoir souillé la nourriture par une culture du microbe du choléra des poules, entraîne rapidement la mort de ces rongeurs.

« Voici quelques-unes des expériences que j'ai fait faire à M. Loir, étudiant en Médecine attaché à mon laboratoire :

« Le 27 novembre on place dans une caisse cinq lapins ; ils y restent jusqu'à 6<sup>h</sup> du soir sans prendre de nourriture ; à 6<sup>h</sup>, on met dans une petite cuvette 100<sup>cc</sup> d'une culture virulente de choléra des poules, où l'on trempe les feuilles d'un chou. On laisse égoutter ces feuilles, puis on les donne à manger aux cinq lapins qui, après quelques minutes, ont achevé leur repas. On place avec eux, à minuit, trois lapins neufs non contaminés.

« Le 28 novembre, à 8<sup>h</sup> du matin, les cinq lapins contagionnés paraissent malades. A 11<sup>h</sup>, deux sont morts, c'est-à-dire dix-sept heures après le début du repas. Les trois autres meurent à 3<sup>h</sup> de l'après-midi, vingt heures après leur repas.

« Le 28 novembre, à 7<sup>h</sup> du soir, on trouve mort un des lapins mis la veille, à minuit, avec ceux qui ont mangé le repas infectueux. Les deux autres lapins ne sont pas devenus malades.

« Le samedi 3 décembre, à 5<sup>h</sup> du soir, on donne à manger à quatre lapins des feuilles de choux sur lesquelles ont été répandus 10<sup>cc</sup> de culture virulente de choléra des poules, étendus de 100<sup>cc</sup> d'eau stérilisé. A minuit, tout le repas a disparu depuis plusieurs heures ; on place avec eux quatre lapins neufs.

« Le 4 décembre, à 8<sup>h</sup> du matin, deux lapins semblent tristes. A 11, il y a un mort ; à 2<sup>h</sup>, deux autres morts ; à 4<sup>h</sup> meurt le dernier de ceux qui ont mangé.

« On laisse les cadavres avec les lapins neufs mis la veille, à minuit, dans la caisse.

« Le 5 décembre, on trouve un de ces lapins mort ; le 6 décembre, un autre ; le 7, un troisième ; enfin le quatrième meurt le 9 décembre.

« Les lapins précédents étaient des lapins domestiques.

« Le 17 décembre, on donne à un lapin de garenne 10<sup>cc</sup> de culture de choléra des poules, également sur une feuille de chou.

« Le 18 décembre, il meurt.

« Dans tous les cas précédents, on a vérifié que la mort était bien due au microbe du choléra des poules.

« Le 3 décembre et jours d'après, on fait des expériences sur les animaux suivants : porcs, chiens, chèvres, moutons, rats, chevaux, ânes, toujours par contamination des repas. Aucun de ces animaux n'a été malade.

« Il y a plus : l'action sur les lapins est si rapide, il est si peu besoin de multiplier les repas que je suis persuadé, en me reportant à mes anciennes expériences sur les poules, que celles-ci même ne mourraient pas si on les laissait sur le sol que les repas des lapins auraient pu souiller en partie ; elles ont, pour la maladie, beaucoup moins de réceptivité que les lapins.

« Au

“ Au contact de l'air, le choléra des poules meurt assez promptement. Il perd sa virulence à 51° C., température quelquefois atteinte, dit-on, en Australie pendant l'été, mais il ne serait jamais nécessaire de s'occuper des lapins, au milieu du jour, en pleine chaleur.

“ La conservation du microbe du choléra des poules est facile, au contraire, à l'abri de l'air et pendant plusieurs années : on pourra donc toujours se procurer de la semence très virulente. Mes expériences d'autrefois communiquées à l'Académie des Sciences en sont la preuve.

“ Les cultures du choléra des poules peuvent être faites dans les bouillons les plus divers d'animaux quelconques. Un des plus économiques serait sans doute celui qu'on pourra préparer avec la chair des lapins.

“ Il résulte des expériences qui précèdent que, non seulement les lapins qui ont ingéré une nourriture souillée par le microbe meurent très rapidement, en moins de vingt-quatre heures, mais que les lapins associés à ces derniers, qui n'ont point eu d'aliments contaminés, meurent également en grand nombre.

“ Je réserve la question du mode de contagion. C'est un point que j'examinerai plus tard.

“ Est-il vrai que les lapins d'un terrier ne se mêlent pas à ceux des terriers voisins ?

“ On peut envisager, sans appréhension pour la réussite du procédé, le cas où les lapins d'un terrier ne frayeraient pas avec ceux des terriers voisins et n'y porteraient pas la contagion après qu'ils auraient été contaminés.

“ La maladie se communique si facilement par les repas que, alors même que la contagion n'existerait pas, des lapins infectés aux autres non infectés, la destruction de ces animaux n'en serait pas moins facile.

“ Je parle, dans ma lettre au journal *le Temps*, de barrières volantes placées autour des terriers. Cette complication serait inutile.

“ Je me représente l'épreuve en grand de la manière suivante : autour d'un ou plusieurs terriers, je ferais faucher une certaine quantité d'herbe qui serait ramenée ensuite avec des râtaux à la portée des lapins, avant leur sortie du soir. Cette herbe, souillée de la culture du microbe, serait mangée par les lapins dès qu'ils la rencontreraient sur leur passage. Une barrière serait inutile pour les arrêter et les forcer à manger. On aurait ainsi, en quelque sorte, la répétition de l'expérience de Reims, dont je vais parler.

“ Il était bien désirable qu'une expérience pût avoir lieu sur une grande échelle.

“ Le hasard vint bientôt me l'offrir dans les conditions les plus favorables.

“ M<sup>me</sup> V<sup>ie</sup> Pommery, de Reims, propriétaire de la grande maison des vins de Champagne qui porte son nom, m'adressa la lettre suivante, après avoir lu ma Note insérée dans le journal *le Temps* :

“ Monsieur,

Reims, le 3 décembre 1887.

“ Je possède à Reims, au-dessus de mes caves, un clos de huit hectares, totalement entouré de murs. J'ai eu la fâcheuse idée d'y mettre des lapins pour procurer une chasse, en ville, à mes petits-enfants.

“ Ces bêtes ont tellement pullulé et minent le sol à un tel point que je désire les détruire. Les furets sont impuissants à les faire sortir de tas énormes de craie où ils se réfugient.

“ S'il pouvait vous être agréable d'expérimenter le procédé que vous préconisez pour la destruction de ces animaux, en Australie, j'offre de vous en faciliter le moyen.

“ Recevez, etc.

“ Signé : V<sup>ie</sup> POMMERY.”

“ Bientôt après, j'appris de mon intelligente correspondante que, dans la crainte de voir les lapins de son clos, poussés par la faim, prolonger outre mesure leurs galeries souterraines et compromettre la solidité des voûtes des caves, on avait eu depuis longtemps l'idée de les retenir dans leurs terriers, non loin de la surface du sol, en leur servant, chaque jour, un repas de luzerne ou de foin distribué autour des terriers. On comprend dès lors aisément combien il était facile de tenter la destruction des lapins du clos de M<sup>me</sup> Pommery.

“ Le vendredi, 23 décembre, j'envoyai à Reims M. Loir arroser le repas du jour d'une culture récente du microbe du choléra des poules.

“ Comme à l'ordinaire, la nourriture fut consommée dans l'intervalle de quelques minutes. Le résultat en fut pour ainsi dire surprenant.

“ M<sup>me</sup> Pommery m'écrivit, le 26 décembre :

“ Samedi matin (par conséquent dès le lendemain du repas mortel), on compta dix-neuf morts en dehors des terriers.

“ Le dimanche, le clos ne fut pas visité.

“ Le lundi matin, on compta encore treize morts, et depuis samedi on n'a pas vu un seul lapin vivant courir sur le sol. En outre, comme il était tombé un peu de neige pendant la nuit, on ne vit nulle trace de pattes de lapins autour des tas de craie.

“ En général, les lapins meurent dans leurs terriers. Les trente-deux cadavres trouvés sur le sol du clos devaient donc représenter une très faible minorité parmi les morts, ainsi qu'on le verra tout à l'heure.

“ Dans une autre lettre du mardi 27, M<sup>me</sup> Pommery m'écrivit :

“ La luzerne (luzerne déposée autour des terriers le lundi soir) n'a pas été touchée et de nouveau on n'a vu nulle trace de pattes imprimées sur la neige. Tout est mort. . . .

“ Et M<sup>me</sup> Pommery, faisant allusion à des journaux anglais qui avaient beaucoup critiqué le procédé que j'avais proposé, journaux qu'elle avait eu l'obligeance de m'adresser, ajoute :

“ Que deviennent les attaques anglaises en présence d'un tel résultat ? Un clos de 8 hectares fourmillant de lapins, devenu un champ de mort.

“ M. Pasteur empoisonne un repas ordinaire de ces lapins, et les jours suivants rien ne remue ; tout est fini, tout est mort.

“ Combien de lapins sont morts dans les terriers ? Il est difficile de le savoir exactement. Cependant M<sup>me</sup> Pommery m'informe, par une lettre que je viens de recevoir, aujourd'hui 5 janvier, que les ouvriers estiment à beaucoup plus d'un mille le nombre des lapins qui venaient manger les huit grosses bottes de foin qu'on distribuait chaque jour autour de leurs terriers.

“ D'autre part, ajoute M<sup>me</sup> Pommery, partout où l'on découvre un peu les monceaux de craie, demeure habituelle des lapins, on voit des tas de cadavres de deux, trois, quatre et cinq lapins.

“ En terminant cette Notice, j'ai l'honneur d'informer le très honorable Agent général que mon intention est d'envoyer en Australie et à la Nouvelle-Zélande deux jeunes savants pour appliquer, dans ces lointains pays, le procédé que je viens d'exposer.

“ J'exprime

“J'exprime enfin le désir que mon travail soit admis à concourir pour le prix de 25,000 livres sterling qui a été proposé récemment par le Gouvernement de la Nouvelle-Galles du Sud pour l'extermination des lapins en Australie.

“Veuillez agréer, Monsieur l'Agent général, l'hommage de ma haute considération.

“L. PASTEUR,

“De l'Institut de France et de la Société royale de Londres,  
45, rue d'Ulm, à Paris.”

#### APPENDIX IV.

##### M. Pasteur's Letter to the Chief Inspector of Stock of New South Wales.

In connection with a letter addressed to the Under Secretary for Mines, Sydney, by the Secretary of the Pastures and Stock Protection Board of New South Wales, the Under Secretary of the Lands Department forwarded to this Commission, for any action deemed necessary, an extract from the *Sydney Morning Herald* of 8th December, 1888, purporting to be an almost literal translation of a letter addressed by M. Pasteur to Mr. Alex. Bruce, Chief Inspector of Stock. The original of M. Pasteur's letter has been kindly submitted to the Commission by the Chief Inspector of Stock. It is as follows:—

Arbois (Jura), 1<sup>er</sup> octobre 1888,

en partant pour Paris.

À M. Alex. Bruce, Chef inspecteur du bétail au Département des Mines, à Sydney.

Monsieur le Chef inspecteur,

Je viens de lire la lettre que vous avez adressée à l'éditeur du *Sydney Morning Herald* du 18 août dernier, en réponse à l'article que ce journal avait inséré, le 9 août, sous la signature du Dr. Wigg.

Permettez-moi, Monsieur, de vous complimenter sur la logique de votre argumentation et de vous adresser mes très sincères remerciements pour votre ferme et honnête réponse aux assertions erronées et insinuations malveillantes du Dr. Wigg, à mon égard.

Je ne saurais douter que votre lettre n'ait la plus heureuse influence pour faire connaître la vérité. Par cette lettre, la lumière va commencer à se faire sur deux questions vitales pour l'avenir de votre beau pays.

L'agriculture australienne est aux prises avec deux grands fléaux : la “Cumberland disease,” et la pullulation des lapins.

Mes jeunes représentants, à ma demande, sur le désir de Sir Henry Parkes, ont démontré pour la première fois, d'une manière incontestable, que la “Cumberland disease” est identique au charbon d'Europe (sang de rate des moutons, anthrax ou fièvre Charbonneuse des bestiaux, splenic fever) \* \* \*

Depuis l'année 1881, à la suite de la célèbre expérience de Pouilly-le-Fort, qui a fait le tour de la presse scientifique dans le monde entier, la pratique de la vaccination permet de prévenir la maladie et de réduire dans la proportion la plus considérable la mortalité des moutons et des bestiaux dans les pays infectés. N'en déplaise à vos docteurs, j'ai seul le secret du “vaccin Pasteur.” Que le public en Australie et ses gouvernements ne se laissent pas jeter de la poudre aux yeux par des personnes ignorantes ou intéressées.

Quant au fléau des lapins, je n'ai pas davantage confié à personne le secret de l'application en grand du moyen que j'ai proposé pour l'extermination partielle ou totale de ces rongeurs par l'emploi du choléra des poules. C'est au gouvernement de Sydney que je le ferai connaître s'il y a lieu.

Mes représentants n'ont qu'une chose à faire et je les ai envoyés la faire, à la demande de ce gouvernement : ils ont à démontrer que j'ai proposé un moyen inoffensif pour les animaux domestiques, moyen qui tue les lapins en vingt-quatre heures à la suite d'un seul repas souillé par le microbe, et que ce moyen est contagieux, c'est-à-dire, que les lapins qui ont pris le repas mortel communiquent d'une manière notable la maladie et la mort à des lapins sains auxquels il sont mêlés comme ils le sont dans les terriers. Comment disposer une fabrique de l'ingrédient mortel, comment ingrédier et utiliser au loin cet ingrédient avec toutes ses propriétés, là est mon secret sur lequel la commission n'a rien à voir ni à savoir pour le moment, et que je ne ferai connaître que si le prix, proposé le 31 août 1887, m'est attribué.

J'affirme que nul autre moyen ne peut réussir aussi promptement et aussi radicalement. C'est assez évident par la rapidité et la facilité de communiquer la maladie et la mort.

Je vous autorise, Monsieur l'Inspecteur, à publier cette lettre, si, comme je n'en doute pas, vous la croyez utile à la défense de la vérité.

Cependant, je ne quitterai pas la plume sans vous remercier, ainsi que tous les membres de la Commission de la “Cumberland disease” dont vous faites partie, de l'empressement, plein de bienveillance avec lequel ils ont accueilli mes jeunes délégués.

Il est bien regrettable que je ne puisse en dire autant de plusieurs membres de la Commission des Lapins qui s'imaginent à tort que mon procédé peut être dangereux.

Mais je ne perds pas l'espoir que, lorsque cette Commission comprendra mieux ses intérêts et ceux du public, elle se mettra à la tête de l'application des procédés de M. Pasteur, après avoir obtenu l'agrément et les instructions de M. Pasteur lui-même. Autrement, à quoi pourra servir le laboratoire qu'elle a fait construire à si grands frais ? Il faudra bien qu'il y ait un jour un représentant de M. Pasteur et instruit par lui. Ce malentendu ne peut se prolonger indéfiniment.

Recevez, je vous prie, Monsieur l'Inspecteur, l'assurance de ma haute considération.

L. PASTEUR,

De l'Institut de France et des Sociétés royales de Londres et de Sydney.

#### APPENDIX V.

##### REPORT by Dr. Bancroft of the visit of the Commission to Dr. Ellis' House, and of examination of Diseased Rabbits from Tintinallgy.

THE members visiting Dr. Ellis were shown several healthy and diseased rabbits. A rabbit, believed to be suffering from the Tintinallgy disease, was killed, also a healthy animal. The former was much emaciated, but showed no remarkable evidence of disease, except in the liver, which was marked with white spots. These Dr. Bancroft recognized as the liver affection spoken of by him. Bile was removed from the gall-bladder of this rabbit, and under the microscope was found full of oval bodies, easily seen under low powers. The other rabbit was free from the liver disease.

Dr.

Dr. Bancroft said he had kept tame rabbits for experimental purposes during his residence in Australia until an Act of the Queensland Parliament required their destruction. When resident surgeon at the Brisbane Hospital, twenty years ago, he had noticed white spots in the livers of rabbits. The spots contained the same microscopic oval bodies which could be traced through the gall-bladder, and were voided with the excretor. In subsequent years, examining livers of rabbits, the same condition was often to be found, and when rabbits had their livers severely affected they became emaciated. With the greatest care as to cleanliness of the hutches, it was practically found impossible to prevent the rabbits contracting the disease.

The conclusion came to was that the oval bodies were introduced into the stomachs of young rabbits on food soiled with the excrement of their elders. Dr. Bancroft could never dissect out of the parent parasite from the liver, as the creature possessed no definite form. It appeared as an irregular sac, containing the oval bodies in various stages of development.

Of sections made of this parent sac by his son he had specimens to exhibit to the Commission.

At the meeting on April 23, Professor Allen informed the Commission that he had consulted the work of Leuckart on parasites, and found the parasites of the liver of the rabbit had been called by that author *Coccidium oviforme*. The author had been at great pains to elucidate the life history of this parasite. Twenty-six pages of his work were devoted to the subject, from which it appears that the oval bodies discharged by the parent sac are considered the mature animal. On leaving the liver of the rabbit the contents of the oval bodies, the coccidia, are granular; by the time the *Coccidium* arrives at the end of the intestinal tract the granular matter has formed itself into four curved embryos, which are named psorosperms; rabbits, fed with the coccidia so developed into psorosperms, soon begin to suffer from the affection of the liver. There are some accounts of human beings having suffered from the same disease (see pages 221 to 228), but from what can be ascertained the cases are very rare and of little practical interest.

Since the above-mentioned investigations Mr. Thos. Francis has kindly taken micro-photographs of the section of the liver disease above referred to and of the oval bodies, the coccidia, removed from the gall-bladder of Dr. Ellis's diseased rabbit.

JOSEPH BANCROFT, M.D.

## APPENDIX VI.

### ABSTRACT of Life History of *Coccidium Oviforme*.

Prepared by Professor Allen from Leuckart's "Parasites of Man (1886)."

THE liver of the rabbit is not unfrequently found penetrated with white nodules, which, in more or less considerable numbers, grow gradually to the size of a hazel-nut, and excite painful affections, in the course of which the animal often dies. In many warrens the disease become a serious epidemic, so that hardly a single healthy animal is to be found. On section of the nodules, a cheesy or purulent, sometimes yellow-coloured, mass exudes, in which a microscopic examination reveals, besides cell debris, a countless number of oval or egg-shaped bodies; and myriads of similar structures may be found in the bile within the gall-bladder.

These nodules in the liver have been examined by many observers during the past fifty years. They were at first variously classed as tubercles, or cancers, or flukes, or as modifications of the cells of the liver or of the bile-ducts. But it is now certain that they are due to the multiplication of gregarinoid parasites in the bile-ducts. Each nodule consists of a congeries of dilated bile-ducts, which, though originally of small size, have enlarged and perhaps opened into one another. The walls of the nodules have been thickened by chronic inflammatory processes, so as to present a thick layer of fibro-nucleated tissue. The dilated ducts may open into one another so freely that only a central cavity is left, from whose walls processes of fibro-nucleated tissue may project into the interior in villous form. These processes are for the most part relics of the thickened tissue between the dilated ducts. The epithelium lining the cavities is partly in a normal state, but in general it is profoundly altered—many cells are modified by the growth of parasites within them; others are shed from the surface, being replaced by a kind of colloid matter. The pulpy contents of the cavities are not purulent; the opacity is due to the presence of minute egg-shaped bodies, 0.033 to 0.037 millimètres long, and 0.015 to 0.02 millimètres broad, having thick smooth shells. These bodies are imbedded in granular detritus, with nuclei, remains of cells, and shed epithelial elements. Some of these bodies, probably the younger, are slender, having, in many cases, a double shell and uniformly diffused granular contents. Others, presumably the older, are broader and more bulging, their granular matter being collected into a central ball, the space between it and the shell being filled with clear fluid which acquires a somewhat firm consistency. In the slender forms the shell has a thin outer layer and a thick inner layer; and it would seem that the thin outer shell disappears when the cells begin to assume the bulging form, and at one end, usually the narrower, a micropylar opening becomes visible in the inner shells. Within the granular ball in the centre of the bulging forms, an ill-defined clear sphere not infrequently appears, resembling a nucleus, but incapable of being stained. It is simply an aggregation of the ground substance which binds the granules together.

These egg-like parasites, which are called coccidia, do not remain permanently in the dilated ducts. Some of them escape through narrow communications, which still exist, into the large bile-ducts, and so pass to the gall-bladder and onwards into the intestines, being finally expelled with the fæces. No further changes of any importance occur in the coccidia during their progress along the ducts or through the intestines. After leaving the body of their first host or bearer, these parasites have an incubation period varying in duration from weeks to months. Their shells are already so strong that neither chromic acid nor bichromate of potash in solutions of ordinary strength do any injury to the life of the organisms.

The stages of development which proceed outside of the body of the first host are simple, and may be watched in specimens kept in water. The central granular mass divides into four, perhaps after first dividing into two. The clear nucleus-like body in the centre of the mass undergoes similar division, and thus four rounded or spheroidal segmentation spherules or spores are formed, differing from the original granular mass only in their smaller size (0.009 to 0.01 millimètres). These spores become lengthened and

and ovoid; a thin but tolerably firm envelope forms on their surface, and their substance is differentiated into a homogeneous transparent C-shaped rod, whose convexity is in contact with the envelope, while its ends are thickened and highly refracting, its concavity embracing the remains of the granular mass. Each rod is about 0.006 millimètres in diameter.

"At this stage the development of the coccidia is for the meantime, in my opinion, complete. Like the eggs of entozoa containing embryos, they await an opportunity to gain access into a new host, and this opportunity can hardly fail, for the coccidia, brought to the exterior with the faeces, undergo exactly the same changes in the rabbit warren as in our glass vessels, and will therefore rapidly populate these places with countless germs."

The germs usually find entrance into their subsequent host while still within the coccidium shells. After being swallowed, the C-shaped rods escape from their envelopes in the stomach, draw themselves into rods, become amœboid in characters, and reach the liver by the common bile-duct. In the small bile-ducts they bore into the epithelial cells and are converted into new coccidia. The smallest germs which Leuckart could distinguish in the cells of the bile-ducts were slightly granular roundish masses of protoplasm of about 0.009 to 0.01 millimètres in diameter, containing a large nucleus-like spot, with enclosed nucleoli. The biliary cells enclosing them become greatly swollen in transverse diameter. The germs within increase till they form spherical balls, about 0.026 millimètres in diameter, consisting of granular protoplasm with a clear nucleus. The germs now fill the cells, so that the latter form only narrow limiting envelopes to the germs. The germs next become oval, and a shell rapidly forms and thickens around them under the cellular envelopes. Then this envelope is destroyed, and the germs, now transformed into coccidia, lie free in the dilated biliary passages.

The experiments of Rivolta tend to show that coccidia must pass through their incubation stage before they can develop in a new host. Coccidia whose central mass has not been segmented may be administered to new animals without result.

Coccidia in the liver may be of fatal importance. Their growth lessens the quantity, and deteriorates the quality of the bile; it interferes with the circulation of blood through the liver, and interferes with the glycogenic function of that organ, so that, according to Cohnheim, diabetes cannot be produced by the usual operation in rabbits infested with coccidia. As soon as the disease has attained a considerable development the animals die. They become very thin after being sickly for some weeks; they lose their appetite and previous activity, begin to breathe quickly and violently, and finally die in convulsions.

"Nor does the rabbit alone thus suffer, but even man, although he is obviously not exposed in the same degree to the possibility of a frequent and numerous introduction of germs, is occasionally infected." Leuckart narrates the case of a stone-breaker who died from the effects of coccidia in the liver, the case being first reported by Gubler, of Paris, in 1858. He says that "the patient perished exactly in the same manner as the infected rabbit." He refers to three other cases in which coccidia were found in the human liver.

Many other forms of gregarinoid parasites are known to occur in animals; for example, one special form is found in the intestines of mice, another form in the intestines of rabbits, dogs, cats, sheep, guinea-pigs, moles, &c., another in fowls, ducks, and geese. These intestinal coccidia cause destruction of the epithelium, swelling, inflammation, and ulceration. Leuckart states that the intestinal form in rabbits is probably quite distinct from the hepatic form, and that the two have never been found associated together. Intestinal coccidia have been found in men in a few instances, the infection being derived possibly from dogs, cats, rabbits, &c.

It must not be imagined that Leuckart's description of the life-history of the coccidia is unchallenged. Several authorities differ from him in various particulars, but the introduction of their views would render the description less clear. Full information may be obtained in Leuckart's "Parasites of Man," translated by Hoyle, pages 202-228.

## APPENDIX VII.

### REPORTS by Dr. Bancroft and Dr. Wilkinson concerning their visits to Tintinallogy.

WITH the members of the Committee, Messrs. Tabart, Bell, and Dr. Wilkinson, I visited Tintinallogy, travelling from Adelaide by way of Broken Hill and Menindie. The object of this visit was to investigate, as far as possible, the circumstances under which the rabbits at Tintinallogy had died.

Between Speculation Lake and Menindie there are many rabbits burrowing in sandy hillocks, through which cane-grass grows. Rabbits also live and hide in the undergrowth and drifted dead vegetation of the sandy beds of water-courses. In the neighbourhood of the Darling River rabbits hide in lignum, and on the adjoining higher ground burrow among the roots of bushes.

Some miles on the road from Albemarle, and before reaching Tintinallogy, few live rabbits are to be seen, but many skins and skeletons lie about the road sides.

Everywhere in the districts visited near the Darling River the shrubs and trees are barked, even to the height of many feet. Occasionally rabbits fall entangled among the several branches, and here and there their skeletons so remain. Near the station-house of Tintinallogy, occupied by Mr. Reid, no live rabbits are to be seen. At some distance up the river I saw two, also a wild rat. The rabbit skins and bones lie about everywhere, showing that at no distant date rabbits were very numerous on the station. In company with Dr. Wilkinson and Dr. Ellis I made a *post-mortem* examination of rabbits killed for the inspection of the Committee, and beyond general emaciation of their bodies and darkening of the livers, no important pathological condition was noticed. Two white rabbits (albinos) said to have been caught wild, were in the hutches. In Dr. Butcher's preserved specimens were small hydatids, cysticercus pisiformis, these I afterwards found in rabbits examined at Albemarle. There was a bottled specimen of a rabbit showing some form of skin disease. I wished to examine this, but did not obtain it. On dissection of rabbits captured for us at Albemarle, no remarkable diseased state was observed. It was brought under our notice that a disease had destroyed a great number of cats, and the bodies of eighteen were seen on the bank of the river. An examination of two cats that died at Tintinallogy, showed inflammation of a portion of the small intestine, the animals dying fat. Specimens of the inflamed intestines are in the possession of Dr. Ellis. The cats, in a great measure, live on rabbits, but it remains for further

further investigation to determine if there be any relation between their diseases. The cysticercus pisiformis of the rabbit leads to a tape-worm in the cat. A form of tape-worm was found in the dead cats, but Dr. Ellis informed me that one cat examined showed only inflammation of the intestine. The temperature of newly caught rabbits was from 108° to 109.5°, showing that hunting them caused a rise of about eight degrees. This confirms the statement of Dr. Ellis, and may have some important bearing on the method of propagation of diseases among rabbits.

Mr. Sadlier drove large numbers into an enclosure made of wire net, with wings of wire net, one hundred yards each. This is an excellent method of capturing rabbits on thickly infested country. The rabbits at Albemarle are said to be now recovering from a very weak condition in which they were a few weeks ago, rain having fallen recently and new herbage grown up.

It is not easy to say from what disease the Tintinallong rabbits died. Rabbits suffer from several morbid states, to which may be added innutrition from eating bark and deficiency of grass, from the heat of the climate in summer weather, from excess of salt in their systems probably, as they consumed all the accessible bark of the old man salt bush (*atriplex nummularia*), many of the clumps of which in consequence died. They also suffer more or less from various parasites. A small nematode worm in the large intestine is abundant. The cysticercus pisiformis, found attached to the mesentery, appears too small to inflict much harm by its bulk. The large New Zealand cyst, called bladder-fluke, has not yet been found by us, or spoken of by residents in Australia. The coccidium (the liver parasite) causes defective nutrition and emaciation. A scorbutic impoverishment of the Tintinallong rabbits from scarcity of fresh food may have led to the scabby skin and intermuscular effusions. This was said not to extend among the confined rabbits of either experimentalist.

The Tintinallong run no doubt was overstocked with rabbits, all accessible bush was barked to a great extent, and in the hot months of the year the animals became muscularly weak.

The shade of the belt of Eucalypti on the river bank was sought by them, and here the disease first began to show its destructive powers. It is known that a wounded rabbit is apt to act fatally on its associates in a burrow. At the time of Dr. Butcher's experiments the animals were hunted about to mix the inoculated with the other rabbits. A form of septicæmia may have been brought about which rapidly extended among the rabbits so unfavourably situated. Still no dissections or microscopic examinations so far have shown this to be the case, and the Committee has had no opportunity of examining rabbits that have died spontaneously.

According to Dr. Butcher's evidence the breeding of rabbits on Tintinallong ceased at the end of September, 1887; many aborted then, and up to the present time there have been no young seen. The sexual organs of the doe rabbits examined by us showed no disposition to pregnancy. Residents of the Darling say that shortly we may expect young rabbits, as the animals are much stronger and in better condition since the recent rains.

The observations of Drs. Butcher and Ellis made on the wild rabbits are at variance on important particulars and take little account of well-known parasitic conditions. Rabbits better fed in Sydney did not die in the same way as those experimented on by Dr. Butcher at Tintinallong. The whole inquiry into rabbit diseases made by Drs. Butcher and Ellis have occupied not more than eight months, and numerous restrictions by the Government fettered the operations. Notwithstanding, there is before us evidence of rabbits being cleared off many miles of the Tintinallong run, a notable fact and well worthy of careful investigation.

It is unfortunate that the interference above referred to prevented Dr. Butcher making experiments when rabbits were numerous at a distance from Tintinallong, as the work done in the district where the disease developed could not be disassociated from the spontaneous operations of unfavourable natural conditions there present.

In confining wild rabbits for experimental purposes, it should not be overlooked that animals newly captured are not easily domesticated, that they injure themselves by violent efforts, that if confined young they generally soon die, and that they rarely or never breed.

Consequently conclusions based on such experiments should be accepted with caution and corrected by control experiments with tame rabbits.

JOSEPH BANCROFT, M.D.

On my way down from Tintinallong I remained some time at Albemarle in order to further investigate the disease amongst rabbits described by Dr. Ellis. Dr. Ellis was staying at Albemarle at the same time, and we went together to a part of the run where this disease was said to have appeared amongst the rabbits. We found that the rabbits were affected in a manner similar to that described by Dr. Ellis before the Commission; and Dr. Ellis himself admitted that we had illustrations of the typical disease. I took back to the station some of the diseased rabbits for further investigation. These rabbits were all caught by us with moderate ease. It was only necessary to follow them up, and sooner or later they fell down and rolled over, apparently not having strength to proceed any further. Weakness, therefore, was an evident symptom of their condition. These rabbits were all extremely emaciated but showed externally no evidence of any particular disease. I made *post mortem* examinations upon several of these rabbits and found the conditions as follows:—Great diminution of sub-cutaneous fat; the fat in some places that remained being gelatinous. The muscles were pale and flabby. On opening the abdomen the bladder was found to be distended with urine in most cases. The peritoneal fluid was in excess—sometimes in marked excess—but perfectly clear and limpid; no signs of peritonitis. In two or three cases coccidium was found in the liver. The spleen was always healthy, and also the kidneys, which were merely pale. The intestinal canal was then examined in all these cases. In every instance, small hemorrhagic patches, often with erosions, and sometimes even with ulcerations, were present on the surface of the stomach. These erosions varied in size and number; sometimes they were as large as a split pea; but for the most part they were about one-half this size. They were numerous both at the cardiac and pyloric end of the organ, but were not limited to these spots. The mucous membrane was generally distinctly thickened and opaque. The contents of the stomach varied somewhat, but consisted for the most part of dry fragments of bark. Sometimes, mixed up with this material, was a considerable quantity of mucus, either in the same fluid state, or, in some cases, forming whitish, opaque, tolerably firm, parchment-like masses, coating this dry vegetable fibre. This dry mucus was most abundant near the pylorus, in one or two cases forming hard firm masses. This dry

mucus material was in this case detached from the mucous membrane on the one hand, and from the contents, on the other hand, with moderate ease. And the material also, to some extent, passed in between the vegetable fibre in the stomach.

In the rest of the intestinal canal there was always a considerable amount of mucus, and the mucous membrane had a distinct ash-grey colour. On clearing away the material in the canal by a thorough washing, small brownish granular spots could be seen in the mucous membrane. On microscopic examination these spots appeared to consist of disintegrated blood. In no case was there any indication of diarrhoea. On the contrary the faeces were well formed, but extremely dry and hard.

Condition of the Liver.—In all those cases where emaciation was pronounced, and hemorrhagic erosions appeared on the wall of the stomach, the liver was of dark bluish colour, sometimes almost black, and the tissue of the organ extremely soft and friable. No fat at all was to be seen between the lobules. The organ, too, was reduced in size. The suprarenal capsules always appeared to be perfectly healthy. The thoracic organs were also healthy to all appearance. The brain and spinal cord were not examined.

Upon these examinations I formed the opinion that the probable cause of emaciation was want of proper food—or this, combined with the taking of improper food. The stomach showed in every case marked evidence of gastric catarrh, and the nature of the contents led me to conjecture that possibly the cause of the catarrh was the nature of the food. But in order to show whether this condition of the stomach was absent in rabbits not suffering from emaciation, I caught some healthy rabbits and examined their stomachs. I also caught other rabbits which were not markedly emaciated, and yet not in good condition. I found that the absence of emaciation was always associated with the absence of catarrh and hemorrhagic erosions in the stomach; and in moderate degrees of emaciation, these hemorrhagic erosions and an increased quantity of mucus appeared in the stomach. I consider that both the morbid condition of the digestive organs and the emaciation are due to a common cause—want of food, or this combined with improper food.

At the same time I examined the state of the livers in order to see whether it was necessary to suppose that other causes than want of food might be responsible for the emaciation. In well-conditioned rabbits the liver has a distinct deep-red colour, but the lobules are marked out by a distinct yellowish-white zone. In rabbits in only moderate condition, this yellowish zone disappeared, the organ still retaining its deep-red colour. As this emaciation became more and more marked, in different cases it was found that the red-brown colour changed more and more into the dark-bluish or bluish-black colour already described as characterizing the livers of these diseased rabbits. Here, too, then, it seemed to me that the changes in the liver in the emaciated rabbit were due to want of proper food. The condition of the liver was in fact one of pronounced atrophy. I examined the blood, but only observed that there was a great tendency in the white corpuscles to stick together and form small groups of cells. The urine in several cases deposited a whitish sediment consisting of amorphous granules—no doubt phosphates. I have kept several of the stomachs, which show the conditions above described, so that members of the Commission can examine these for themselves.

W. CAMAC WILKINSON, M.D., London.

P.S.—While I was at Albemarle, I took the trouble to investigate the method employed at the station for poisoning rabbits. Strychnine was the poison used, and this was dissolved in sulphuric acid. The strength was about four grains to the ounce; wheat was then soaked in the solution. According to the calculations of the manager of the station, three or four grains of wheat would kill a full-grown rabbit. I found that two or three drops of the solution of strychnine killed a full-grown rabbit very quickly. I then experimented with the wheat soaked in the solution of strychnine. I began with nine grains. This was the grain which was being extensively distributed over the ground immediately about the homestead for the purpose of killing the rabbits. Nine grains had no effect. I increased the number of grains to twenty, then to thirty, and then to forty; in every case feeding the rabbit with the wheat by the hand—even forty grains had no effect; I therefore concluded that experiments with poisons, performed by station hands, were not to be trusted.

W. CAMAC WILKINSON.

## APPENDIX VIII.

### REPORT on the Parasitic Diseases affecting Rabbits in the Wairarapa District.

Professor A. P. W. Thomas, M.A., F.L.S., F.G.S., to the Hon. the Minister of Lands (Stock Branch).

University College, Auckland, 20th February, 1889.

AN interim report on the present subject was submitted to the Hon. the Minister of Lands in May, 1888 (Parliamentary Paper H.—18, 1888). Since that time my experiments have been completed, and I am now able to speak more definitely of the value of the disease as a means of combating the rabbit-pest. The delay in concluding the report has been due to the slow development of the bladder-worm disease, and the time required to work out the results of a very extensive series of experiments on more than forty animals, including rabbits, dogs, cats, ferrets, and sheep. These experiments have been carried out single-handed, and with no assistance except in the feeding of the numerous animals under observation.

The report will be arranged under the following heads:—

- I. The decrease of rabbits in the Wairarapa, and the causes to which it has been assigned.
- II. Observations and experiments on the parasitic diseases of rabbits found in the Wairarapa.
  1. The bladder-worm (*Cœnurus serialis*): its nature. Mode of studying its development.
  2. Experiments on rabbits. Development of the bladder-worm.
  3. Experiments on carnivorous animals with the bladder-worm.
  4. Tape-worm (*Tania serialis*) reared in the dog: its character.
  5. Is the *Cœnurus* of the rabbit distinct from that of the sheep?
  6. Smaller bladder-worm of the rabbit (*Cysticercus pisiformis*).
  7. Coccidia of the rabbit's liver.
  8. Other parasites of the rabbit.
- III. Value of the diseases as a means of dealing with the rabbit-pest:—
  1. General conditions to be satisfied by any disease used as a remedy for the rabbit-pest.
  2. Value of the bladder-worm. Conditions for the spread of the disease.
  3. Value of the liver-coccidia.
  4. How far is the reduction of rabbits by parasitic disease possible?
  5. Summary.

## I. THE DECREASE OF RABBITS IN THE WAIRARAPA.

The rabbits in the Wairarapa district, and especially on the plain, have unquestionably been greatly diminishing in numbers during the last few years. The diminution has been attributed to the following causes: (1) Poisoning—chiefly with phosphorized grain in the winter time; (2) trapping, and the use of dogs; (3) the liberation of the natural enemies—viz., cats, ferrets, and, more recently, stoats and weasels; (4) parasitic diseases—viz., that caused by the bladder-worm.

It is, I believe, generally admitted by stock-owners and farmers in the Wairarapa that the winter poisoning by means of phosphorized grain, followed up by rabbiting during the rest of the year, has been the most efficient cause of the decrease of the rabbits. A very large number of ferrets—probably not fewer than three thousand—and a considerable number of cats have been turned out, and more recently stoats and weasels have been liberated. It is not easy to gauge with accuracy the amount of destruction accomplished amongst the rabbits by animals which seek concealment from the eyes of man; but I was able to satisfy myself that both ferrets and cats are numerous in some places, at least, and that they appear to render good service.

With reference to the fourth cause, it is well known that it has been claimed that the bladder-worm has been largely instrumental in reducing the rabbits, and that it affords a remedy for the rabbit-pest worthy of the reward offered by the New South Wales Government.

It will be desirable, therefore, to describe the life-history and effects of this and other parasites, as shown both by my observations in the Wairarapa and by experiments in the laboratory, somewhat fully. We shall then be in a better position to form a correct estimate of the value of the disease with reference to the rabbit-pest.

## II. OBSERVATIONS AND EXPERIMENTS ON THE PARASITIC DISEASES AFFECTING RABBITS IN THE WAIRARAPA.

Some hundreds of rabbits were examined by me in the Wairarapa, and I found in them the five following parasites, most of which were widely spread in the district: (1) Bladder-worm (*Cœnurus serialis*); (2) smaller bladder-worm (*Cysticercus pisiformis*); (3) Coccidia, producing a disease of the liver; (4) mites, producing a form of itch or scab; (5) lice. Of these the bladder-worm (*Cœnurus serialis*) and the liver-coccidia are by far the most important to us, for they are the cause of greater injury to rabbits.

1. *The Bladder-worm* (*Cœnurus serialis*.)

The bladder-worms (incorrectly called "bladder-flukes") are well-known to be the larval forms of tape-worms. Two distinct kinds were found by me in rabbits in the Wairarapa; but one of these appeared to be rare, and is not of so much importance as the second and larger form. This latter is shown by my experiments to be the larval form of a particular kind of tape-worm inhabiting the intestine of the dog.

A rabbit infested by this bladder-worm has one or more swellings in connection with the muscles of the body. This may have a more external position on one of the limbs or on the outside of the trunk, neck, or head, in which case it may at once attract attention; or it may have a more internal position, and be found in the cavity of the abdomen or chest. (See fig. , Plate I, which represents a rabbit with such a swelling on the left side of the face, and the white fur towards the angle of the jaw being brought into sight by the swelling.)\* When the rabbit is dissected and the swelling examined, a bladder is found imbedded in the muscular tissue. The bladders vary in size according to their stage of development, but are often of the size of a fowl's egg, while the largest I have seen was  $3\frac{1}{2}$  in. long and  $2\frac{1}{4}$  in. in breadth. The bladder fits closely into a cavity in the muscles, this cavity having a smooth lining of connective tissue. This lining, of course, is simply formed by the development of the connective tissue which unites the bundles of muscular fibres. It is usually thin, and is sometimes of extreme tenuity, forming merely a surface-covering. The bladder-worm itself consists of a delicate white membrane, enclosing a cavity filled with a clear serous fluid. The outer surface of the bladder is sometimes smooth and rounded as an egg; sometimes it shows numerous lobes and processes. To one side of its inner surface are attached a large number of round white bodies rather smaller than a mustard-seed (See Plate I, figs. 7 and 8). Examination with the microscope shows that each of these bodies consists of the head of a tape-worm, recognizable by its four suckers and crown of hooks, situated within a small sac or pouch-like involution of the wall of the bladder. (See Plate II, fig. 10). These "head-sacs," as we may term them, are placed close together in series or in irregular groups, which are usually elongated. These groups always show a more or less marked radial arrangement. It is clear that we have here an example of that particular form of tape-worm larva to which the name of *Cœnurus*, or many-headed bladder-worm, has been given.

*Modes of Studying the Development of the Bladder-worm.*—It is a well-established fact in the natural history of the tape-worm that the larval form is found in one animal, whilst the corresponding adult form is found in the intestine of some other animal, which preys upon the bearer of the larval form. It is, of course, usually the natural enemy of the animal harbouring the larval form which serves as the bearer or host of the adult tape-worm. The question, therefore, to be decided by my inquiries was, which of the natural enemies of the rabbit served as the carrier. The only carnivorous animals occurring in the district which fed upon the rabbits were dogs, cats, ferrets, and hawks. Stoats and weasels had been introduced into the district, but the bladder-worm was known to exist there long before their introduction. Hawks were far less open to suspicion than dogs, cats, and ferrets, and I therefore endeavoured to discover whether any one or more of these three animals served as bearer of the supposed tape-worm. There were two ways of attacking the problem: the first was to ascertain whether the bladder-worm, if given to these animals, would develop within them into a tape-worm; the second was to discover whether these natural enemies of the rabbit, living near rabbit-warrens where the bladder-worm was prevalent, harboured any tape-worm, and, if such a tape-worm were found, then to administer its eggs to rabbits, and watch for the development of bladder-worms within them. Both methods were adopted, and both have led to the same result, namely, that the dog, and the dog only, is the bearer of the adult tape-worm of which this bladder-worm is the larval form.

A wild ferret and two wild cats were obtained from the immediate neighbourhood of a rabbit-warren where the bladder-worm was relatively abundant, and were examined. All three were free from tape-worm. On the other hand, it was found on inquiry that the rabbiters' dogs were commonly infested with tape-worms. At the Dry River Run, indeed, all the dogs were said to be so troubled. Specimens of their tape-worms were therefore obtained, and were found to include two kinds, one (a single specimen only) the well-known

*Tœnia*

\* The illustrations of Professor Thomas' report have not been reproduced.

*Tenia elliptica*, and the other a kind I was led to regard with much suspicion. The dogs, it should be stated, from which the tape-worms were obtained had been bred on the estate, and had never left the rabbit's home except to go rabbiting. They had been fed chiefly on rabbit, often uncooked, and only occasionally on mutton. The presence of the *Tenia elliptica* was explained by the fact that the larval form of this tape-worm is found in the dog-louso (*Trichodectes canis*), but the other tape-worm found, in great numbers, was most naturally referable to the rabbit or sheep on which the dogs were fed. The head of this tape-worm was not at first obtainable, but in order to test the supposition, ripe joints of the tape-worm were administered to rabbits. These ripe joints, it should be said, contained great numbers of minute ova, in each of which a mature embryo was already present. I soon found that the experiment gave positive results, and that the embryos developed in the rabbit into bladder-worms. Subsequently, as material was available, other rabbits were infected, in order to ascertain more exactly the effects of the disease.

## 2. Experiments on Rabbits. The Development of the Bladder-worm.

The first rabbit fed with eggs of the dog's tape-worm died thirteen days after infection. On dissecting it no bladder-worms were seen at first, but it was noticed that the muscles were marked with irregular thick yellowish or reddish lines, and careful examination showed that the lines were the tracks of young bladder-worms, marked by a granular matter due to the irritation of the tissues. At the somewhat thicker end of each track a minute translucent bladder of about the size of a pin's head (more exactly, from 0.6mm. to 1.6mm. in length) was found in the midst of the granular material. A very large number of these minute bladders were found in this rabbit—indeed, I estimated the total number as being at least five hundred. A second rabbit, fed with a smaller number of tape-worm eggs, died on the twenty-first day after infection, and about a score of bladder-worms were found in it, and, corresponding with the longer period allowed them for development, they had attained a larger size of— $\frac{1}{8}$  in. (1.1mm.—2.5mm.). Although none of these little bladders showed as yet any trace of the formation of the tape-worm heads, the source from which the eggs had been obtained, and other evidence, induced me to state in the Interim Report that the generic connection between the bladder-worm of the rabbit and the tape-worm of the dog was sufficiently demonstrated. Further experiments on over a score of rabbits and a number of dogs have fully confirmed the opinion then expressed.

I have found that the bladders first show signs of the formation of the tape-worm heads about the fourth week. The smallest bladder-worm in which I have seen any trace of the formation was just four weeks old, and was only  $\frac{1}{8}$  in. in length. As a rule, the rudiments of the heads (or, rather, head-sacs) do not appear till the worm has attained the size of a pea, *i.e.*, about  $\frac{1}{4}$  in. or  $\frac{1}{2}$  in. in length. At the end of seven weeks the bladders, usually oval in form (and measuring  $\frac{1}{2}$  in. in length by  $\frac{1}{3}$  in. in breadth), carry more numerous head-sacs, some of them being more advanced than others. As the development proceeds the bladder becomes larger, whilst the number of head-sacs increases. In the fifteenth week the bladders may be from 1 in. to 1½ in. in length, and the head-sacs are approaching their full size and are very numerous. (Pl. I., fig. 7). I have counted 211, 295, and 424 respectively in three bladder-worms obtained from the same rabbit on the hundred-and-first day after infection. Amongst those heads which are nearly or quite mature may, however, be found others which are in various earlier stages of development. The size of the bladder-worm, and also, apparently, the number of heads, may go on increasing for some months longer. A bladder-worm 2½ in. in length contained 740 head-sacs, whilst the largest I have seen was 3½ in. by 2¼ in., and contained nearly a thousand heads.

It should be mentioned that there is a considerable amount of variation in the rapidity or extent of development of the different bladder-worms of the same age, and found in the same rabbit. The statements given above apply, therefore, to the average length of time required for the different degrees of development. Moreover, the development of the bladders may be arrested at any stage, but more especially during the earlier stages. I have found in several cases bladder-worms which had died and were undergoing disintegration. The death of the parasite may be due either to an unsuitable position in which it has settled, or it may be due, especially in the earlier stages, to the resistance which the tissues of the rabbit offer, in a greater or less degree, to the foreign organism. The bladder-worm being dead, its walls lose their elasticity and are ruptured, whilst the collapsed walls of the bladder are converted into a cheesy mass, which seems to be slowly absorbed. I have seen reason to believe that at times very many of the bladders fail to reach their full development, perishing during the first few weeks of their growth; and this is, of course, a point of much importance when we desire to estimate the effect of the bladder-worm on the rabbit.

By comparing the different stages in the development of the bladder-worms we are able to trace the origin and mode of development of the tape-worm heads. They generally originate in small sacs or pouches formed by the growth inwards of certain parts of the wall of the bladder. At the bottom of this sac the tissue thickens, and gives rise to the four suckers and the rostellum, with its crown of hooks, characteristic of the tape-worm head (Plate I., fig. 10). The heads are developed, as it were, inside out. The opening of this sac becomes constricted, but is never entirely closed, a small aperture being left (Plate I., fig. 9). The heads are always restricted to one-half of the bladder, and their arrangement will be best understood by reference to figs. 6-8, Plate I. The long, irregular groups or series in which the heads are disposed have a roughly-radiate arrangement, which is most marked in the younger specimens. In the larger bladder-worms, with more numerous heads, the groups may be broader and less regular. Fig. 8 shows such a bladder-worm pinned out to show the heads more clearly. In this the radiate arrangement is less marked than usual, but is still clearly traceable.

I should mention here that in the older specimens small bladders are not infrequently found outside of, but in contact with, a large central bladder. They are evidently derived by budding from the surface of the older bladder-worm, for, although they are sometimes found quite free and detached, yet in many cases I have found them still connected with the parent bladder-worm by a wide or by a narrow slender stalk. These daughter-bladders give rise to tape-worm heads precisely in the same way that the parent does. This mode of multiplication may be compared with the formation of daughter-cysts in the *Echinococcus*—the "hydatid" of man and some of the domestic animals—by external budding. I have also observed cases in which the bladder-worm of the rabbit has given rise to daughter-bladders by internal budding; but these are not so numerous as cases of external budding.

It has been stated that the bladder-worms were found by me only in the muscles. They are found in all the muscles of the body except those of the distant parts of the limbs, where perhaps the conditions

as to temperature or liability to injury are unfavourable. I have found them even in the muscles moving the eyeball, on the walls of the heart, in the diaphragm, and even, in two cases, in the unstriated muscle of the wall of the intestine. In no case, however, did I find a bladder-worm in any other organ. Special search was made for them in the brain and spinal cord, but without success. As the bladder-worm grows larger it frequently projects on the surface of the muscle, so that it may seem to lie external to it, and project, for instance, into the cavity of the abdomen. But even in such cases careful examination almost invariably shows a thin sheet of musculo-fibres spread over the projecting bladder-worm.

When the eggs of the tape-worm are swallowed by the rabbit the secretion of the stomach destroys the strength of the shell, so that the embryo is able to escape. This embryo is armed with six hooks (see figs. 1 and 2, Plate I), by means of which it works its way into the wall of the alimentary canal, and thus gains access either to the lymphatics or the blood-vessels. Thence it may be carried with the blood-stream to the various organs of the body. On reaching the ultimate ramifications of the blood-vessels the embryo appears to bore through the wall of some capillary. The commencement of the track found in early stages in the muscles may probably indicate the point at which it leaves the blood-vessel. We have seen that the bladder-worms are only found in the muscles, but we may readily believe that many embryos are led by chance to take up their abode in other organs of the body, but that they fail to develop there. Even where the bladder-worms were most numerous they only represented a very small proportion of the eggs which had been given to the rabbit.

All rabbits are not equally susceptible to the bladder-worm disease. Some individuals seem to furnish a specially suitable home for the development of the bladder-worm, and great numbers of the parasites may be found in them. Sometimes the number is so great that they produce a considerable disturbance in the system, owing probably to the numerous points of local inflammation set up. Hence, such rabbits may die during the first two or three weeks after infection. Other rabbits, again, affording less suitable conditions for the development of bladder-worms, a comparatively small number of them are found. Yet other rabbits may enjoy complete immunity, the bladder-worm being quite unable to develop within them. Some of my rabbits were fed several times with tape-worm eggs, but all attempts to infect them failed. I obtained evidence showing that the younger rabbits were more susceptible than the older ones; but on this point my observations were necessarily limited, as all the experiments were conducted on wild rabbits, and at the time of the year no very young rabbits were obtainable. But, although young rabbits are more susceptible, yet it is only some of the older rabbits which enjoy immunity from the disease.

It is not easy to explain why some rabbits should afford so much better a home for the growth of the bladder-worm than others; but the phenomenon is not one confined to the particular bladder-worm of the rabbit which we are considering, but has been shown to occur in the case of other bladder-worms. I will only mention here the bladder-worm of the armed tape-worm of man (*Tænia solium*). This bladder-worm is found in the pig. It is of small size, and forms the so-called "measles" of pork. Haubner fed five young pigs with abundant ova of *Tænia solium*. Of these, two remained quite free from infection, a third contained only forty or fifty measles, another several thousands, and the last one still more. Leuckart fed five young pigs with very numerous ova; each of them received at least a whole tape-worm, whilst some of them were fed two or three times. On dissection, after the lapse of various intervals of time, the number of measles which were found to have developed were said to be respectively a single one, a few hundreds, two or three thousand, several thousand, and twelve thousand. Even in the last instance, where the measles were the most numerous, only one per cent. of the eggs administered had developed.

### 3. Experiments on Carnivorous Animals with the Bladder-worm.

As I have already mentioned, the chief carnivorous animals which feed upon the rabbit in the Wairarapa are the dog, cat, ferret, and hawk; and of these it is the first three which were open to suspicion as bearers of the adult tape-worm of which the bladder-worm is the larval stage. I endeavoured therefore to ascertain by experiment whether the bladder-worm, if given to these animals, would live in them and develop into the corresponding tape-worm. Two young ferrets and a young cat were obtained and fed several times with bladder-worms, which they swallowed greedily. But in all three animals the attempt to rear the tape-worm failed.

Having already ascertained that the dogs in the district were often infested with tape-worm, it was still more desirable to try a similar experiment with dogs. It was undesirable, for obvious reasons, to do this with dogs from the district which might already contain tape-worms; and rabbits carrying bladder-worms were therefore taken up to Auckland, with the intention of experimenting there on dogs free from tape-worm. The diseased rabbits, however, died at sea, and it was found impossible to import more from the Wairarapa. At a later date I had succeeded in rearing the bladder-worms in a rabbit fed with the ova of a tape-worm found in dog in the district. Some of these bladder-worms were given to three dogs, the first two receiving each some three to four hundred heads, and the third two complete bladder-worms, each containing nearly three hundred heads. Of these three dogs, two developed the same kind of tape-worm, which agreed in its characters with the tape-worm found in the dogs in the Wairarapa, from the eggs of which the bladder-worm had been reared. To render the matter still more conclusive, proglottides of the tape-worm thus reared in the dogs were given to the rabbits, and in the majority of these the *Cœnurus* was developed.

### 4. Characters of the Tape-worm (*Tænia serialis*) reared in the Dog.

The tape-worm thus reared in the dog's intestine from the *Cœnurus* of the rabbit has a long, narrow, flattened form (see Plate II, fig. 1). Its length may be from 16 in. to 24 in., though it may appear either longer or shorter, for the tissues of the body are contractile to a very high degree. It consists of a minute head, a somewhat narrower unjointed neck, and a series of joints or segments, which gradually increase both in length and width and their distance from the head-end increases. As the segments grow they develop the reproductive organs—a separate set for each segment—and eggs are formed and undergo their development, so that the last segments contain ripe eggs—i.e., eggs containing fully-formed embryos. The ripe segments drop off one by one at the hind end of the tape-worm, and pass out of the dog. These separate segments

segments are frequently known as proglottides. As the proglottides drop off behind, new segments are gradually separated in front from the neck, so that the tape-worm always has about the same number of joints, though it is constantly shedding proglottides behind.

The head of *Tenia serialis* is somewhat pear-shaped, when from the flatter surfaces (*i.e.*, the dorsal or ventral surfaces) (fig. 2, Plate II), tapering gradually behind to the narrowest part of the neck. Its extreme width is about  $\frac{1}{2}$  in. (1mm.), but it must be borne in mind that the shape and dimensions are liable to variation with the state of contraction. As seen from in front it appears flattened in the same manner as the body, but not to anything like the same extent, its outline being rather oblong. (Plate II, fig. 3.) The head bears four suckers, of moderate size only, two on each side. They have the diameter of about 0.28mm. The extreme end of the head is armed with a crown of twenty-eight or thirty hooks arranged in two concentric circles, each circle having the same number of hooks, and with their roots imbedded in the rostellum, a circular disc of muscular tissue (0.29mm–0.32mm.) (Plate II, figs. 3 and 4.) The hooks of the inner circle (Plate II, fig. 12*b*) are the larger (0.145mm.–0.153mm.); those of the inner arc shorter and more strongly curved (0.096mm.–0.101mm.). Both suckers and hooks, of course, serve for the attachment of the head to the walls of the dog's intestine. The unjointed neck is about  $\frac{1}{2}$  in. in length. The total number of segments or joints is from a hundred and fifty to a hundred and sixty. This number includes all. The first small and short joints can be distinguished in the neck with the aid of the microscope. The character of these first joints will be gathered from enlarged drawing (fig. 2, Plate II). Each joint in the tape-worm is in a slightly more advanced stage than the one in front of it, so that the whole series presents some hundred and fifty or more stages in the development of the segment.

In each segment a complete set of reproductive organs, both male and female, is present, the male maturing rather earlier than the female. It may be well to add here, as more or less distinctive characters of this tape-worm, that traces of the *vas deferens* appear about the sixtieth segment, but it is first distinct about section 70. The rudiment of the genital pouch appears on the average at segment 82. The numerous roundish testes are discoverable in segment 80, but are most distinct and definite in segments 91–100. The first branches of the uterus appear in segment 102, and by segment 115 the uterus-branches cover the whole of the genital area. In the following segments the eggs may be seen passing through the stages of their development, which it is unnecessary to describe here. The first appearance of the chitinous egg-shell is in segments 130–135. These segments of a tape-worm in which the uterus of a tape-worm has assumed its full number of branches are sometimes termed "ripe," and the number of ripe segments is used as a character in the discrimination of various forms of tape-worms. By other writers the term "ripe" is apparently restricted to those segments in which the eggs are fully developed, and contain a mature or nearly a mature eubryo within the thick chitinous egg-shell. As already observed, each joint is slightly more advanced than the one in front, so that there is a certain amount of difficulty in drawing the line between ripe and unripe segments. If we employ the term in its narrower sense we may say that *Tenia serialis* has about half a score, sometimes more and sometimes fewer, for the ripe joints do not appear to detach themselves very regularly, so that the same tape-worm may have at one time a larger and at another time a smaller number of ripe segments.

As the segments grow they change their form, for they increase more rapidly in length than in breadth. The details will be best understood by a reference to the illustration in Plate II, fig. 4. The last few segments are rather less than  $\frac{1}{2}$ -in. in length (more exactly, 10mm.–12mm.).

The proglottides, when separated from the tape-worm, still retain the power of locomotion for a while. They leave the intestine of the dog, passing outward with the fæces, or sometimes independently. They possess great contractility, by means of which they crawl away and hide themselves under grass, sticks, or any shelter which may be available. If the ground be damp they may be able to crawl to the distance of a foot or more, but exposure to very dry air soon brings them to rest. I have frequently found them lying under the shelter of straws. They evidently recognise the value of shelter, for when the straws or similar objects are very scanty the proglottides may still be found under them. On several occasions I have seen the proglottides mount the blades of grass and remain attached there as they dried up. A striking difference is shown in the form of the proglottis whilst crawling, according to its state of contraction. These changes of form are shown in fig. 5, Plate II.

If a proglottis be placed on a plate of glass, and the trail left by it be examined under the microscope, it will be seen to be marked by vast numbers of eggs, which appeared to be squeezed out of the proglottis by its powerful contractions whilst crawling, and so are left behind. Indeed, I have examined proglottides in which almost all the eggs were thus lost whilst crawling, not more than a few score, and in one case only about a dozen, being left inside. It would seem to be a provision which secures a wider distribution of the eggs, and is a point of some importance in considering the possibilities of the natural infection of rabbits. The proglottides of the tape-worm were first obtained seven or eight weeks after administering the bladder-worm. If we allow fifty days as the time necessary for the growth of a hundred and fifty joints, we shall have the joints produced at the rate of three per day.

##### 5. *Resemblance of Cœnurus of the Rabbit to the Cœnurus producing a Disease in Sheep. Evidence of its Distinctness.*

The only species of bladder-worm of the *Cœnurus* form—*i.e.*, one producing a large number of heads in connection with a single bladder—which is generally and definitely recognised, is the one known as *Cœnurus cerebralis*. This is found in the sheep, and receives its specific name of *cerebralis* from the fact that it is found in the brain. The tape-worm stage of the parasite is found in the dog. This parasite is, or used to be, exceedingly common in certain parts of Europe, and produced serious ravages in the flocks of sheep, and occasionally even in cattle. The disease it causes is known as "gid," or "sturdy." Leuckart states, on the authority of the famous stock-breeder Von Nathusius-Hundisberg, that a loss from this parasite amounting to 20 per cent. of the flocks was reduced to 1 and 2 per cent. by exercising the necessary supervision over the sheep-dogs.

Before we can discuss any proposal to use the *Cœnurus* of the rabbit as a remedy against the rabbit-pest, we must decide clearly and definitely whether the *Cœnurus* of the rabbit is identical with that of the sheep, or whether it is altogether distinct.

*Cœnuri* have been found not only in the sheep and rabbit, but also in several other animals. *Cœnurus cerebralis* is said to occur in the brain of the sheep, ox, mouflon, antelope (sp.), roebuck, reindeer, dromedary

dromedary (all of which are ruminants), and horse. Cœnuri have also been found outside of the brain in the rabbit, hare, a squirrel, jerboa, coypu, spalax (all rodents), a lemur, and once each in the sheep, calf, and cat. Sometimes these have been attributed to *C. cerebralis* and sometimes to distinct species.

The earliest mention of the Cœnurus of the rabbit is that by C. B. Rose, who, in a letter to the *London Medical Gazetteer*, 9th November, 1833, after speaking of *Cœnurus cerebralis*, stated that he had seen another Cœnurus in the muscles of the rabbit. He says, "When the warroner meets with a rabbit thus affected he punctures the tumour, squeezes out the fluid, and sends the animal to market with its brethren." As he could detect no difference in structure between this Cœnurus and the *Cœnurus cerebralis* of the sheep, he was unwilling to consider it a different species. In France the Cœnurus has been found in the rabbit by Gervais, Rousseau, Prince, Baillet, Bailly, and Davaine. In 1847 Gervais described a Cœnurus of the rabbit under the name of *Cœnurus serialis*, because the heads were arranged in series. A Cœnurus of the rabbit is preserved in the Oxford University Museum under the name of *C. cuniculi*, a name which was adopted by Cobbold. The name *C. serialis*, however, appears to have the right of priority. Baillet (1858) gave the Cœnurus of the rabbit to his dogs, in which he subsequently found a Tœnia, which he called *T. serialis*. He described the characters of the tape-worm; but they differed so slightly from those of *Tœnia cœnurus*—the tape-worm corresponding to the *Cœnurus cerebralis* of the sheep—that zoologists do not seem to have been in any way satisfied that the *Tœnia serialis* was a good and distinct species. The Cœnurus of the rabbit has also been found in Germany, and in Italy its occurrence is recorded by Perroncito.

It may, I think, be said that the existence of a second Cœnurus in the rabbit, which is distinct from the *Cœnurus cerebralis* of the sheep, has not yet been demonstrated. In support of this statement we may quote Küchenmeister and Zürn, who refer the Cœnurus found by Perroncito in the abdominal cavity of the rabbit to *Cœnurus cerebralis*.\* Leuckart says, with reference to Cœnuri found outside the brain, that they may "in part, perhaps, represent distinct species." Moniez† refers to experiments of Perroncito (whose paper, I regret to say, I have been unable to procure) on rabbits and sheep with eggs of *Tœnia serialis*. The rabbits died accidentally a few days later, and were not dissected, and the sheep gave a negative result. Moniez was of opinion that further experiments were necessary before a definite conclusion could be arrived at. W. H. Jackson, in the most important text-book of zoology‡ recently published, says that *Cœnurus cerebralis* is "found most usually in the brain of the sheep, though sometimes in other parts of the body of this ruminant, as also of rodents." But on page 664 of the same work there is a footnote as follows:—"It is possible that there is more than one species of Cœnurus. The identity of the two forms occurring in the sheep and rabbit has not been established, and there are others known." Many other references might be given having the same purport, but the above will suffice.

I propose, therefore, to give here the evidence I have collected showing that the *Cœnurus serialis* of the rabbit is distinct from the *Cœnurus cerebralis* of the sheep. The evidence, from five sources, is arranged under as many heads:—

(a.) The *Cœnurus serialis* of the rabbit is abundant in many parts of the Wairarapa; but, so far as I could hear from the sheep inspectors and farmers, there is no trace of "gid" or "sturdy" amongst the sheep which feed on the same ground with the rabbits. Nor, indeed have I been able to hear of the existence of this sheep-disease in New Zealand. The freedom of the sheep from the Cœnuri, whilst the rabbits are so frequently attacked, is in itself the strongest presumptive evidence that the Cœnurus of the rabbit cannot develop in the sheep.

(b.) The Cœnurus of the sheep and other ruminants is confined to the brain, whilst that of the rabbit is found only in the muscles. It should be mentioned that Bichler found a Cœnurus about the size of a goose-egg in the subcutaneous tissue of a sheep. This, however, appears to be quite an exceptional occurrence.

(c.) Anatomical evidence is obtained from the structure of the Cœnuri of the rabbit and sheep respectively. The *Cœnurus serialis* of the rabbit has the heads arranged in linear groups, the arrangement in lines being specially marked in the less advanced stages, but still traceable in the oldest. Again, these series radiate from a centre. In the *Cœnurus cerebralis* the groups are not linear, and are arranged irregularly. Again, the *Cœnurus serialis* is remarkable for the formation of daughter-bladders by budding, both externally and internally; the *C. cerebralis* does not show this character, though it often has a more or less irregular outline.

(d.) Further anatomical evidence is obtained from the comparison of the tape-worm (*T. serialis*) reared from the rabbit's Cœnurus with *Tœnia cœnurus*. I have not been able to procure specimens of *Tœnia cœnurus*, but I take for the comparison the description given by Leuckart, who will be recognized by all zoologists as a sufficiently accurate authority. The characters of the *Tœnia serialis* are taken from my own examination of the tape-worms reared in dogs fed with the Cœnurus of the rabbit. At first sight the two tape-worms seem to be singularly alike; but careful measurements show a sufficient number of differences. As is well known, there is often considerable difficulty in distinguishing the different species of tape-worm, owing to such resemblances, so that the apparent similarity of the two now under consideration need not be deemed to prove their identity.

*T. cœnurus* is said to be 30cm.—40cm. (12in.—16in.) in length. I have found *T. serialis* 40cm.—60cm. long, and sometimes longer. *T. serialis* has not more than a hundred and fifty segments before the first ripe one, using the term "ripe" in its narrower sense (*v. supra*): *T. cœnurus* has nearly two hundred. The number of hooks in *T. serialis* is twenty-eight to thirty, more frequently thirty: in *T. cœnurus* it is usually twenty-eight, but varies from twenty-four to thirty-two. The larger hooks are smaller in *T. serialis* than in *T. cœnurus*, being 0.15 mm. long in the former and 0.16 mm. in the latter; the small hooks are much the same size in both, being from 0.096mm.—0.101mm in *T. serialis* and 0.1 in *T. cœnurus*. A comparison of the hooks of *T. serialis* (see plate II, fig. 12) with those of *T. cœnurus* (fig. 11, reproduced from Leuckart), shows that they differ both in curvature and in other minor points. In *T. serialis* the curved and pointed end is not so nearly in the same straight line with the posterior root of the hook, and there is a constriction near the base of the curved part. The points described as specially characteristic of the hooks of *T. cœnurus*—viz., the heart-shaped form of the anterior root of the large hook, and the slenderness of the posterior root of the small hook, are not characteristic of the corresponding parts in *T. serialis*. It must be mentioned, however, that the hooks show some variety in these minor points. The ripe segments appear

\* "Parasiten des Menschen," 2te auflage, p. 59.

† "Essai Monographique sur les Cysticerques," 1880, p.

‡ "Fornix of Animal Life," Rolleston and Jackson, 1888, p. 323.

appear to be distinctly larger in *T. serialis*, and the uterus with its branches, covers a smaller proportion of the width of the segment than in *T. canurus*. (Compare fig. 10, Plate II, a segment of *T. canurus* magnified 10–15 diams., after Leuckart, with figs. 8 and 9, of segments of *T. serialis*, magnified  $6\frac{1}{2}$  diams.)

The above points will be sufficient to show that anatomical differences do exist; but we cannot expect to find very wide differences between the two tape-worms, for the fact that both have larval forms of the *Cœnurus* type proves that they are closely allied, and may therefore be expected to show a general resemblance to one another.

(e.) The most conclusive evidence, however, is to be derived from feeding experiments on the sheep. If *T. serialis* is really identical with *T. canurus*, then the eggs of *T. serialis* should, when administered to a sheep, give rise to a bladder-worm in the brain, and produce the disease known as "gid."

*Cœnurus cerebralis* is more particularly found in young sheep. I obtained, therefore, the youngest sheep available at the time of the year, which was just before the lambing-season. The sheep must therefore have been ten to twelve months old. It received at different times some forty to fifty proglottides of tape-worms reared from the *C. serialis* of the rabbit—i.e., it must have received over a million eggs. Nevertheless the sheep showed no sign of "gid," and when finally dissected some three or four months later, showed no trace of bladder-worm in brain, muscles, or any other part of the body. A few months later another lamb, four or five months old, was obtained, and eggs of *T. serialis* were given to it. At the time of writing the lamb is still perfectly healthy. It appears to me that the evidence brought forward is amply sufficient to demonstrate that the *Cœnurus* of the rabbit is specifically distinct from that of the sheep.

#### 6. *Smaller Bladder-worm of Rabbit (Cysticercus pisiformis).*

It will be desirable to make a brief reference here to this small bladder-worm, though it was only found by me twice in rabbits from the Wairarapa, and always in small numbers. But in wild rabbits captured in the Waikato for the purpose of experiments, this well known *Cysticercus* was almost always found—generally only from one to half a score specimens in a rabbit. One rabbit, however, formed a marked exception, for it contained over four hundred small cysts, of which over two hundred were counted on the great omentum. This bladder worm is round and about the size of a pea—hence its name of *pisiformis*. It is a very familiar form in Europe, and is the larval or cystic stage of *Tania serrata*, a tape-worm of the dog. I have found the tape-worm in dogs in the neighbourhood of Auckland.

The earlier stages in the development of the *Cysticercus pisiformis* are passed in the rabbit's liver; it then makes its way out of that organ, and after passing a certain time free in the abdominal cavity, it becomes encysted and attached to the peritoneum, especially that forming the great omentum and that covering the rectum. Whilst present in small numbers it causes very little injury to the rabbit, but there is reason to believe that when very large numbers develop simultaneously serious disturbance is produced in the liver. It must be seldom, however, that this parasite can, under conditions obtaining in nature, cause the death of a rabbit.

#### 7. *Liver-coccidia of the Rabbit.*

I have already stated in my Interim Report that a considerable proportion of the rabbits examined by me in the North Wairarapa were more or less affected with a disease caused by minute animal parasites belonging to the group of Gregarinida, and known as Coccidia (*Coccidium oviforme*). It will be unnecessary for me to repeat here the description already given in a previous report.

The Coccidia undergo development in water or in moist places, the contents of each *Coccidium* breaking up and transforming into four oval spores. Each spore has a delicate membranous wall, and contains a curved rod-like body, with thickened ends, whilst against the concavity of the curve rests a round granular mass, which, with osmic acid and picrocarmine, stains more deeply than the rod-like body. The rod-like body is believed to be the true germ.

So far as I am aware, no experiments have been hitherto recorded to show in what form the liver-coccidia enter the rabbit. From experiments of Waldenburg on the *Coccidium perforans* (Leuckart) of the intestine of the rabbit (a species distinct from the liver-coccidia) it seems probable that the spores in the condition just described are capable of developing further when given to a rabbit. Three rabbits obtained from the Waikato, where the disease is not known, were fed with large numbers of Coccidia which had been kept in water until the spores were formed as above described. When the rabbits were dissected several weeks later all were found with perfectly sound livers. This result must, however, be considered as purely negative evidence; the experiment may have failed because the rabbits were unsuitable subjects. I should have preferred to experiment with younger rabbits; but it was winter time, and the youngest rabbits available were some eight months old.

Want of material has prevented me from investigating the matter further, but this is of the less importance because the disease, though frequently fatal to rabbits, is not one which could be recommended for the object now in view, as it has been known to affect human beings.

#### 8. *Disease due to Scab or Louse-mites and Lice.*

Two external parasites were found in the rabbits in the Wairarapa—namely the scab or louse-mite and a kind of louse. As these are readily distributed by the contact of the rabbits in their burrows, they are not uncommonly found together on the same animal. The scab or louse-mite is a minute species of mite, just visible to the naked eye. I have not been able to find any description of this species in the books available in Auckland, but it is probably a species of *Symbrites*. It is clear, however, that it does not burrow into the skin like the true itch-mites, but lives upon the surface. This mite is therefore distinct from the true itch-mite (the *Sarcoptes cati* of Hering and Gerlach, or *S. cuniculi* of Gerlach, or *S. minor* of Furstenberg) found on the cat and rabbit, which burrows in the skin and causes a much more formidable injury. The *Sarcoptes minor* is not uncommon on the Continent of Europe, and is especially destructive to cats in the larger towns. The intensity of the malady produced varies from time to time, sometimes causing very severe epidemics. The mite found on the Wairarapa rabbits, confining its attacks to the surface, seems to be comparatively harmless, though all the rabbits which have any large number of the mites show scabby spots.

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The rabbit-louse (*Haematopinus ventricosus*) is a much larger animal than the mite, being readily seen by the naked eye. Sometimes it is found in considerable numbers. It may be seen with its beak buried in the skin, whilst its abdomen becomes round and distended with the dark-coloured blood it has sucked up. In a majority of the rabbits seen by me in the Wairarapa I found a larger or smaller number of either lice or mites, or both. As a rule, the number of parasites was small, and the injury done to the rabbit was insignificant. A few of the rabbits carried greater numbers, and these were marked by scabby patches. Mr. Orbell states that he has found rabbits showing scabby symptoms of a similar kind, but in a much higher degree, with the hair falling off over large areas of skin. Some of the rabbiters, too, state that they have found rabbits largely denuded of hair, and with scabby patches, and so thin as not to be able to run more than a few yards at a time. More recently the same mite has been noticed by Agent H. Hull in Southland. On the Sunnyside Station a diseased rabbit was dug out of a burrow; the skin showed scabby patches outside and dark spots inside, and it adhered to the flesh. Mites were discovered by the aid of a lens, and some of these were afterwards identified by me as belonging to the species found in the Wairarapa. It is not improbable that a rabbit may occasionally succumb to these parasites; but I am of opinion that the combined effects of the mites and lice are seldom so serious as to lead to the death of the rabbit.

III. VALUE OF THE DISEASES AS A MEANS OF DEALING WITH THE RABBIT-PEST.

1. *General Conditions.*

Any disease, to be suitable for this purpose, must fulfil the following conditions: (1) It must be sufficiently destructive to rabbits; (2) It must not be injurious to man or any of the animals useful to man.

When we know that these conditions are satisfied we have still to consider the economical aspects of the question—*i.e.*, whether the good effected would be commensurate with the cost of the employment of the disease; for, be it observed, what is really required is a cheaper means of destroying rabbits than the customary poisoning, rabbiting, &c. Of the five parasitic diseases found in the rabbits in the Wairarapa only two cause a disease of such intensity as to at all satisfy the first of the above conditions; the other three seldom cause death to the rabbits. The two parasites which concern us here are the bladder-worm and the liver coccidia.

Before discussing to what extent the two diseases are valuable, it may be well to observe that evidence of the injurious effects of a disease may be adduced from the following considerations: (a) The disease may be shown to be more or less widely prevalent. It is clear that it is not enough that a disease should have an intensive character and have the power of causing death; it is also essential for our purpose that it should affect a large proportion of the rabbits in the district. (b) The intensive or destructive character of the disease may be shown by the fact that rabbits are found dead or clearly suffering a serious amount of injury from the presence of the parasite. (c) The character and power of the parasite may be gathered from the results of experiments on rabbits in the laboratory. But here we must bear in mind that the conditions in the laboratory are not quite the same as those in nature; the mere confinement of rabbits in hutches introduces a condition very different from that of the full freedom of the wild rabbit. Nevertheless, the detailed knowledge of the natural history of the parasites will give us a fuller knowledge, and enable us to form a sound judgment on many points which it is difficult to observe in animals in a state of freedom.

2. *The Bladder-worm.*

A comparatively small proportion of the rabbits examined by me in the Wairarapa were affected by the bladder-worm—not more than 5 per cent. The rabbiters, however, state that it is no uncommon thing to find 20 per cent. of the rabbits with one or more bladder-worms. The men would only notice the advanced stages of the disease, so that a larger percentage of the rabbits may really be affected. But it is important to notice that this does not apply simultaneously to the whole of the Wairarapa district. There is a great deal of difference in the prevalence of the disease in different localities, and even in the same locality the disease may be common at one time and scarce at another. In one instance during my visit four out of six rabbits shot in one day were found to contain bladder-worms. It should be observed, however, that the time of my visit—shortly after the close of some months of dry summer weather—was not the time at which we should expect to find the greatest number of rabbits affected with the disease. The rabbiters, too, at the Dry River Run and elsewhere, I found, were in the habit of giving their dogs medicine to expel their tapeworm—a measure calculated to reduce the prevalence of the disease.

I could not obtain any positive evidence that rabbits are ever found lying dead on the ground, or in a dying condition, from the disease. The rabbiters state that they sometimes find rabbits lying dead on the ground, but the hawks have always been at them, so that it is too late to find out what the cause of death may have been. I was able to observe for myself the great number of hawks in the district, and their activity in attacking rabbits caught in traps or lying on the ground. We must remember further that many of the rabbits will probably die in their burrows.

Most of the affected rabbits obtained by me in the Wairarapa contained only a single bladder; some had two, and in one instance I found three. The rabbits were for the most part still in moderately good condition, but not equal in this respect to their brethren free from the bladder-worm. When we remember that the parasite frequently attains the size of a fowl's egg, weighing, with the included fluid, 1½ oz. to 2 oz., and occasionally reaches double the size, we can see that even a single specimen must, to some extent at least, act as a drain on the strength of its host, whilst two or three or more will have a still greater effect. The addition of some ounces of weight to a rabbit means a tax on its powers, and must hinder it in escaping from its enemies, especially if the parasites are in a position in which their bulk interferes with the rabbit's power of locomotion. That even a single bladder-worm weakens a rabbit is shown by the fact that I have not been able to have any infected rabbits brought alive from the Wairarapa to Auckland, all having died on the voyage, though other rabbits, free from the parasite and sent at the same time, have arrived safely. Still, though a single bladder-worm weakens a rabbit, it is clear that the rabbit may live a very long time notwithstanding the presence of a bladder-worm, and even of two or more.

We may now with advantage consider the results obtained with rabbits artificially infected with the bladder-worm. It may be well for me to state that in order that my results may more fairly be taken as a basis in estimating the effects of the disease on rabbits in a state of nature, I endeavoured to keep the rabbits under conditions approaching the natural ones.

I have found that when the rabbits are fed with large quantities of eggs some of them may die within the first two or three weeks. These are the rabbits in which the largest proportion of the eggs develop. But the number of bladder-worms developed is by no means simply proportional to the number of eggs which a rabbit swallows, but depends far more on its constitutional power of resistance. Even in cases where the greatest number of bladder-worms have appeared, and the rabbits have died at an early stage of the disease, the number of parasites present did not correspond to more than about 1 per cent. of the eggs administered. Usually the percentage of eggs which developed was far lower, and over 30 per cent. of the rabbits failed to take the disease at all, though some of them were fed several times with the tape-worm eggs.

The development of the bladder-worm is, as we have seen, slow; so that if a rabbit contains only a small number of bladder-worms it may live a considerable time. But as the bladder-worms grow older they become larger and larger, and so, of course, the ill effects of their presence become more marked. One of my experimental rabbits died at a date which was 104 days after the first infection with one proglottis, and forty days after a second infection with two proglottides. It was found to contain twenty bladder-worms. Most of these dated from the first infection, three from the second infection. The largest bladder-worm was  $1\frac{1}{2}$  in. long by 1 in. in width; most of the others were about 1 in. in length. Another rabbit died at the same stage of the disease from the presence of seven bladder-worms. A third died forty-eight days after infection, and contained seventeen bladder-worms, the largest being  $\frac{3}{4}$  in. in length.

Avoiding unnecessary details, we may say that the effect of a single bladder-worm will, as a rule, hardly be shown during the first three or four months, but that afterwards, as it continues to increase in size, it may be a source of weakness to the rabbit; but I have not been able to find any evidence that a rabbit affected with a single bladder-worm only might not live till death came to it from some other natural cause. But with the increase of the number of parasites the tax on the strength of the rabbit becomes greater than it can bear, and it succumbs to the burden, sometimes directly, sometimes indirectly, being brought into a low and weak condition, in which it readily falls a victim to other adverse influences, such as weather, scarcity of food, or enemies.

We must add, however, that the bladder-worm sometimes settles in a position in which its mere presence is more than an inconvenience, and interferes with some of the essential functions of life. The bladder-worms, as commonly found in the muscles of the limbs or trunk, are in a position in which they do not interfere with other organs; but I have seen them in a good number of instances in positions where they must have been distinctly hurtful. Thus, I have several times found them in the muscles moving the eyeball, producing displacement of the eye. In one case a bladder-worm was growing in the tongue, and by producing a swelling at its base had rendered it difficult for the rabbit to swallow. In another instance a group of tape-worms was found on the outside of the jaw. Their pressure had caused absorption and perforation of the jaw-bone, and subsequently the weakened bone had been broken. Again, I have found the bladder-worm pressing on the larynx and windpipe. In three cases they were present in the muscular walls of the heart; in one of these the bladder-worm was nearly the size of a marble, and was already developing the head-sacs of the future tape-worms; but at this stage the rabbit had died. In one instance I found a large bladder-worm in the diaphragm, one half projecting into the cavity of the chest and pressing on the lungs, the other half projecting into the cavity of the abdomen and displacing the liver.

We have already seen that the rabbits in the Wairarapa are usually found with only a single bladder-worm, and that this was the largest number found by me. We have also seen that the presence of a single bladder-worm, though more or less injurious, will seldom be fatal to a rabbit. We are therefore naturally led to inquire whether rabbits in a state of nature are frequently infested by a larger number of the parasites. The rabbiters state that they have observed rabbits with more than three bladder-worms, and it is possible that the scarcity of such observation is due to the parasites causing the death of the rabbits at a relatively early stage before their size would attract an unskilled eye. An examination of the conditions for the spread of infection will aid us at this point of our inquiry. The infection is due to rabbits swallowing the eggs of a tape-worm with their food. These tape-worms live in the intestines of the dog, and produce proglottides containing the eggs. When the proglottides are ripe—*i.e.*, contain eggs with embryos, ready to cause the infection—they drop off from the tape-worm and pass out of the dog. I have calculated that each tape-worm may produce three proglottides a day. An estimate of the bulk of the uterus and its branches gives the result that each proglottide will contain a bulk of 0.745mm. of eggs. I am indebted to my colleague, Professor Aldis, for the mathematical calculation of the quantity of eggs of the given size and form which would fit into one cubic millimetre. From these data I estimate that an average proglottide will contain about thirty thousand eggs. Now, a single dog may harbour from one to forty or more tape-worms. Allowing that a dog contains ten only, it will distribute thirty proglottides a day, each containing thirty thousand eggs—*i.e.*, it will distribute nine hundred thousand eggs. If we could insure that all the eggs should reach the race of rabbits and develop within them, there would be no further trouble with the rabbit question. But we cannot do this, and the chances are immensely against any particular egg reaching a rabbit; and if it does reach a rabbit the chances are a hundred to one against its developing there. In my experiments I could, of course, secure the proglottides, and insure that a rabbit should swallow as large a number of eggs as I pleased. In nature the proglottides are usually distributed with the droppings of the dog. If the weather is dry and the droppings fall in a dry place the proglottides cannot move away. But if the weather be wet, or, at least, the ground is moist, the proglottides crawl away and hide themselves in the grass, or sometimes climb up the stalks. As the proglottides crawl along, the eggs are squeezed out and smeared over the ground. If rain comes, or the spot be marshy, water may further distribute the eggs. If the eggs are in a moist place they retain their vitality for some days: I have infected a rabbit with eggs which had been kept in water for seventeen days. It is not necessary that the eggs should be actually in water—all that is needful is that the air around should be saturated with moisture. Hence the eggs will keep good during the cooler part of the year so long as the surface of the ground is moist; but exposure to a current of dry air or to the full rays of a hot sun is quite sufficient to destroy their vitality. It will be seen, therefore, that the chances of infection during hot, dry summer weather are but small unless the proglottides are deposited in the neighbourhood of springs or on marshy places. Moreover, at all times of the year the chance of infection is greatest on moist ground, though in broken country, where the hill-tops are quite dry, the presence of moist patches of ground on the hill-sides and in the gullies is sufficient to allow the spread of the infection to a certain extent.

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The spread of the eggs by the proglottides, whilst it may favour the extent of prevalence of the bladder-worm, is less favourable to the occurrence of cases of infection by large numbers of the parasites. Sometimes, however, the proglottides retain a considerable number of eggs within them, and a rabbit may, by eating a whole proglottide, incur the risk of multiple infection. I have seen that rabbits will eat the proglottides attached to grass or green food. Of the nine hundred thousand eggs which may be distributed by a dog in a day, but a small proportion will be picked up by rabbits whilst they still retain their vitality. And even after they have got so far as the rabbit's stomach their dangers are not at an end. Some will have insufficient vitality to resist the digestive action of the rabbit's gastric juice; others will fail in boring their way through the walls of the stomach. Of those which succeed in passing from the interior of the stomach many will go astray in various parts of the body, only a small number securely establishing themselves in the muscles of the rabbit. Even then the tissues have a certain power of resistance, and the bladder-worm may die at various stages. The power of resistance in some rabbits, especially older ones, is so great that some individuals enjoy a complete immunity. No wonder, then, that so great a fertility on the part of the tape-worm is necessary in order to contend with the great risks to which the continuance of the race is exposed.

It will be readily understood that where the conditions for the spread of the disease are more than usually favourable the immense fertility of the tape-worm permits (within certain limits) a greatly-increased prevalence. The bladder-worm disease, like so many parasitic diseases, is eminently liable to variation, and, if the conditions are favourable, considerable epidemics are likely to occur. But such epidemics, though they may depend on causes having a wider influence, such as the character of the weather in any particular season, will, as a rule, be due to circumstances which have a local extent only. Hence the epidemics will not be experienced in equal measure throughout a whole district, but only in those localities where there is a recurrence of the favourable conditions. For a hot and dry climate like that of the greater part of Australia the disease would be of far less value than in the moist climate of New Zealand.

To what extent, it will be asked, can the prevalence or severity be increased? The only means which can be adopted to secure the maximum destruction by the disease is to increase the chances of rabbits swallowing the tape-worm eggs. We must keep as many tape-worms as possible in the neighbourhood—that is, we must make sure that each dog carries his due complement of tape-worms, and we must see, further, that the dogs pass frequently over ground where the rabbits feed. It would be useless, of course, to keep the dogs chained up at home. The rabbitter's pack of dogs will obviously be the most suitable for the purpose, though any dogs will do which are kept under supervision. It will not do to liberate dogs to run wild and keep down the rabbits, as has been done in the case of cats, ferrets, &c., for dogs would quickly learn to attack the sheep.

The disease, of course, can be encouraged largely, though not indefinitely, by increasing the number of dogs in the neighbourhood; but here the question of cost and other practical matters demand consideration. The rabbitter's dogs and any other dogs already kept could, of course, be employed to disseminate the disease without incurring any special expense (always supposing the dogs do not suffer—a point to be considered later on). But these dogs have already been unconsciously used in the way indicated, and, though some of them have had their power of distribution restrained by medicine to cure the tape-worm, it will, I believe, be necessary to increase the number of dogs to secure any much greater prevalence of the disease. With the increase of the dogs expenses will arise, though it will clearly be desirable to use the dogs for rabbitting also. If the dogs are not made useful in other ways, I doubt if the results they produce in disseminating the bladder-worm disease would, as a rule, be commensurate with the cost of maintaining and supervising them.

We have seen above that the bladder-worm that we are now considering has been found in various parts of Europe, and we are therefore naturally led to ask, what are its effects there? Has it been found to cause any destructive epidemic among rabbits? I have not been able in the literature of the subject to find any statement of any serious epidemic of the kind, and, though the disease has been long and firmly established in various parts of Europe, I do not find any record of its occurring anywhere so commonly as it appears to have done in the Wairarapa.

The greater prevalence which the bladder-worm has shown in the Wairarapa is probably due in part to the moisture of the climate during a considerable portion of the year, in part to the abundance of both rabbits and dogs, many of which are used chiefly or entirely for rabbitting, and are allowed to feed upon uncooked rabbits, and so are generally infested with the tape-worm. In England the rabbit is valuable for the market; in the rabbit districts in New Zealand it is at best looked upon as food for dogs. There can be no doubt that the disease has been introduced in the Wairarapa from Europe, and probably England, where it has been found in Norfolkshire, near Oxford, and in Ayrshire. It is most probable that the disease has been brought by a dog infested with *Tania serialis*.

In the "Transactions of the New Zealand Institute," Vol. xx., p. 457, will be found a statement by Sir J. Hector "that in America he had seen large tracts of country cleared of rabbits in a few months by the propagation of this disease"—namely, bladder-worm. In the absence of detailed evidence, I think it highly doubtful whether the disease which is said almost to exterminate the Canadian rabbit (not the same species as the English rabbit) is due to a bladder-worm. The statements made by Mr. C. N. Bell, of Winnipeg, do not bear out any such idea. The two known bladder-worms of the rabbit (the *Cœnurus serialis* and *Cysticercus pisiformis*) are most certainly not likely to effect such sweeping destruction. Although known so long in Europe, nothing of the kind has ever been observed there.

It may be asked why the *Cœnurus* is more injurious to rabbits than a good many other bladder-worms are to their hosts. The injury is partly due to the size which this bladder-worm attains and partly to the positions it sometimes occupies. The *Cysticercus pisiformis*, the other bladder-worm of the rabbit, is of very much smaller size, and I have found over four hundred examples in a single rabbit, which was not obviously suffering from its load of parasites. But a single *Cœnurus* may have a bulk greater than two hundred of the *Cysticercus pisiformis*, and the latter, though they may create a good deal of disturbance in their early development in the liver, subsequently settle in a position in which their presence does little harm. We are, however, acquainted with bladder-worms which do create injurious epidemics in other animals—for instance, the other species of *Cœnurus* (*C. cerebralis*), which formerly caused serious losses amongst flocks of sheep. This bladder-worm was probably more hurtful than the *Cœnurus* of the rabbit, for it occurred in the brain, an organ specially susceptible to injury. The Echinococcus, or hydatid of

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man and some of the domestic animals, is also an example of a large form of bladder-worm, causing severe injury to its host. As is well known, it is very prevalent in the Colony of Victoria, and is often fatal to human life.

*Second Condition.*—The disease must not be injurious to man or any of the animals useful to man. The best evidence showing that the bladder-worm satisfies this condition is that, although from time to time it has been so common in the Wairarapa, yet the stock feeding on the same ground have never suffered. The *Cœnurus* of the rabbit, however, bears a certain resemblance to the *Cœnurus* producing a disease in the sheep, and I have therefore taken considerable trouble to find out whether the two species are distinct or not. The results are detailed above (II., 5), and the evidence there given shows that the *Cœnurus* of the rabbit is distinct from that of the sheep, and that sheep fed with the eggs of the *Tenia serialis* remain free from bladder-worm.

There remains, however, one point to consider, and that is, what is the effect of the tape-worm on the dog? Do the dogs suffer when harbouring the tape-worm? I do not think they suffer to any serious extent: the dogs which I have seen as hosts of the tape-worm have been in apparent good health. Of course, the parasites require to be fed, and the dogs may be a little thinner and consume rather more food than they would otherwise do; but if at any time a dog seems to suffer from its parasites it will be easy to secure a little rest for it by administering a dose of medicine to expel the whole or a portion of the tape-worms. In some animals, it is true, the presence of tape-worms is distinctly injurious—as, for instance, the *Tenia expansa*, which I have found in New Zealand on several occasions, as a cause of debility in lambs. On the other hand, dogs seem to suffer less from their tape-worms, of which no fewer than eleven species are recorded, some being of very common occurrence. The natives of Abyssinia are almost without exception infested by the unarmed human tape-worm (*Tenia mediocanellata*). So far from regarding this as a cause of weakness or disease, they say that in many ways its presence exercises a beneficial influence on the health and if they have the misfortune to lose their parasite they take measures to obtain another.

### 3. Value of the Liver-coccidia.

Although the disease caused by the liver-coccidia does not satisfy the second of our conditions—namely, that the disease must not be injurious to man or any of the animals useful to man—it will be necessary to refer to it here, because it is a disease capable of inflicting serious injury on rabbits, and has, I believe, been operative in some degree in reducing the rabbit-pest in the Wairarapa. I have not had the opportunities of acquiring sufficiently ample data to enable me to decide to what degree it has been operative, but I found the coccidia present in a larger percentage of rabbits than the bladder-worm. Near Masterton, out of nineteen rabbits dissected in one morning, eleven of them were affected by this disease, and five of them badly. I may add here evidence from other sources as to the destructiveness of the disease. A few years ago, whilst investigating the natural history of the liver-fluke for the Royal Agricultural Society of England, I paid some attention to the parasitic diseases of rabbits. The rabbits in certain localities near Oxford had, after a series of wet seasons, been greatly reduced in numbers, and were found lying about dead on the ground. Some of these were brought to me for examination. One of them proved to have been killed by the liver-fluke; in another the liver was extensively invaded by the coccidia, which had been the cause of death.

Leuckart says of the liver-coccidia of the rabbit that the disease is endemic in many warrens, so that scarcely a sound rabbit is found. "As soon as the disease reaches a considerable development, the rabbits are constantly seen to perish. After passing, perhaps, a few weeks in a sickly condition, they become very thin, lose the desire to eat and their former activity, begin to breathe more quickly and violently, and die at last in convulsions."

The disease has been found in man on at least four occasions; in one case it was the cause of death. On this account the artificial encouragement of the disease could not be advocated. Nevertheless, the disease has been introduced into the district, and it would be a difficult matter to stamp it out if it were desired. It seems not improbable that it will develop further, and, whether we wish it or not, may prove the cause of death to a certain proportion of rabbits. Men, however, are very seldom exposed to the risk of infection with the liver-coccidia, and that only where uncleanly habits prevail; so that their presence in the district threatens little danger to human life.

### 4. Possibilities of Destruction of Rabbits by Parasitic Disease.

Surprise is often expressed at the rapid rate of increase of rabbits in Australasia. This is not to be attributed to the greater fecundity of the rabbit here, but rather to the absence of those checks upon its naturally rapid increase which operate in keeping down the rabbits in other parts of the world. Every living being in a state of nature is subject to an active or passive struggle for existence. It constantly endeavours to increase its kind and extend its area, whilst it meets with various adverse influences or checks to its increase, against which it may be said to struggle. Even in Europe the rabbit sometimes increases to such an extent as to become a nuisance; but there the checks to its increase are much greater.

These checks may be grouped as follows: (1) Action of man; (2) scarcity of food (this is chiefly due to climate, for there are few of the herbivorous animals who can compete with a rabbit); (3) destruction by carnivorous animals; (4) effects of climate, both direct and indirect; (5) parasitic diseases. It must be admitted that in New Zealand, where population is scanty, the climate mild and generally favourable, where there are large areas of natural grasses and no indigenous carnivorous animals to prey on the rabbits, and no indigenous parasitic diseases to thin their numbers, that the rabbit escapes the most of those adverse influences which keep it in check elsewhere. The population, however, is increasing rapidly, and carnivorous animals have to a certain extent been established, whilst several parasitic diseases have (though unintentionally) been introduced. The climate here is sufficiently moist to encourage the spread of some of these parasites. Wherever the population is moderately thick the rabbit difficulty is not felt, for the action of man easily keeps the rabbits in check. There are, however, many districts in New Zealand which are not likely to attract a considerable population for very many years to come; but where there is a wholesome though not a rich pasturage for sheep, the land carrying perhaps a sheep to one, two, or even three acres. It is here particularly that the injurious effects of the rabbit-pest are felt, for, though the rabbits could of course be kept down by human agency, this result could only be attained at a cost which would more than swallow

swallow up the whole of the profit of sheep-farming on such land. It is here, then, that the destruction of rabbits by carnivorous animals or parasitic disease would be most welcome.

The parasitic diseases of the rabbit which we have been discussing would have a limited but appreciable influence in this direction. It must not be expected, however, that they will prove the means of suddenly or completely exterminating all the rabbits in a district. Many infective diseases possess great powers of destruction, but there is no instance known of any infective or parasitic disease in nature which possesses the power of absolutely exterminating any species of animal. Any parasitic organism which should mercilessly cause the death of all the members of a species would thereby defeat its own object, for with the extinction of all suitable victims the existence of that specific parasite would come to an end. If we read through the records of destructive epidemics which have occurred in man and the domestic animals we shall find that, though the number of deaths may be large, yet it is but small as compared with the number of individuals left alive. The disease takes its proportion of victims—it may be a very high proportion in certain localities—but if we extend our views so as to take in a wide district, we find that the tax seldom amounts to 10 per cent. of the species affected. I may mention here, as an example of a destructive epidemic, that the losses of sheep from liver-fluke in the British Isles in the winter and spring of 1879–80 was estimated at three millions, or about 10 per cent. of the total number of sheep. But that season was one of a succession of wet years, and the disease was unusually prevalent, the losses in an average year being one million, or about 3½ per cent. These losses were unequally distributed, for in some localities the disease was not known, in others it was severely felt.

One of the most prominent characteristics of parasitic diseases is their unequal development in different localities and in different seasons. So with reference to the diseases due to the bladder-worm and liver coccidia, we may expect in some localities a more extensive development and useful results, whilst in other localities the diseases may not meet with necessary conditions, and little or no good may result. Further we have seen that moisture is favourable to the spread of these diseases; we may expect them, therefore, to be more prevalent in moist or ill-drained localities, and to be more useful in wet seasons and climates than in dry ones. Hence over a great part of Australia the diseases would be less effective than in New Zealand.

When animals of the same kind are densely crowded together on the same ground, as is the case with the rabbits in the infected districts, one of the conditions for the spread of a parasitic or infectious disease is best fulfilled. When the number of animals is reduced the danger of infection will diminish.

#### 5. Summary.

1. The reduction of the rabbits in the Wairarapa has been chiefly due to measures adopted by man. The most valuable of these measures has been the winter poisoning, which has been followed up during the rest of the year by trapping, &c. Cats and ferrets, too, seem to have done good work.

2. Certain parasitic diseases have appeared in the district, and have been widely though unequally prevalent.

3. Of these parasitic diseases two only—those due to bladder-worm and liver coccidia—deserve special notice as being capable of destroying rabbits. There is reason to believe that these have assisted to a small extent in destroying rabbits in the district.

4. The employment of the liver coccidia for the destruction of rabbits cannot be advocated, as in rare instances the parasites have been known to attack man. They are, however, present in the district, and it would probably be impossible to suppress them. Fortunately the danger to human beings is very small indeed, and the disease may prove of further use in killing rabbits.

5. The bladder-worm may be usefully employed against the rabbit pest; but it must not be expected that it will destroy more than a small percentage of the rabbits in the district. Like all parasitic diseases it is variable and apparently capricious in its distribution, and its propagation is limited by conditions which will vary with locality and season. It would be more useful in a moist climate than in one which is hot and dry. It assuredly cannot be regarded as furnishing alone a sufficient means of dealing with the rabbit-pest, nor will it render unnecessary the ordinary methods of the destruction of rabbits, but must be looked upon as simply a minor and auxiliary means of destruction.

#### DESCRIPTION OF PLATES.\*

##### PLATE I.—ILLUSTRATES THE BLADDER-WORM OR CENURUS STAGE IN THE RABBIT.

Fig. 1. Egg of *Tenia serialis*, showing the six hooked embryo within the egg-shell. Magnified 630 diameters.

Fig. 2. Embryo freed from the egg. As this is a view from the side, one of the lateral pairs of hooks is not represented. Magnified 630 diameters.

Fig. 3. Portion of muscle from rabbit showing the tracks made by the bladder-worms during the early stages of their development. At the enlarged end of each track a minute bladder-worm is to be seen. The rabbit had been fed with tape-worm eggs thirteen days previously. Natural size.

Fig. 4. Young bladder-worms at early stages of their development: (a) From a rabbit thirteen days after it had been fed with eggs of tape-worm; (b) three weeks after infection of a rabbit; (c) four or five weeks. All natural size.

Fig. 5. Young bladder-worm (about six weeks old), showing the "heads" in an early stage of development (about forty "heads" are present in rudiment). They show a radial arrangement from the first. Magnified 4½ diameters.

Fig. 6. Rabbit which had been infected with eggs of *Tenia serialis*. It shows a large swelling on the left side of the face, the white fur towards the angle of the jaw being brought into view by the swelling. This was subsequently proved to be due to the presence of a bladder-worm. From a photograph taken ninety-five days after infection.

Fig. 7. Two bladder-worms of small size but carrying mature tape-worm heads. The bladder-worms have been hardened in spirit and then divided by a razor longitudinally. Those halves only are shown which bear the heads. From rabbit which died one hundred days after infection. Natural size, from a photograph.

Fig. 8. A large bladder-worm, opened and pinned out to show the "heads" on its inner wall. The "heads" here are larger than in Fig. 7, and are much more numerous (about 740). Natural size, from a photograph.

Fig. 9. A group of four "heads," or "head-sacs," showing how the mouth of sac opens on the outer surface of the bladder-worm. Magnified 10 diameters.

Fig. 10. A vertical section through a head-sac, showing the tape-worm head in the position in which it is developed, i.e., inside out. At the end of the cavity of the sac (which usually has a more spiral direction than is here shown) are to be seen the rostellum, with a portion of the crown of hooks and two of the suckers. Magnified 60 diameters.

Fig. 11. Shows two head-sacs—(a) with head in position in which it is developed; (b) sac turned inside out, so that the head now assumes its proper position. Drawn with *camera lucida*. Magnified 10 diameters.

Fig. 12. A group of bladder-worms produced by budding from a single original bladder-worm. Some of them are free, others are still attached by a wide or slender stalk. About natural size.

PLATE

\* These plates are not reproduced in this Report.

PLATE II. ILLUSTRATES THE TAPE-WORM OR TENIA STAGE OF *TENIA SERIALIS* AS FOUND IN THE DOG.

Fig. 1. The tape-worm (*Tenia serialis*), reared in a dog which had been fed with the bladder-worm (*Cœnurus serialis*). It consists of a head and neck, together with a series of joints or segments, increasing in size from the head towards the hind end. The joints, *a*, *b*, *c*, *d*, are shown on a larger scale in figs. 6-9. One free joint (= proglottis) is shown natural size.

Fig. 2. The head and neck and first few joints of the same tape-worm, magnified 28 diameters.

Fig. 3. The head of a similar tape-worm, showing the flattened form, the four suckers, and the rostellum with the crown of hooks, magnified 28 diameters.

Fig. 4. Crown of hooks of a similar tape-worm, drawn with *camera lucida*. Magnified 146 diameters.

Fig. 5. Free joints or proglottides of *Tenia serialis* in different states of contraction, as observed in proglottides when crawling.

Fig. 6. The ninety-first segment (*a*) of the tape-worm in fig. 1. Shows the reproductive organs shortly before the development of the eggs: *t.*, testes; *v.d.*, vas deferens; *g.*, germarium (germ-forming gland) of right side; *y.*, vitellarium, or yolk-forming gland; *u.*, uterus; *v.*, vagina; *s.*, genital sinus; *e.*, excretory vessel. Magnified 13 diameters.

Fig. 7. The hundred-and-fourth segment of the same tape-worm. Shows the first branches developed from the uterus as the primitive eggs pass into it. Magnified 13 diameters.

Fig. 8. About the twentieth segment from the end, showing the uterus with its numerous branches. This segment is slightly contracted. Magnified 6½ diameters.

Fig. 9. One of the last segments (*d*). The uterus and its branches are crowded with eggs containing mature embryos. Magnified 6½ diameters.

[Figs. 6-9 are reduced from drawings made with *camera lucida*. Much care was taken to secure accuracy in the details of the branches of the uterus.]

Fig. 10. Segment of *Tenia cœnurus*, for comparison with figs. 8 and 9. After Leuckart. Said to be magnified 10 or 15 diameters.

Fig. 11. A small (*a*) and large (*b*) hook from *Tenia cœnurus*. Copied from Leuckart for comparison with fig. 12. Magnified 280 diameters.

Fig. 12. The corresponding hooks of *Tenia serialis*. Drawn with *camera lucida*. Magnified 280 diameters.

## APPENDIX IX.

## Letter from Mr. Robert S. Hawkins, of North Wairarapa (N.Z.), concerning Bladder-worm Disease.

[Extract from New Zealand newspaper.]

AUSTRALIAN NEWS.

Sydney, December 21.

THE Rabbit Commissioners have adopted their report for presentation to Parliament. The report deals extensively with the various experiments, and as far as the experiments have gone, they tend to prove that M. Pasteur's remedy is totally inefficacious. Under the conditions prevailing in the interior of the continent, the microbe loses its virulence after a few hours' exposure to moderately warm weather, or when subjected to the drying effect of the wind. The disease (*sarcopiles cuniculi*) discovered by Professor Watson, and others, are dealt with. With regard to the bladder-worm, it is said that it cleared the Wairarapa district of rabbits, and the Commissioners recommend that further investigations be made into this disease.

Sir,

Everton Terrace, Wellington, 22 December, 1888.

Referring to the cable message received here this morning, I think that the last paragraph indicates that the Commissioners have been seriously misled, I do not say intentionally; I have no doubt that the persons who have so persistently attempted to give importance to the rabbit-fluke disease believed that they were doing good.

But when it comes to the Commission treating the disease so seriously as to recommend further investigations, it is time that they should be informed as to the practical experience of the disease and its effects.

I and another owned, in 1881, 12,000 acres of rabbit-infested country in North Wairarapa, surrounded on all sides by other rabbit-infested country. I saw the disease myself first early in 1883, and on inquiry from the rabbiters found that it was then well known to them as a common disease among the rabbits.

I subsequently paid more attention to it, and as I was myself constantly superintending the rearing of ferrets, which were fed on dead rabbits, and often had out four good rabbit dogs with me on the run to test the state of the rabbits, I was able to see a good deal of the disease.

The sacs holding the fluke were generally on the thigh, but sometimes under the lower jaw and neck. I have seen the lower jaw puffed out to half the size of half a tennis ball. The sac always contained fluke floating in serum.

I never noticed that the rabbits thus diseased ran less fast than others, or that they were in noticeably low condition. In fact it was a matter of surprise to me that they were so little affected, apparently, by what I thought must be a considerable cause of distress.

I left the run at the end of 1886; but I am able to assure the Commissioners that, notwithstanding that during seven years every means had been used to destroy the rabbits—including the laying in the winter of many tons of poisoned grain, the employment of trappers, diggers-out, and shooters, and the turning out of large numbers of ferrets—the rabbits are just as bad as they were seven years ago; that is, that the same poisoned grain, the same trapping and shooting, has to go on now to keep them within bounds.

The fluke has exercised no influence whatever—has neither weakened the rabbits nor affected their procreative powers.

A few people in the south country having suddenly in 1887 found out the existence of the fluke, made a great fuss—got down Government scientists, and so on. They found their rabbits had largely diminished, and attributed it to fluke.

The real fact is that ferrets thrive and became acclimatized in the south, and did not thrive with us in the north. After years of turning out and feeding there are less ferrets in our country than there were in 1884. I cannot account for it, but it is a fact.

To sum up: Is it not clear that if this bladder-fluke had really been destructive to the rabbit, its effect would have been felt in the north country? Of what use is it wasting money and time in investigating a disease which has been so powerless to hurt the rabbit, as I have proved it to be?

Your obedient servant,  
ROBERT S. HAWKINS.

The Secretary,  
Rabbit Commission, Sydney.

(Signed)

APPENDIX X.

## APPENDIX X.

## Nasal Catarrh in Rabbits.

To Francis Abigail, Esq., Department of Mines, Sydney, N.S.W.

Sir,

13, Oxford-street, London, 1st December, 1887.

In response to a proclamation issued by the New South Wales Government, regarding the extermination of rabbits in that Colony, we have the honor to bring to your notice the following particulars of a scheme for accomplishing the same, which we humbly submit for your consideration.

By this scheme it is proposed to gradually exterminate the animals in question by communicating to them a fatal epizootic disease, which shall not be noxious or in any way injurious to any other animals except, perhaps, to a few other rodents which will hereafter be enumerated.

From carefully observed experiments, we are enabled at the present moment to state as our humble opinion, that a disease taking the form of, and known as, "nasal catarrh" is one that answers all the conditions of the previous statements, and one that will at once command the confidence of scientists, not only by reason of its being peculiar to the rabbit family and its non-liability to spread to or infect any other valuable animal, but also on account of its being so highly infectious and rapidly fatal to rabbits.

We have been able to obtain and to cultivate the micro-organisms of this disease, and have found that they may be easily preserved. They may be communicated to rabbits in several simple ways, but with your permission we would prefer to postpone our remarks in that direction, and to make it the subject of a future communication, in which we purpose describing the method of transmission which we would recommend should be adopted.

The peculiarity and main feature of our scheme may be said to lie in the fact that it advocates diseases which, in case an animal may recover and survive one attack, do not secure to such animal any immunity from being subsequently attacked, but which on the contrary tend to predispose it to their ravages.

It will be seen that by adopting the disease proposed by our scheme, the inoculating of any animal with attenuated virus or vaccine in order to secure immunity to it would be obviated, as also would any precaution.

We most respectfully beg to be understood that we do not claim to have originated or to have discovered the disease mentioned herein, but what we do claim as constituting the vitality of our scheme is the discovery of its complete applicability to the extermination of rabbits in New South Wales.

In conclusion, we desire again to ask permission to be allowed to address a further communication on this subject to you, which communication will contain details and particulars of how our scheme is to be carried into practical effect.

We have, &c.,

JAMES P. WEST.

HENRY J. W. RAPHAEL.

EXTRACT quoted by Dr. Bancroft, and ordered by the Experiment Committee to be printed, 1st May:—

Thus Zürn has lately come to the conviction that the infectious virulent influenza of the rabbit—an often fatal rhinitis, which usually spreads rapidly from the nose to the pharynx and tympanum, and, after perforation of the membrane, sometimes attacks the external ear, or passes to the intestine—is caused by parasites,\* which can be observed in great numbers as naked gregarines and psorospermie in the affected mucous membranes and their secretions. Similarly, Silvestrini and Rivolta were able in 1872 to refer an epidemic prevalent amongst the fowls around Pisa to psorosperms.† The disease was localized, like the influenza of the rabbit, in the pharynx and nose, but sometimes affected the conjunctiva, intestine, or even the comb.—(Leuckart "The Parasites of Man," page 227).

## APPENDIX XI.

## Communications from witnesses relative to Statements made in Evidence.

[Evidence of Arthur R. Torrens, page 59.]

To the Secretary, Rabbit Commission,—

Sir,

Silverton, 28 May, 1888.

In my evidence before the Rabbit Commission I do not think that I laid sufficient stress on the fact that the late light rains seemed to have very greatly revived unhealthy rabbits; and that, apparently, can rabbits only get sufficient feed and water, they will recover from the disease they now appear to be suffering from.

I have, &c.,

A. R. TORRENS,

Rabbit Inspector.

[Evidence

\* "The globular and egg-form psorospermie as cause of sickness in domestic animals," p. 14, Leipsig, 1878. The infectious catarrh of rabbits is described as a fungoid disease in Von Schmidt's work, "The Mycotic Diseases of the Respiratory Organs especially of Rabbits." Hofgeismar, 1877.

† "Journal of anatomy, physiology, and pathology of animals," Pisa 1873. See also Rivolta, "Parass. veget.," p. 390.

[*Evidence of H. P. Richardson, page 86.*]

To Mr. Mahon, Secretary, Rabbit Commission,—

Sir,

Silverton, 28 May, 1888.

I beg to state that, from April to December, 1887, the amounts of money paid for the destruction of rabbits was greater per month than previously, although the bonus paid per scalp was lower. A larger number of rabbits were also caught during these months.

The rabbits now alive seem to be improving since the late rains.

I have, &c.,

H. P. RICHARDSON,  
Rabbit Inspector.

[*Evidence of Alexander Bell, page 85.*]

To Hugh Mahon, Esq.,—

Dear Sir,

Langawirra, 6 October, 1888.

I have yours of the 25th of last month with my evidence enclosed that I gave before the Commission on the Rabbit Inquiry.

I find by our books that I did over-estimate some things. In January, 1886, we killed 410; the rabbits increased every month to December, when we killed 3,454 rabbits. In January, 1887, we killed 4,507, increasing every month until December, when we killed 32,425. The number of rabbiters in 1886 was 14; in 1887, 32.

Rabbits drink arsenic-water freely in dry hot weather. Strychnine, 1 oz., in one bucket of water is the correct thing; not two buckets as I gave in my evidence.

All other parts of my evidence are correct, to the best of my knowledge.

I have, &c.,

ALEXANDER BELL.

[*Evidence of C. J. Valentine, page 89.*]

#### CARRYING CAPABILITIES.

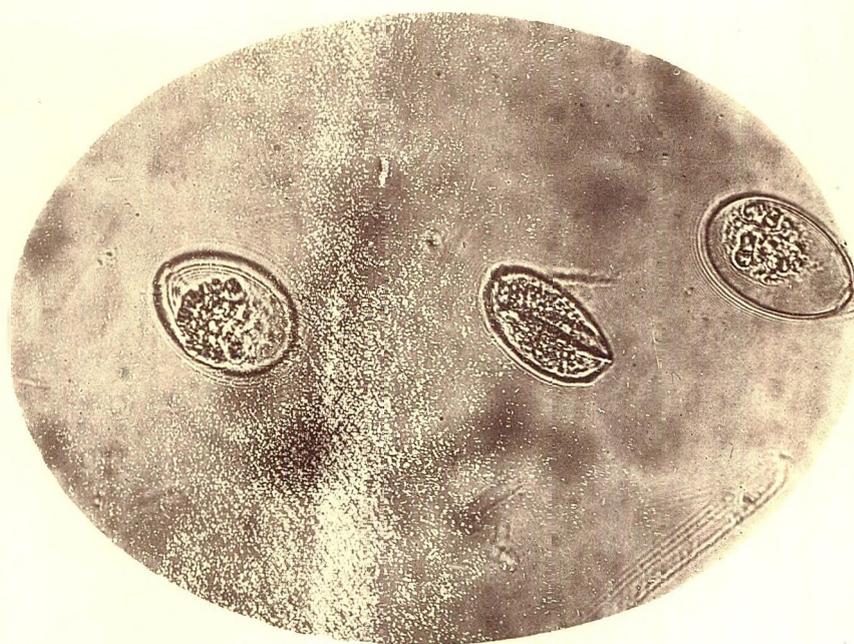
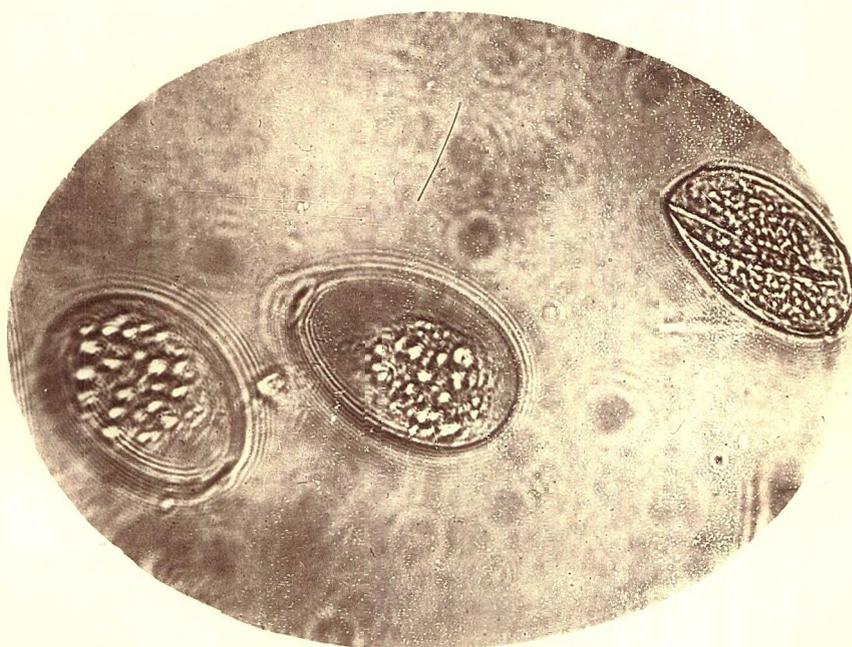
In some instances the reduction in the carrying capabilities of the runs has been very great, from 30,000 sheep to 10,000. Although the drought has reduced the carrying capabilities of the runs, that has been of a temporary nature, but where the country has been infested with rabbits, the capability has been affected by the destruction of small shrubs, which are the main source of food during dry seasons. Many of the shrubs will never recover; some of the larger shrubs may recover, but the effect on the country where the rabbits have been very numerous, will be to decidedly reduce the carrying capabilities for some seasons.

On one run the rabbits have, it may be said, completely died out, most probably from some disease caused by over-crowding. No disease was known to have been placed amongst rabbits.

Rabbits were first brought to Encounter Bay, and placed on Wright Island in 1837; but, although placed on the mainland, never increased in any numbers.

CHAS. JONAS VALENTINE.

[Thirteen plates.]



Photographs of magnified Coccidia. (See Dr. Bancroft's report, pp. 204-5.)



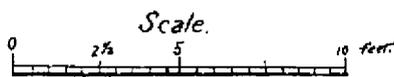
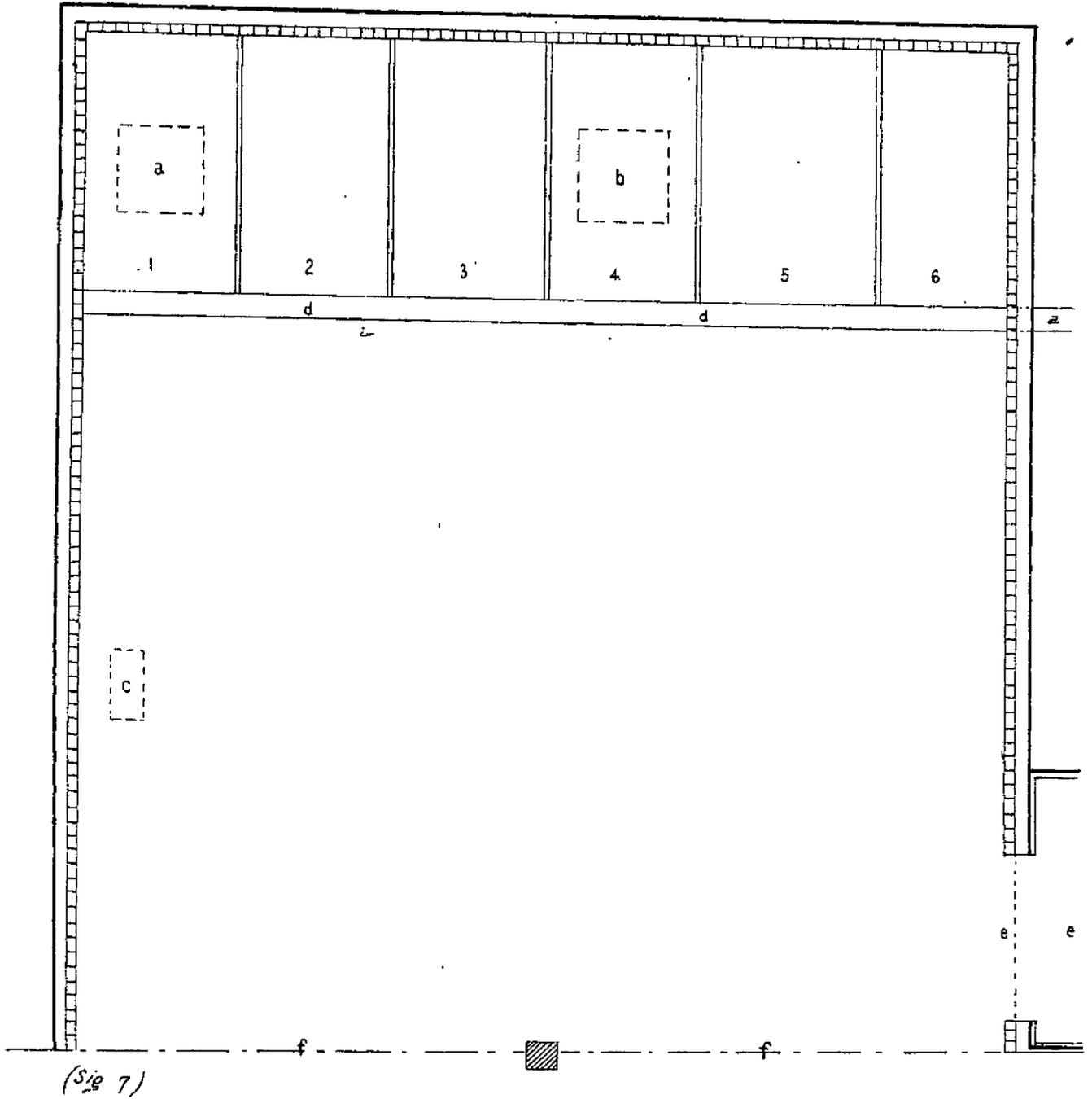
Photograph of a magnified microscopic section through one of the nodules in the liver of a Rabbit suffering from *Coccidium oviforme*. (See Dr. Bancroft's report, pp. 204-5.)

Sig. 7.

SKETCH OF STABLE

DIAGRAM I.

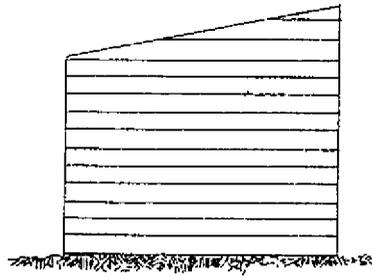
Plane Section.



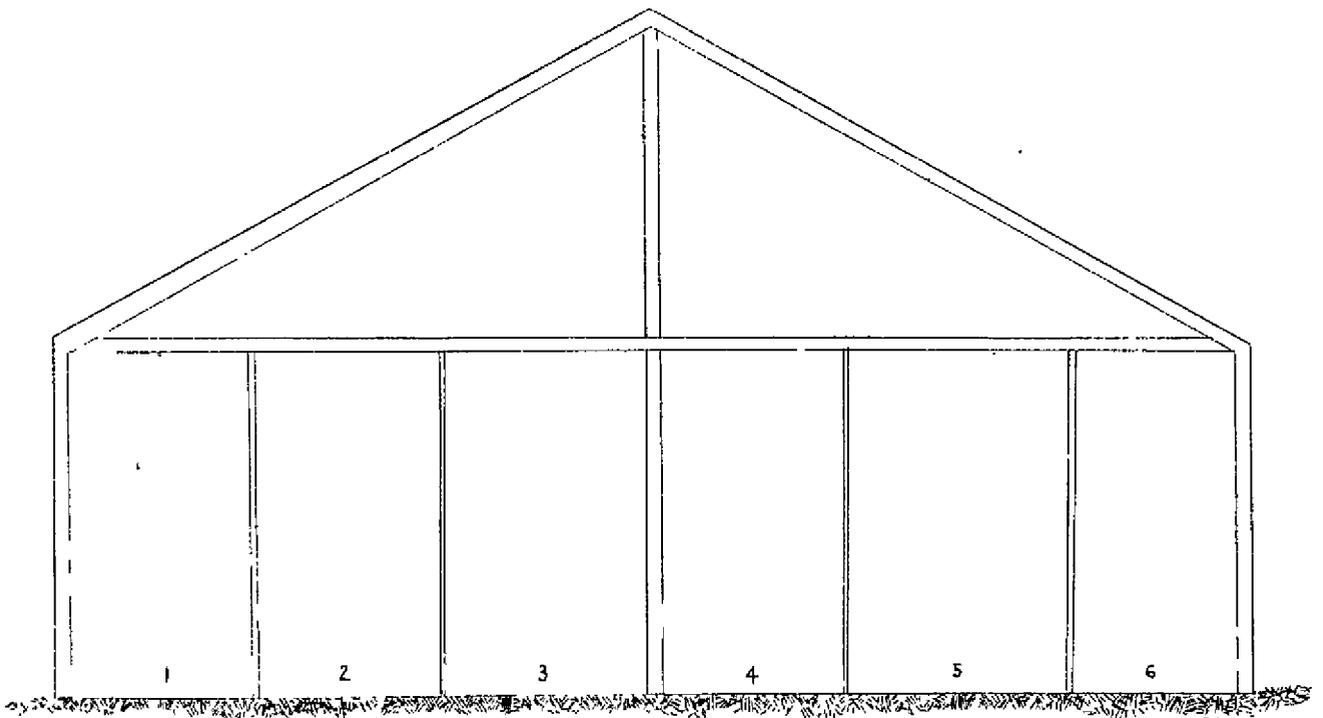
SKETCH OF STABLE

DIAGRAM II

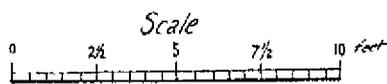
*Side elevation of a stall.*



*Vertical Section*



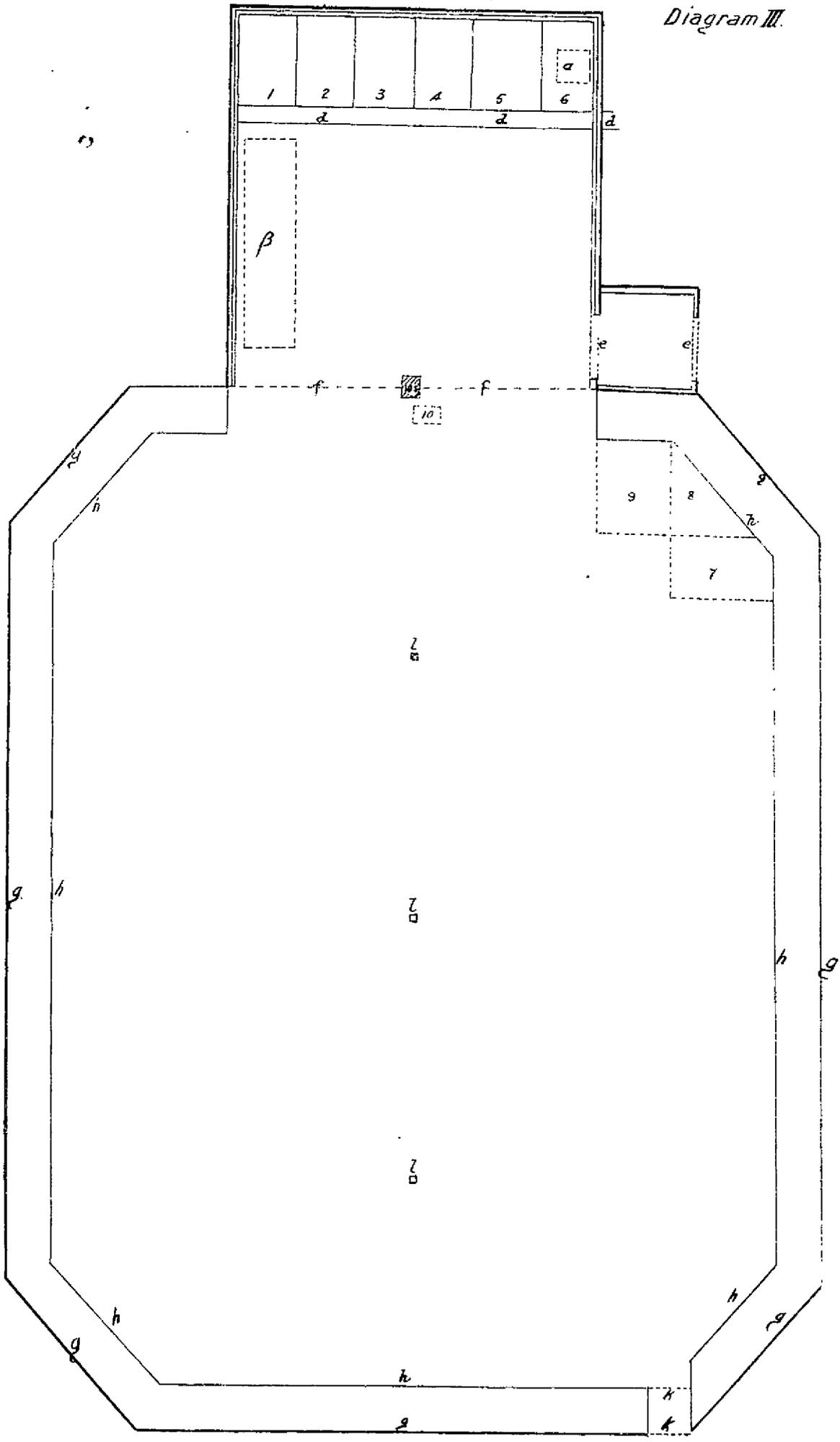
(Fig. 7)



Sketch of Stable Inclosure

Plane Section

Diagram III.



Scale

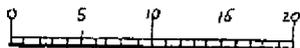
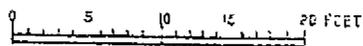
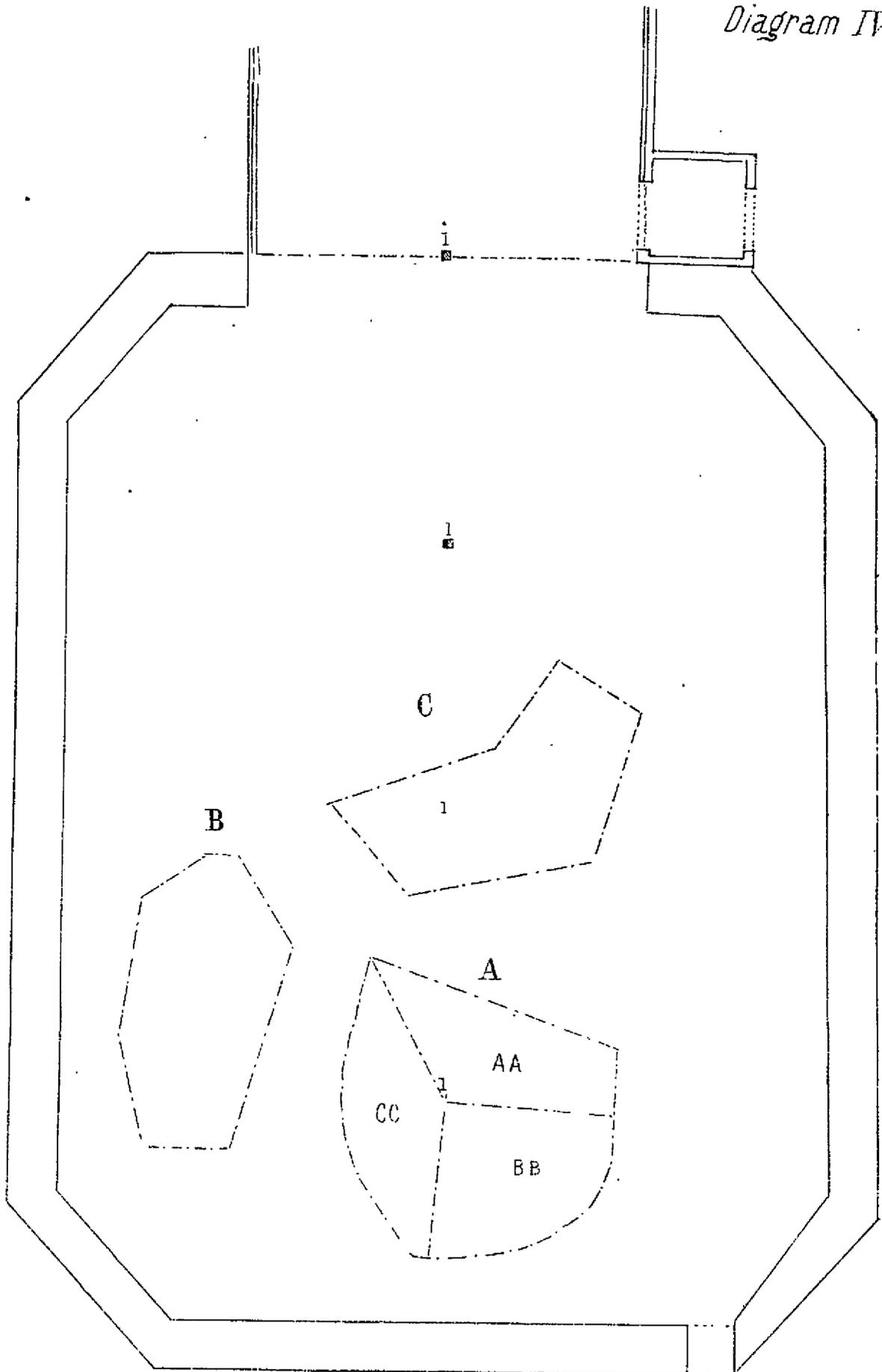
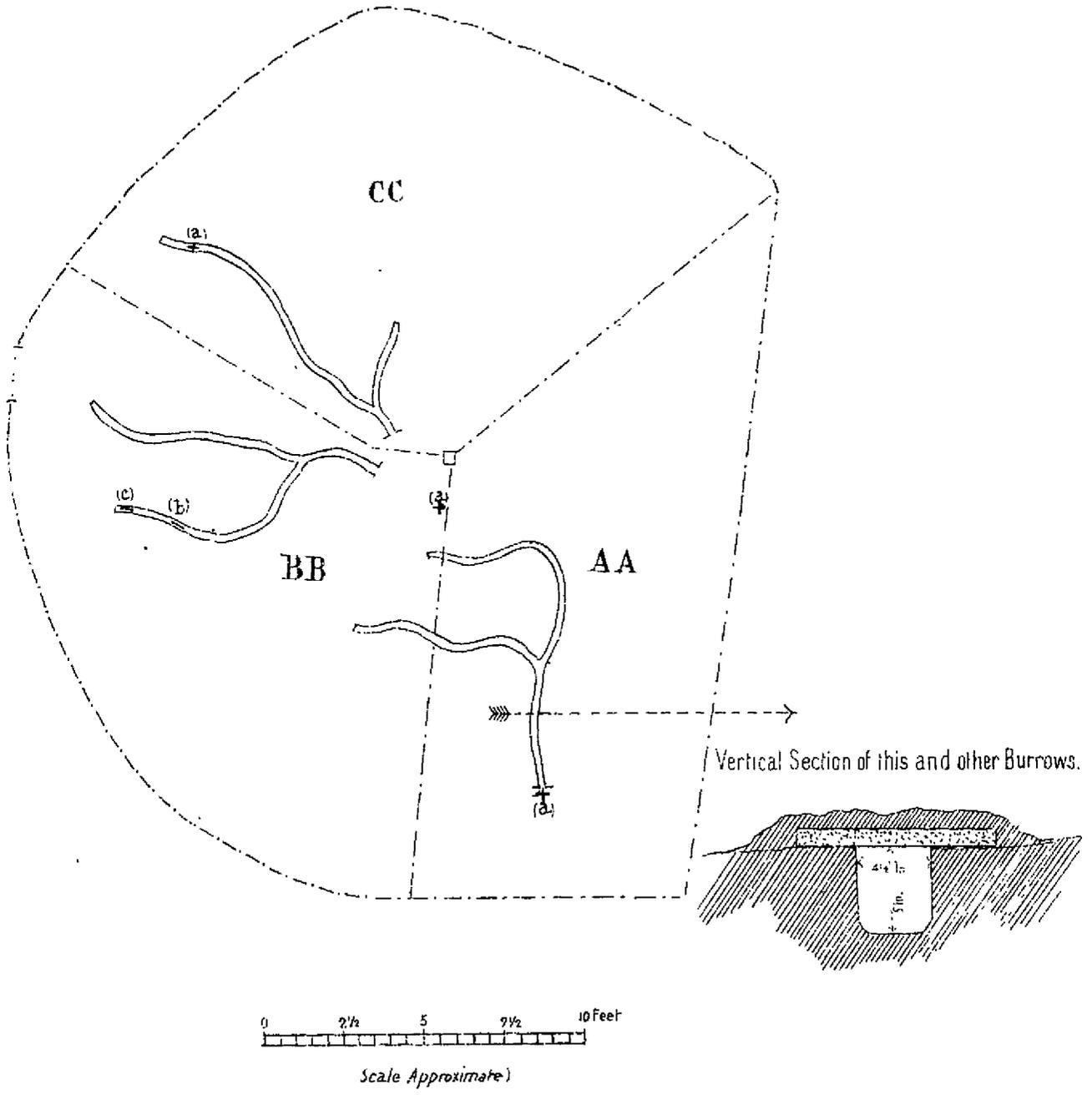


Diagram IV



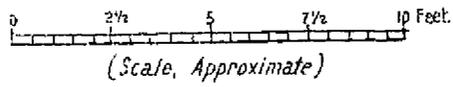
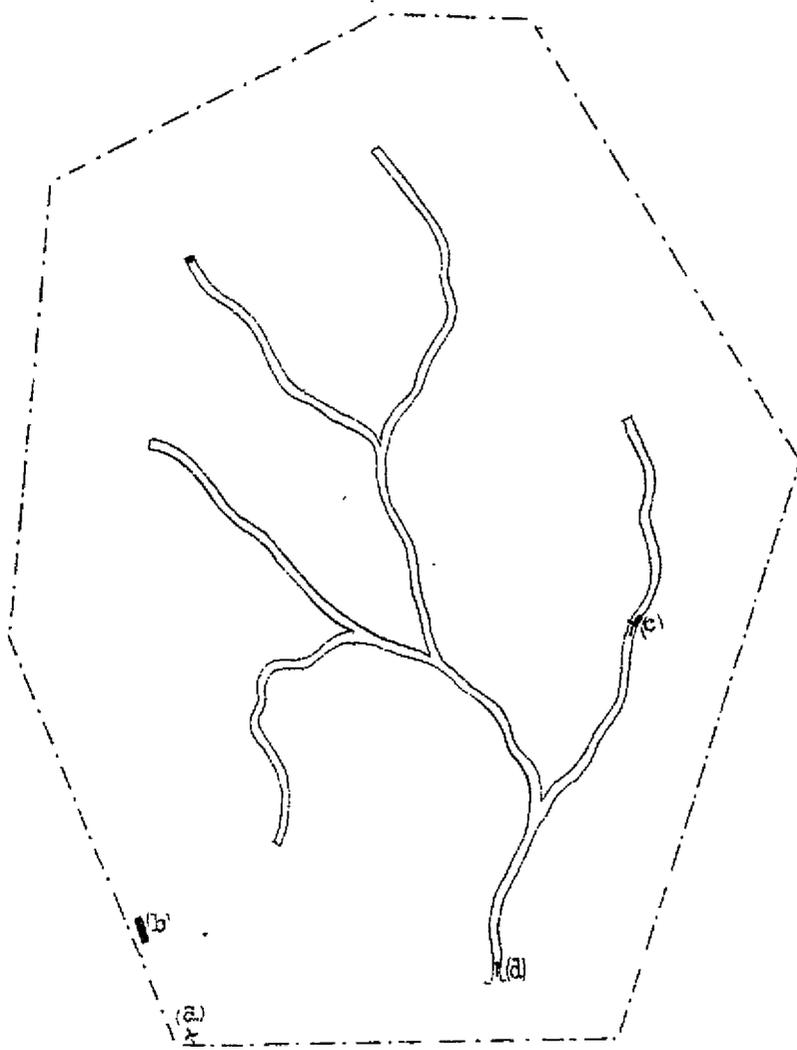
SKETCH OF THE MAIN ENCLOSURE SHOWING ALSO PART OF THE STABLE.

Diagram V.



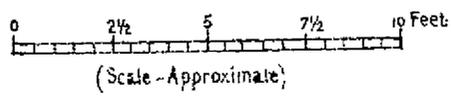
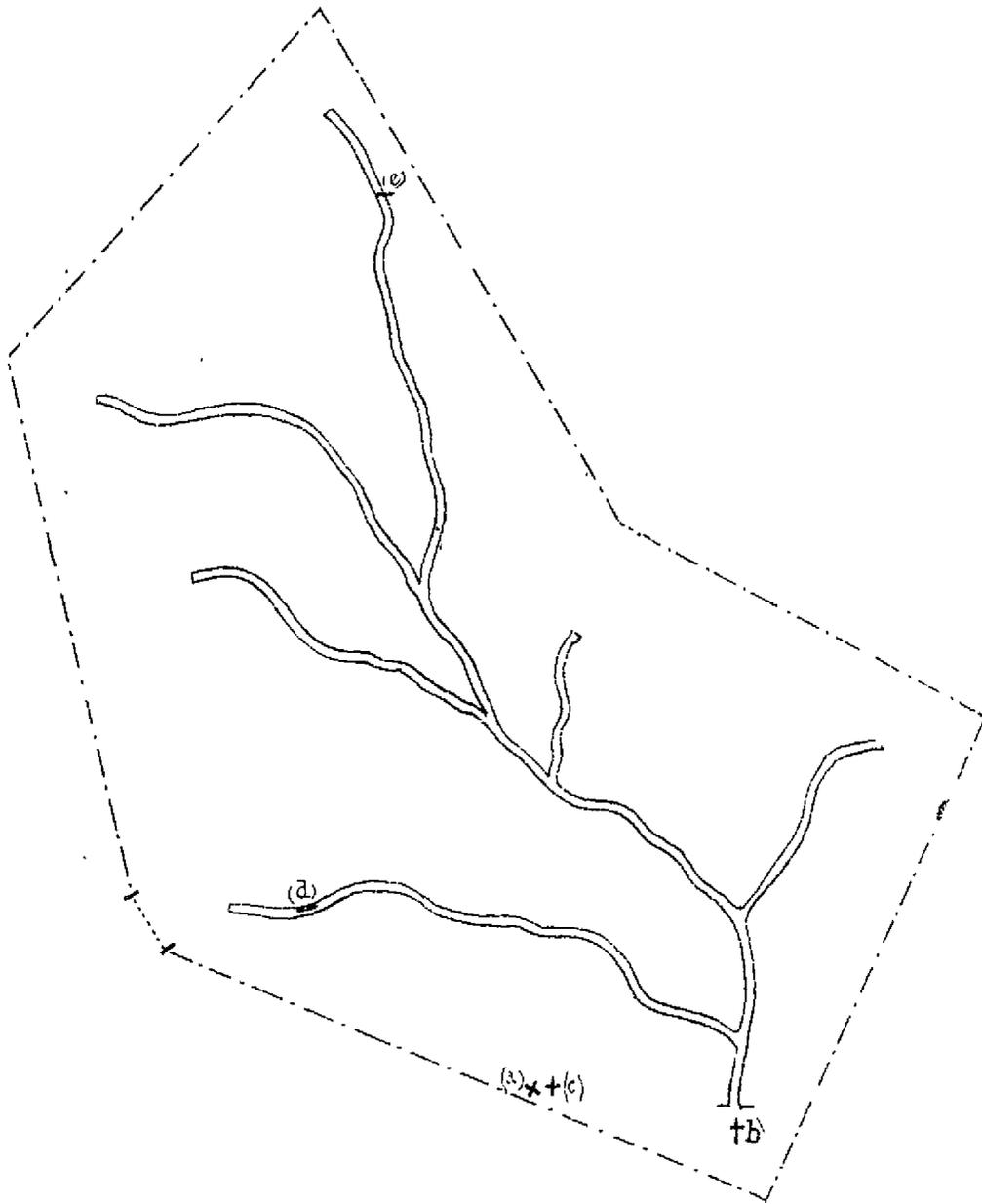
ARTIFICIAL BURROW. A.

Diagram VI



ARTIFICIAL BURROW. B

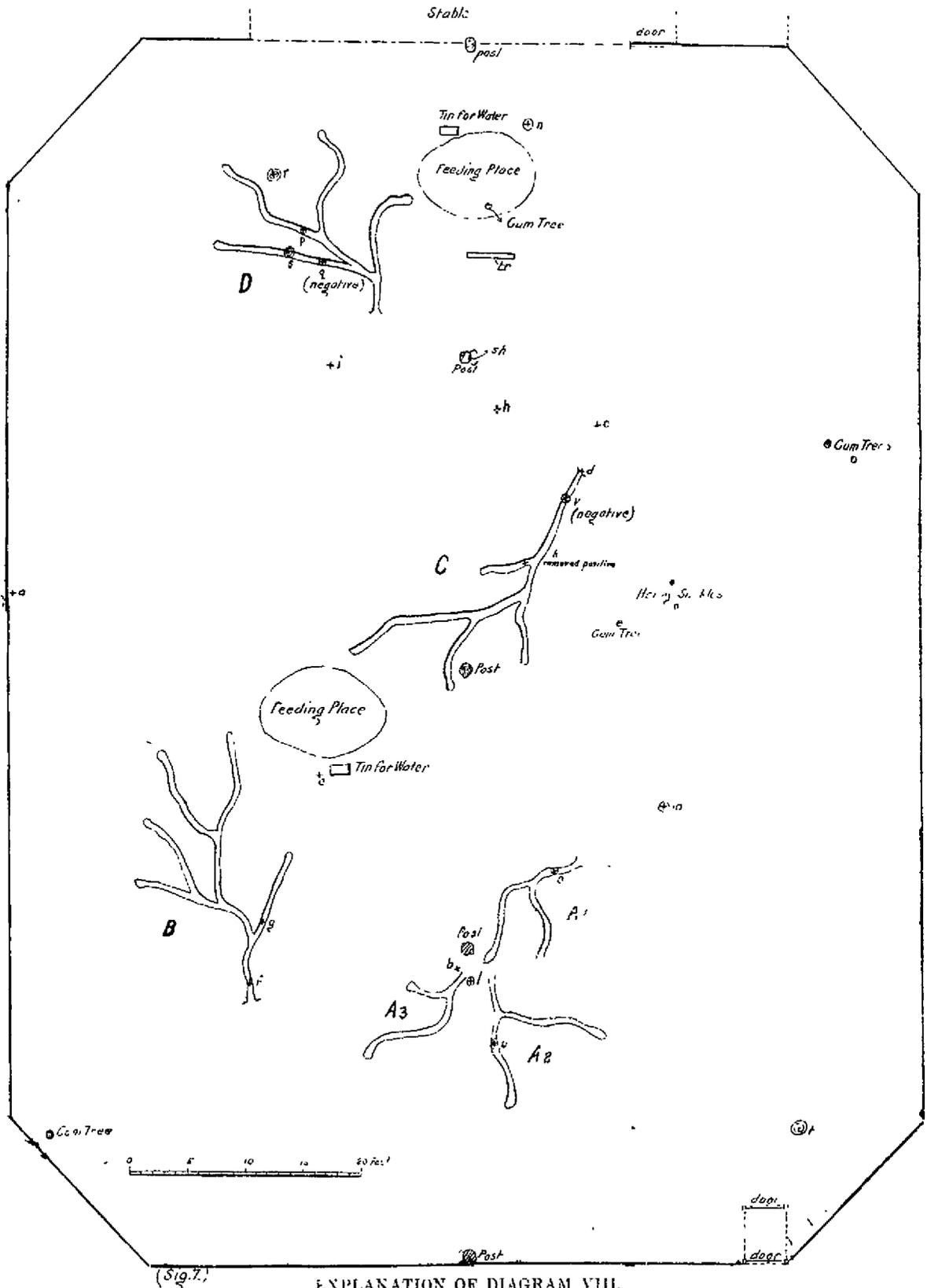
Diagram VII



ARTIFICIAL BURROW C.

[Sig. 7

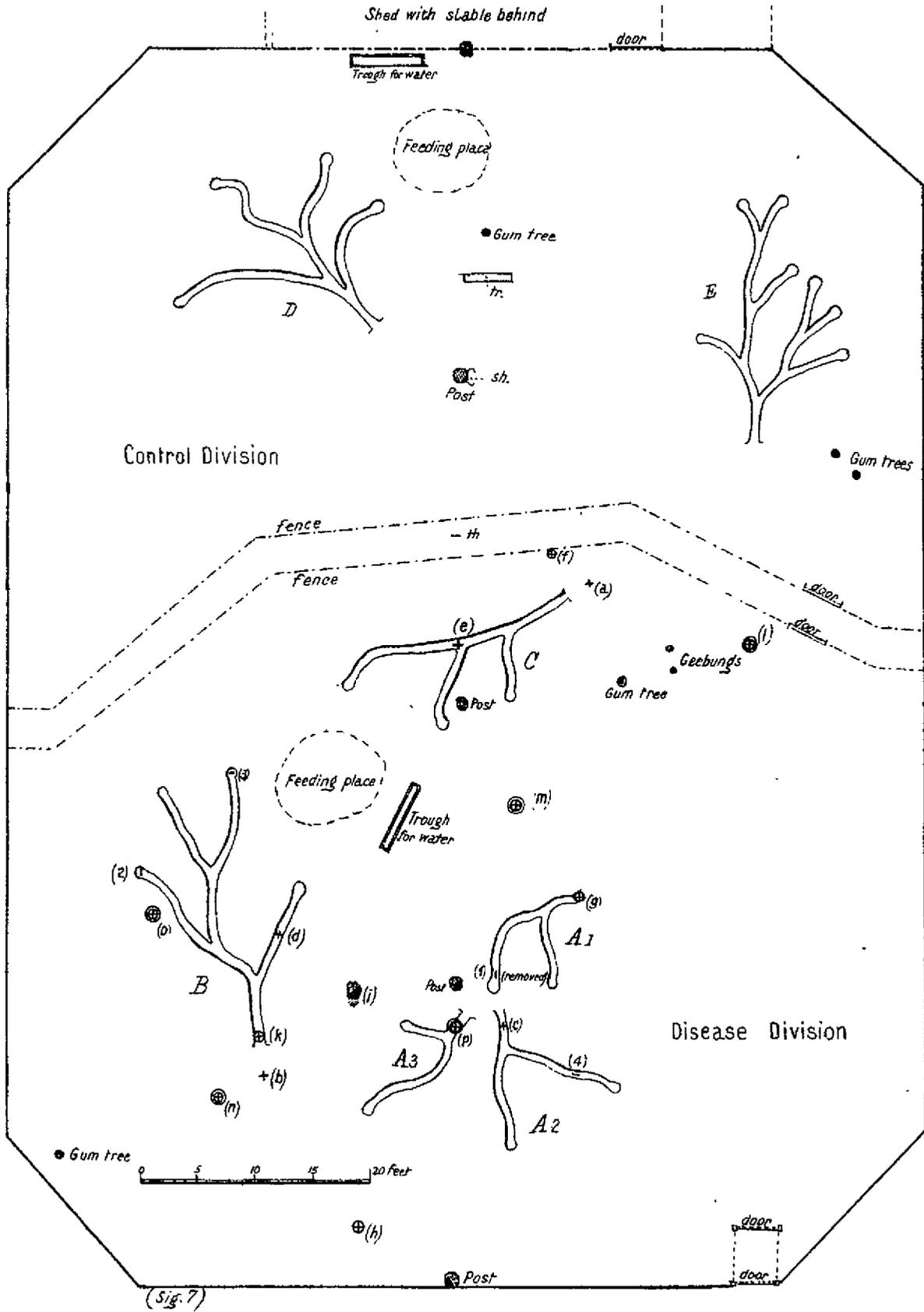
DIAGRAM VIII



EXPLANATION OF DIAGRAM VIII.

Diagram VIII showing the enclosure used for the experiments; together with the burrows, the position of the dead infected rabbits, feeding and watering places, and the spots where temperatures in air (shaded) and underground were taken. The first lot of rabbits which died after having been treated with microbes, viz., a to l, are marked with the symbol  $\ominus$ . The second lot, l to q, with the symbol  $\oplus$ . The third lot, r to v, with the symbol  $\oplus$ , tr. is the trench, at the bottom of which a thermometer was placed for taking temperatures, sh. is the spot where the temperatures of the shaded air were taken.

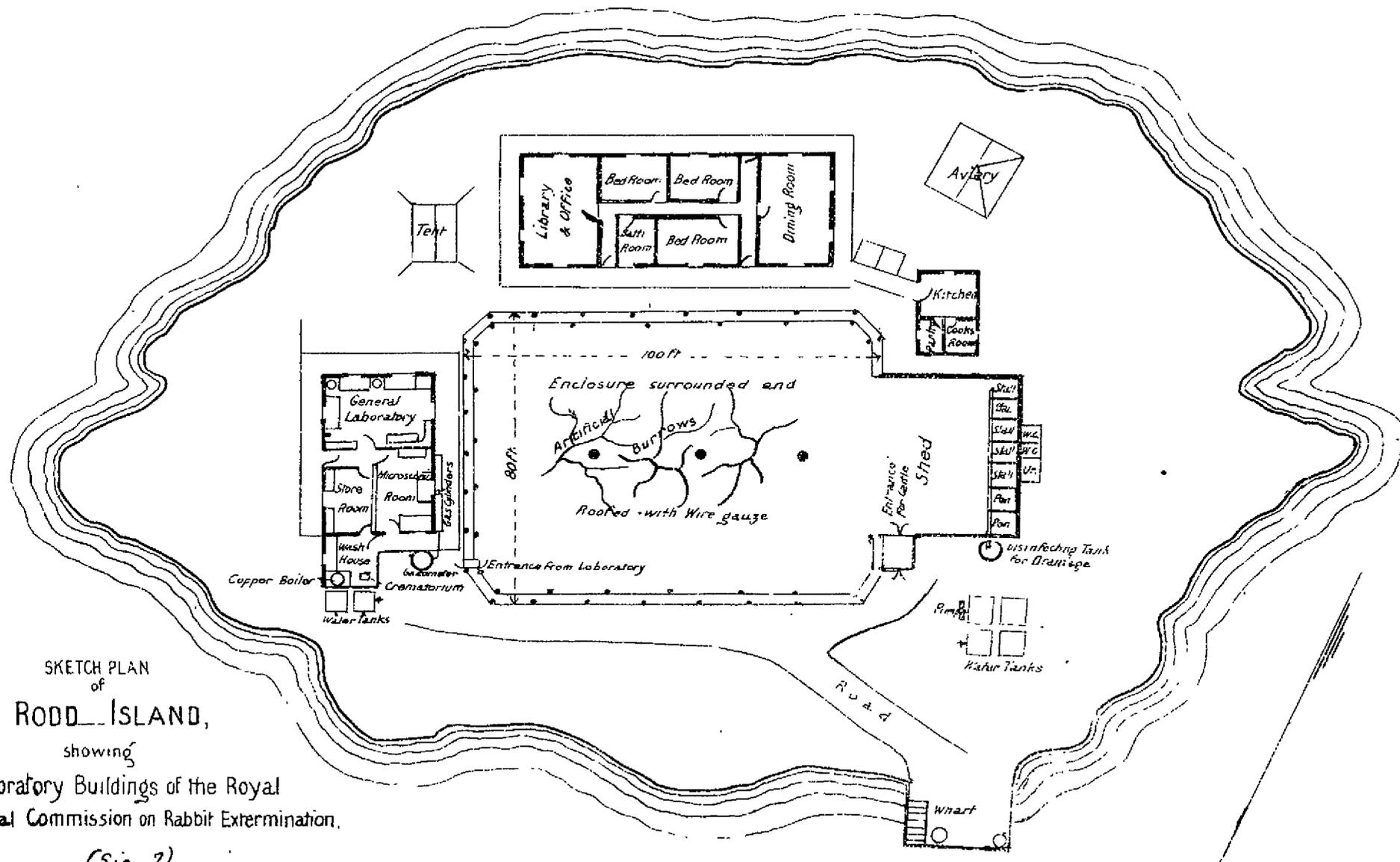
DIAGRAM IX.

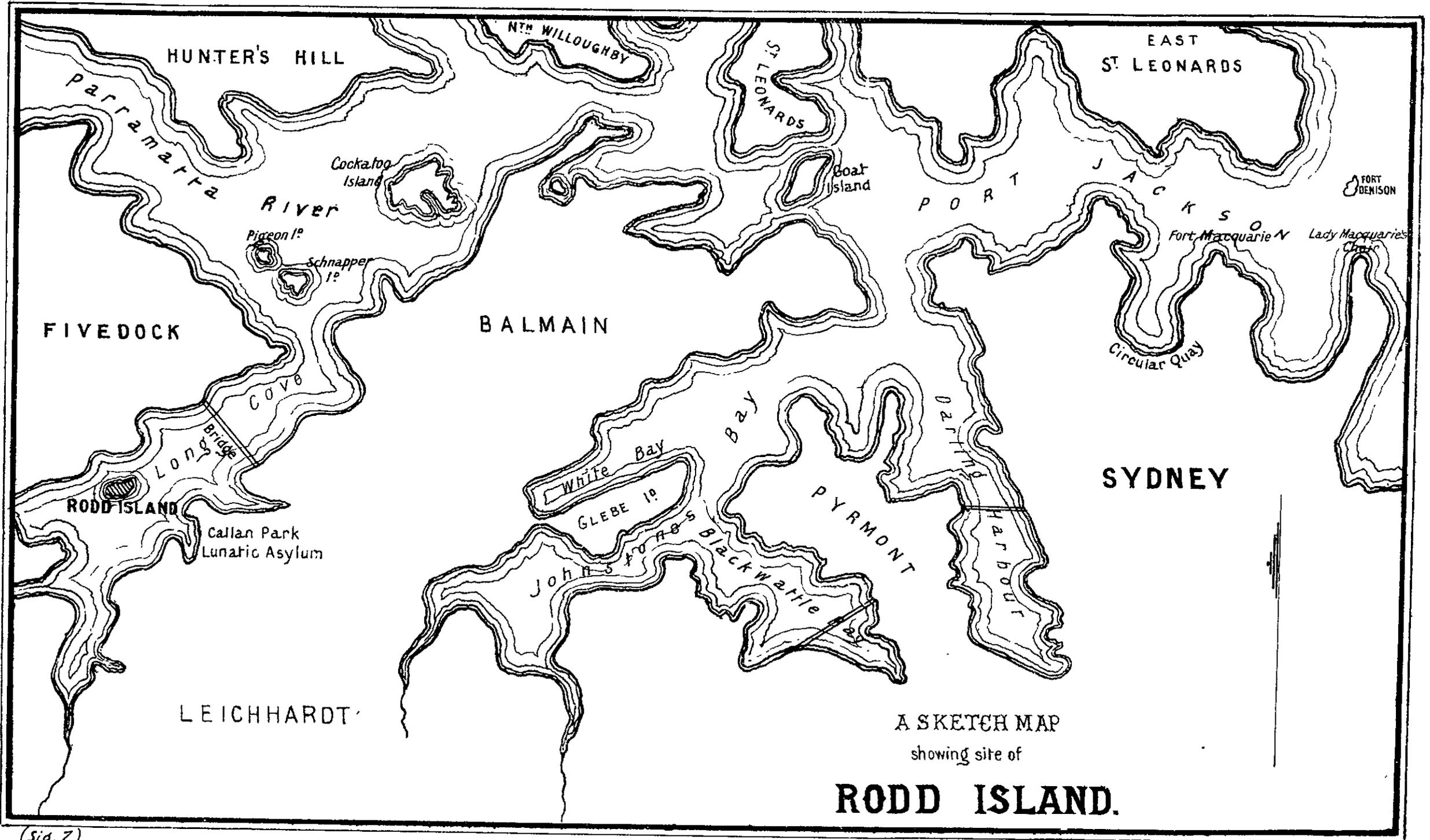


SKETCH PLAN  
of  
**RODD ISLAND,**  
showing  
Laboratory Buildings of the Royal  
Intercolonial Commission on Rabbit Extermination.

(Sig. 7)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE  
SYDNEY, NEW SOUTH WALES





A SKETCH MAP  
showing site of

**RODD ISLAND.**

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RABBITS.

REPORT UPON METHOD OF DESTROYING—UPON THE TERYAWYNIA HOLDING.)

*Ordered by the Legislative Assembly to be printed, 4 June, 1890.*

RETURN to an *Order*, made by the Honorable the Legislative Assembly of New South Wales, dated 3rd June, 1890, That there be laid upon the Table of this House,—

“ A copy of the Report of the Officer who was sent to inspect and report  
“ upon the method of destroying Rabbits on the Teryawynia Holding.”

*(Mr. Dickens.)*

Mr. H. C. Taylor to The Under Secretary for Lands.

Department of Lands, Rabbit Branch,  
Sydney, 31 March, 1890.

Sir,

I have the honor to state that, in accordance with your instructions, I left Sydney on the 28th ultimo for the purpose of inquiring into the methods adopted by Mr. W. P. Wynne for the destruction of rabbits upon the pastoral holding known as Teryawynia, and for your information submit herewith a report based upon the result of my observations of the work done and being done upon Teryawynia and other holdings in the vicinity. My instructions referred principally to Teryawynia, and the data upon which I started to work were contained almost entirely in Mr. Wynne's now well-known letter, bearing date 29th January last; nevertheless, with your permission, my inspection was allowed to extend to other runs in the district, with the result that I am able to speak more decisively upon the whole question raised.

After being eight days upon Teryawynia and travelling over 250 miles of the country within the boundaries of the leasehold and resumed areas, I am enabled to assert that an immense amount of destruction can be caused among the rabbits during the dry season at a comparatively trifling cost by the use of both poisons and traps in the immediate vicinity of water. As stated in his letter, Mr. Wynne has made a special study of rabbits, and one cannot fail to be impressed with the earnestness he displays in endeavouring to cope with the pest in a cheap and effective manner. The area of the holding, roughly estimated, is in excess of 920,000 acres, and the leasehold area is watered by a river, creeks, and lakes, while on the resumed area the stock are entirely dependent for water upon the supply contained in the tanks constructed at various times by the Crown tenants.

Shortly after arrival at the homestead I determined upon making an inspection of the country in the leasehold area, and of the work being done in the neighbourhood of what may be called the natural waters, and I am ready to admit that the absence of rabbits in large numbers was to me a surprise, more especially as evidence of their previous existence was plainly manifest, a fact which also pronounced itself to a prominent pastoralist in the Western district, who accompanied me during portion of my inspection. On the frontage to the Darling the width of the run is 8 miles, but taking into consideration the devious course of the river the extent of the water frontage is 24 miles, and here the work has been completed to the lessee's satisfaction, with the exception of what Mr. Wynne describes as a “ little titivating ”; but on the Talyawalka Creek, which crosses the run from north to south,

287—

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south, the work of laying poisoned sticks is in full swing. On the way to this portion of the run the country traversed is eminently suited for rabbits, but very few could be seen, although I drove through cane grass swamps and over sandhills which looked like the home of the wily rodent. On arrival at Blantyre Hut, on the east side of the creek, indications were plentiful of the work being done, and in a short walk the carcasses of rabbits could be seen in all directions. Crossing the creek I visited a camp consisting of seven men, who were busily engaged in cutting, poisoning, and distributing lignum, which is one of the means used in destroying rabbits, and after seeing the whole process in operation, and the results obtained, I was satisfied that the method is a satisfactory one. An excellent growth of lignum is obtained in the waters of the creek, and this, after being drenched in a preparation of strychnine, is distributed at intervals of about 10 feet close to the water's edge, and although it dries very quickly owing to the heat of the sun, the results must be gladdening to those immediately concerned, as on the succeeding day the dead rabbits are to be seen in great numbers, while the medium used indicates plainly the cause of the mortality.

It may be noticed that at this camp the poison used was strychnine, in lieu of the cheaper and equally effective poison, arsenic, this being due to the fact that several men had suffered in health from the frequent use of the latter, a condition of affairs that might be obviated by the exercise of greater care on the part of those interested. The men engaged in this work are paid 20s. per week and rations, while the ganger receives an additional 5s., and it is alleged that the employment will in no case exceed three months in every two years. Again crossing the creek, and driving along the eastern side of the Tallynwalka, I arrived at another camp, where the men were busily engaged preparing and laying sandal-wood sticks poisoned with arsenic, and on the road the presence of live rabbits was more noticeable than at any previous time, and in a cane grass swamp passed through they may be described as being fairly numerous, but it must be noticed that owing to a recent fall of rain there were various crab-holes full of water which destroyed the inducement for the rabbits to journey into the creek, and in addition it was country which Mr. Wynne described as not having yet been worked. This camp is worked on the same principles as the one previously visited, and the poisoned sticks can be seen stripped of every vestige of bark in a manner similar to those recently produced for your inspection. Great results are being obtained in this locality, although the process of preparing the bait is much slower and more tedious than at the other camp, but it must be remembered that the lignum cannot be used in paddocks that are occupied by sheep. Objections have been raised in some quarters to the use of lignum as a means for the destruction of rabbits, on the grounds that it dries too quickly, and it is alleged that "the old man salt-bush" is a much more effective agent, but my observations lead me to doubt this. However, the parties immediately interested should experiment for themselves.

On the resumed area the work of destruction is done almost entirely by enclosing the tanks with wire-netting, and erecting at each one or two traps (*specimen produced*), which cost about 6d. each, within which the rabbits are caught alive, afterwards killed, the skins being stretched, dried, and preserved for market. I visited a number of the tanks, and witnessed the whole of the operations, and at one tank in "the Pine Paddock," which had been closed for the first time the night previously, it was found upon my arrival there the following morning that the result of the catch was 789 rabbits. At this place three men were engaged killing and skinning the rabbits, the carcasses being afterwards removed to a convenient distance from the water, and destroyed by fire. At the present time all the men engaged in this work are paid weekly wage, the skins remaining the property of the employer, who hopes by their sale to recoup himself for the cost of the labour. Upon the question of the commercial value of the skins I was not able to obtain in the locality any satisfactory evidence, but I have with me a fair average sample of those obtained on the run, which I have submitted to several experts in the city, who estimate them to be worth 1s. per dozen here. Mr. Wynne bases his estimate of the value of the skins upon the fact that a year ago he sold about 7,200 to the captain of one of the river steamers, for which he received at the rate of 9d. per dozen, and, although there is nothing phenomenal in two men obtaining 10,000 skins in a fortnight, it must also be remembered the skins still remain in their possession, and when they contrive to sell them at 9d. per dozen their earnings will amount to the sum named by Mr. Wynne. However, a large number of skins are at present stored at various places on the run, which will in due course be sent to market, and the carriage being by water the expense of getting them there will be trifling.

The following is a list of results obtained by trapping at various tanks on the run between the first week in January and the 28th February last:—

Christmas Wells tank ... ..	12,105
*Fords ... ..	4,190
Bleaalben ... ..	6,210
*Burndoo ... ..	4,505
*Cowarg ... ..	4,345
Wanalla ... ..	1,362
*Warlo ... ..	2,037
*Coolamarra House ... ..	1,888
Yella ... ..	1,244
*Paradise ... ..	1,740
*Surveyor ... ..	750
Government tank (26-mile) ... ..	6,412
*Coolamarra Swamp ... ..	5,570

An interesting fact, and one that affords ample evidence of the necessity for rabbits to obtain water when there is no moisture in their food, is that on Teryawynia, and other stations, where tank trapping is resorted to, the daily registers kept, showing the number of rabbits caught, discloses that immediately upon the fall of rain the number so caught are strikingly diminished, and at a tank, where, one morning the catch was 278, the following morning which was preceded by a slight fall of rain, the number of rabbits obtained was but three. I am particular in emphasizing these facts, as it is but a few years since that the highest authorities confidently asserted that the existence of rabbits was in no way interfered with

\* The asterisk is intended to denote the tanks which are still being trapped.

with by the want of water. As showing the steady decline in the numbers caught each day at these traps I give below the result of the work done at the Beelparjah Dam, situated on an out station of the holding, known as Kulfera:—

Date.	Rabbits killed.	Date.	Rabbits killed.
13th January, 1890 ... ..	1,600	21th January, 1890 ... ..	65
14th " " ... ..	1,100	25th " " ... ..	96
15th " " ... ..	300	26th " " ... ..	6
16th " " ... ..	295	27th " " ... ..	42
17th " " ... ..	206	28th " " ... ..	16
18th " " ... ..	580	29th " " ... ..	6
19th " " ... ..	323	30th " " ... ..	16
20th " " ... ..	229		
21st " " ... ..	125	Total... ..	5,159
22nd " " ... ..	109		
23rd " " ... ..	45		

During the whole of my inspection it was a noticeable fact that the presence of rabbits was more plainly discernible in the locality of water than elsewhere; and only in one instance was evidence forthcoming that the rodents were breeding, that being on the country surrounding a lignum swamp, where, owing to the water receding, green feed was springing up, and here young rabbits were to be seen.

In his letter Mr. Wynne indulges in a rather wholesale condemnation of wire-netting, and I think without sufficient cause. There is no doubt that a portion of the wire-netting erected on Teryawynia was found after the lapse of about two years to have rotted under ground (sample produced), but this refers entirely to netting surrounding the tanks which has been erected on soft damp ground, and which, as is plainly indicated, has been subjected to the action of water, a condition of affairs which can only exist to a very limited extent in the event of a lessee deciding upon enclosing the outer boundaries of his run. In the same locality I have seen wire-netting which has been standing for two and a half years, the portion buried being as sound as it was when first erected, and in addition I have the testimony of two squatters in this very district to the effect that they had examined wire-netting which had been erected in Victoria and Tasmania for periods of twelve years and twenty years respectively, and in both instances the portion of the material buried in the ground was found to be sound.

At the deputation which recently waited upon the Honorable the Minister it was asserted that the excellent lambing said to have been obtained on Teryawynia was due to the fact that this holding had been favoured with a rainfall in excess of that obtained on neighbouring stations, and with a view to settling this point I append statistics showing the rainfall on Mr. Wynne's run, extending from 1874 to 1889, together with a statement of the fall during each month of the years 1888 and 1889. I also attach a statement, taken from the station books, showing the agistment fees paid to Wynne, Hudson, & Co. for stock depastured on Teryawynia Station from October, 1888, to January, 1889.

In bringing my remarks regarding Teryawynia to a close I desire to state that the process in operation there is, under suitable conditions, a cheap and effective means for reducing the rabbit pest, and is infinitely superior to the system in operation when the Government were engaged in subsidising owners for the work done. The millions of rabbits which were reported to exist on this run at one time are not now to be seen, but the evidence of their previous existence is plainly discernible. Acres upon acres of valueless scrub have been destroyed by the ring-barking operations indulged in by the rabbits, while indications of recent work of this description are not numerous. On the back portion of the run, 200,000 acres of which were, in August, 1887, reported to have been eaten bare, dry grass is now to be seen, and there can be no doubt that the system of rabbit destruction adopted has contributed largely to this result, assisted probably by other causes, such as starvation and migration. The chief objections to be raised to the system are that it brings about no finality, and entails constantly recurring labour and expense.

Having written so much regarding Teryawynia, I do not think it would be fair to omit making some remarks regarding the work done on various other holdings which I visited during my recent trip, more especially as an opinion appears to be prevalent that rabbit destruction is almost entirely neglected throughout the infested country. On Mossgeil Station at the time of my visit a tank close to the homestead had been enclosed with wire-netting, outside of which was a small hole filled with poisoned water and surrounded by a log fence which, however, presented no obstacle to the rabbits. The next morning the bodies of several hundred dead rabbits could be seen contiguous to the water. Several carts are also engaged distributing poisoned wheat with results which may be described as fairly satisfactory.

The next place visited was Kulfera, and here I found the leasehold area, say 130 miles round, to be enclosed with a rabbit-proof fence, while a number of horse paddocks had also been protected in a similar manner. The managing partner of this holding, Mr. B. C. Webb, is a great believer in the use of poisoned water, and at the various tanks visited the evidence of the work can be seen by the thousands of rabbit carcasses strewn about the place, and it can safely be stated that an inspection of this description on a hot summer's day is by no means a pleasant occupation. A large quantity of poisoned wheat has at various times been distributed on this holding, while, immediately on the boundaries, which have been wire-netted, dead and dying rabbits can be seen in numbers, the cause of the mortality being hard to determine, unless it be that these rabbits have been shut off from water and death has ensued consequent upon thirst and heat.

On Marfield a rabbit-proof fence is also being erected, but as to the steps taken for the destruction of the rabbits I can speak with no authority.

While passing through Albemarle I visited the back station in company with the manager, Mr. Sallior, and here again great destruction has been caused among the rabbits by laying poisonous sticks along the edge of the waters of the Lakes Victoria and Waterloo. The poison used is strychnine, and its effectiveness is demonstrated by the carcasses to be seen in all directions, and over which the wheels of the buggy went crashing. This run is also being enclosed within a rabbit-proof fence which when completed will run for a distance of about 70 miles along the southern boundaries of Teryawynia.

The next station visited was Manfred, where rabbit-proof fencing has also been erected, and in a neat manner. The use of poisoned water and sticks in the vicinity of the tanks has, I am informed, also been resorted to here, but as my examination was only a cursory one I am not able to speak confidently as to the results obtained. As noticed in other localities dead and dying rabbits were to be seen clinging to the wire-netting fence on this run.

On

On Clare Mr. Waugh has been very busy laying poisoned water outside the tanks, which, as in other cases, are protected by wire-netting. Heaps of dead rabbits are to be seen on various parts of the holding, and the owner informed me that a man was engaged for over a week in carting the rabbits destroyed at one tank to a distance remote from the waterhole. A large quantity of phosphorized wheat has also been laid on parts of Clare, and a quantity of the various poisons used is stored at the head station. It may not be out of place to remark here that a large quantity of arsenic, strychnine, and phosphorus is being used throughout the country, and some good would perhaps result if the various tins and drums containing these mediums were overhauled before they left the various warehouses, in order to guard against any leakage during carriage, and to minimize, as far as could be, the possibilities of any accident.

The Report of the Royal Commission of Inquiry into schemes for the destruction of rabbits contains some valuable information as to the use of poisons, and good would result if the pastoralists interested were to make themselves acquainted with its contents.

In conclusion, I trust that my report may place you in possession of such information as will be of value in enabling the subject of rabbit destruction to be successfully dealt with, and that in my inspection of this part of the Western District I have complied with the nature of the instructions conveyed to me.

I have, &c.,  
HENRY C. TAYLOR.

[Enclosure.]

TERYAWYNIA RAINFALL.

1874.....	11·08	1882.....	10·92
1875.....	9·29	1883.....	6·86
1876.....	6·78	1884.....	6·85
1877.....	8·23	1885.....	10·78
1878.....	9·33	1886.....	13·82
1879.....	13·85	1887.....	17·46
1880.....	8·55	1888.....	4·25
1881.....	11·48	1889.....	17·29

TERYAWYNIA RAINFALL.

1888.		1889.	
January .....	·13	January .....	1·44
February .....	·33	February.....	·85
March .....	0	March .....	0
April .....	·9	April .....	2·66
May .....	1·74	May.....	1·06
June .....	·1	June.....	2·67
July .....	·26	July.....	0
August .....	·14	August .....	2·85
September.....	·36	September .....	1·15
October .....	·4	October .....	2·42
November.....	·3	November .....	1·44
December .....	1·12	December .....	·15
	4·25		17·29

Stock sold to J. M. Byrnes, butcher, Wilcannia.

	£	s.	d.		£	s.	d.
Fat cattle .....	130	0	0	Sheep .....	69	6	0
	1	0	0		107	5	0
	94	10	0		72	9	6
	88	15	0		106	5	6
					3	18	0
					68	0	0
					64	0	0
Total.....	£805	9	0				

AGISTMENT paid to Wynne, Hudson, & Co. for Stock depastured on Teryawynia Station, from October, 1888, to January, 1889.

	£	s.	d.		£	s.	d.
Dawes .....	1	5	0	Finch.....	1	0	0
	14	16	0	Burgess .....	30	0	0
Baden Park .....	8	18	5	Jones .....	1	0	0
	300	0	0	Alcock .....	0	10	6
	34	10	0	Stevens .....	0	12	6
Weinteriga Station .....	32	0	10	T. Burns .....	1	10	0
Byrnes .....	5	12	6	Rogers .....	1	0	0
	4	5	0	Crosse .....	0	5	0
Mitaelburg .....	6	13	7	Penton .....	0	5	0
Dollman .....	9	5	8	West .....	0	2	0
M'Carthy.....	1	14	0	Gardiner .....	2	17	0
Bell .....	0	7	6	Poundage and driving fees .....	1	0	0
	2	12	6				
Farry .....	1	14	0		£466	17	0
Patterson.....	3	0	0				

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RABBIT NUISANCE ACT.**  
(RETURN OF ANNUAL EXPENDITURE UNDER.)

*Ordered by the Legislative Assembly to be printed, 15 October, 1890.*

[Laid upon the Table in answer to Question No. 9 of Votes 74, 15 October, 1890.]

Question.

- (9.) EXPENDITURE UNDER RABBIT ACT:—MR. J. P. ABBOTT *asked* THE COLONIAL TREASURER,—  
(1.) When will the return under the Rabbit Act ordered by this House to be laid upon the Table in June last be supplied?  
(2.) What is the annual expenditure at the present time under this Act?

Answer.

RETURN showing the Annual Expenditure at the present time under the Rabbit Nuisance Act.

	£	s.	d.
H. C. Taylor, Clerk ... ..	340	0	0
A. R. Torrens, Fence Inspector ... ..	300	0	0
W. R. Stanley, Clerk ... ..	240	0	0
Caretaker, Rodd Island ... ..	104	0	0
	£984	0	0
Insurance on Buildings and Equipment, &c., at Rodd Island ... ..	16	17	0
Incidental Expenses... ..	50	3	0
	£1,051	0	0

DAVID MILLER,  
*Pro* Accountant.

Account Branch, Department of Lands,  
15 October, 1890.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RABBIT NUISANCE ACT.**  
(RECEIPTS AND EXPENDITURE UNDER.)

*Ordered by the Legislative Assembly to be printed, 15 October, 1890.*

RETURN to an *Order* of the Legislative Assembly, dated 11th June, 1890, That there be laid upon the Table of this House, a Return showing,—

- “ (1.) The receipts under the Rabbit Act from the time when it came into force up to the present time, for each year, and from all sources.
- “ (2.) The expenditure for each year during the same period, showing the total items of expenditure for each year,—
- “ (1.) For subsidies.
- “ (2.) For salaries.
- “ (3.) For fencing and netting.
- “ (4.) For salaries, travelling expenses, and otherwise, in connection with fencing.
- “ (5.) For experiments in connection with the destruction of rabbits.
- “ (6.) All other expenses apart from salaries and subsidies, and those matters mentioned in paragraphs 3, 4, and 5.”

*(Mr. J. P. Abbott.)*

RETURN of the Receipts and Expenditure under the Rabbit Nuisance Act, for the years 1883 to 1889, and the half-year ended 30th June, 1890, so far as can be readily ascertained from the accounts in the Department of Audit.

	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890, to 30th June.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
No. 1. RECEIPTS .....	35,890 14 9	44,757 8 0	37,443 10 10	40,023 17 9	41,173 4 3	47,941 1 9	46,900 16 9	33,531 4 4	327,670 18 5
„ 2. EXPENDITURE—									
(1.) Subsidies .....		59,223 3 2	128,207 4 8	71,911 15 11	179,393 0 9	119,146 3 8	73,028 0 1	481 7 0	631,390 15 3
(2.) Salaries .....	289 1 6	15,426 4 4	14,079 0 0	21,186 14 2	13,006 3 2	12,000 0 6	2,157 9 4	676 13 2	78,821 6 2
(3.) Fencing .....				1,356 10 9	3,718 9 10	3,261 10 2	6,462 8 0	2,586 8 6	17,385 7 3
Netting .....				3,836 14 7	6,014 4 10	8,062 12 10	6,702 0 4	37 16 0	24,653 8 7
(4.) Salaries .....				133 14 2	282 8 3	527 11 11	1,193 9 6	340 14 1	2,477 17 11
Travelling expenses .....				35 5 0		147 11 4	93 16 0		276 12 4
Freight, storage, cartage, duty, &c. ....						1,291 0 4	574 13 3	24 14 2	1,890 7 9
Conveyance by rail .....						770 2 6	328 19 6	21 12 5	1,120 14 5
Wages .....						60 0 0	107 2 3		167 2 3
Stores, horses, &c. ....							79 3 8	14 5 0	93 8 8
(5.) Experiments at Rodd Island <i>re</i> destruction of rabbits.						1,371 12 6	6,957 2 11	469 14 7	8,798 10 0
(6.) Rabbiters' wages .....	22 18 4	5,517 12 5	10,021 12 7	9,586 8 3	4,752 2 9	6,502 3 7			36,402 17 11
Stores, forage, horses, &c. ....	47 5 0	2,300 12 4	1,689 16 5	1,610 3 0	389 6 2	998 11 6	30 0 4		7,065 14 9
Carbon .....	58 2 0	871 13 6	2,215 4 9	1,781 3 11	75 7 8	13 0 10			5,014 12 8
Rent of offices .....		51 9 6	41 1 4	96 2 3	71 19 8	52 10 1	7 8 8		320 11 6
Scalps .....			70 7 8	353 12 8	608 13 8	691 11 10	1 11 10		1,725 17 8
Travelling expenses .....	54 0 0	939 15 3	1,419 18 1	1,810 1 9	649 3 8	863 0 8	527 6 7	30 16 10	6,294 2 10
Refunds .....	3 0 5	78 11 11	1,291 15 3	135 2 5	53 19 2	97 14 4	23 7 6	17 16 8	1,701 7 8
Petticoes, repairs, &c. ....	2 14 0	207 7 5	300 17 2	228 11 11	97 17 6	274 9 1	14 8 3	2 17 6	1,129 2 10
Conveyance of goods .....	4 2 6	206 5 7	217 3 10	168 19 5	1,387 15 9	984 10 4	23 8 9	8 8 6	3,000 14 7
Legal expenses .....	8 15 0	7 0 6		50 5 3	80 2 8	136 5 4			282 8 9
Conference held in Sydney .....				1,429 19 4	13 3 0			1 0 0	1,444 2 4
	480 18 9	84,829 15 11	159,554 1 9	115,711 4 9	210,593 18 6	157,252 3 4	98,311 16 9	4,714 4 4	831,457 4 1
Dr. Balance .....									£503,786 5 8

Department of Audit, 24th September, 1890.

E. A. RENNIE,  
Auditor-General.

1890.

—  
 LEGISLATIVE ASSEMBLY.  
 NEW SOUTH WALES.

—  
**RABBIT NUISANCE ACT.**

(PETITION FROM CERTAIN STOCKOWNERS IN COOMA DISTRICT PRAYING FOR REPEAL OF.)

—  
*Received by the Legislative Assembly, 17 June, 1890.*  
 —

To the Honorable Members of the Legislative Assembly of New South Wales, in Parliament assembled.  
 The Petition of the undersigned, Owners of Stock in the Cooma District,—

HUMBLY SHOWETH:—

1. That your Petitioners have for several years been burdened with a grievous exaction in the form of a tax levied under the provisions of the Rabbit Nuisance Act of 1883.

2. That the amount of this tax is vastly in excess of the aggregate amount payable under the Stock and Pastures and the Sheep Assessment Acts.

3. That, unlike these lastnamed Acts, the contributions under which are payments for services rendered, the Rabbit Nuisance Act has never been, and could not have been, of the slightest benefit to the Cooma District, or to any individual therein.

4. That while your Petitioners recognise the justice of affording some help, direct or indirect, to those pastoralists in infected districts who, unaided, may be unable to cope with the evil, they consider, that the necessary cost thereof should fall on the general taxpayer, and not on a particular class which has no more direct interest in the matter than agriculturists or any other body in the community.

5. That the Honorable the Minister for Lands has repeatedly admitted the iniquity of the present law, and the necessity for its repeal at the earliest possible moment, and that this led your Petitioners to believe that the tax would not be enacted after 1889.

6. That all pretence of applying the proceeds of this tax to its intended purpose having been abandoned since 1888, your Petitioners respectfully submit that there cannot now be a shadow of moral, even if there be of legal, right to continue the levy of this impost upon them.

7. Your Petitioners therefore humbly pray your Honorable House to regard the premises, and to grant them relief by passing a Bill for the immediate repeal of the Rabbit Nuisance Act of 1883.

And your Petitioners will ever pray.

[Here follow 21 signatures.]





1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

FOREST CONSERVANCY BRANCH.

(REPORT ON, FOR 1889.)

*Ordered by the Legislative Assembly to be printed, 24 July, 1890.*

The Acting Officer-in-Charge to The Principal Under Secretary.

Sir,

Forest Conservancy Branch, Sydney, 20 May, 1890.

I have the honor to forward, for the information of the Colonial Secretary, the Annual Report of the Forest Conservancy Branch for the year 1889, which was transferred on the 1st January, 1888, from the Department of Mines to the Department of Lands, and by *Gazette* notice of the 17th April, 1889, was placed under the Colonial Secretary.

THE STAFF.

The field staff consists of one inspector of forests, twenty-four forest rangers, eight assistant forest rangers, one overseer of State forest nursery, one engineer, and one wood-cutter for the patrol steamer on the Murray River. There are also four men constantly employed at the nursery. Others are engaged from time to time, according to requirement. In addition, there are two acting rangers at Lord Howe Island, charged with the protection of the indigenous flora, one at Broken Hill, and one at Silverton, to protect certain timber reserved along the creeks in those districts, who not being wholly employed by the Department, are paid a small allowance.

The office staff consists of five clerks, one temporary clerk, and one probationer, besides the chief clerk, who is Acting Officer-in-Charge.

Twenty-seven of the forest rangers and assistants, twenty-one inspectors of stock (the latter being officers of the Department of Mines), and the Cumberland ranger (an officer of the Department of Lands) are appointed inspectors under the Prickly-pear Destruction Act of 1886.

DUTIES.

The duties of the branch may be briefly stated as consisting of—First, the carrying out the provisions of Part VI of the Crown Lands Act of 1884, as amended by the Crown Lands Act of 1889, which provides for making State forests and regulating the felling of timber, quarrying of stone, removal of clay, shells, &c., on State forest timber reserves and Crown lands; second, establishment of nurseries and plantation of timber trees, thinning out useless trees on timber reserves; third, the carrying out of the provisions of the Prickly-pear Destruction Act of 1886.

The forest rangers also inspect timber on Crown lands and report to the Local Land Boards upon applications for permission to ringbark. This duty in some districts involves a considerable amount of work, and, of course, adds to the cost of the branch by increasing travelling expenses. The fees paid by applicants to the Department of Lands covers this cost.

The steam launch purchased in 1877 to enable the rangers to protect the valuable red-gum forests on the Murray River was disposed of, having become unserviceable, and a contract accepted, through the Department of Public Works, for building a stern-wheel steamer for this purpose. Last June it was found necessary to hire a small steamer for the season for this special work.

REVENUE.

The revenue from licenses and royalty on the quantity of timber felled during the year amounted to £16,521 2s. 5d., and the revenue from other sources, viz., quarry licenses, sale of confiscated material, and rent of leases held under the Prickly-pear Destruction Act brought the total up to £17,137 0s. 11d. This is satisfactory, considering that the heavy floods for some time stopped the felling and measurement of timber on the Murray River red-gum forests, though it is less by £2,590 17s. 6d. than for the previous year. It may be noted that in 1877 the total revenue received was only £4,324 10s. 3d.

Schedule No. I to this report shows the amount received under the different heads, and Schedule No. II the revenue from State forest and timber reserves. This revenue is exclusive of pastoral rents, the reserves not being withdrawn from the holdings of which they form a part.

PROSECUTIONS.

Particulars of prosecutions by forest rangers for breach of the timber regulations or for trespass on Crown lands are furnished on Schedule III. There were 164 cases, which resulted in 139 convictions, with penalties amounting to £166 10s. 11d. In some districts the rangers report that the penalties inflicted are so low as to defeat the object of prosecution, offenders against the regulations preferring to run the risk of detection to paying license fees.

RESERVES AND TIMBER.

There are 918 reserves, notified for preservation of timber supply containing an estimated total area of 5,553,388½ acres; these are divided into different classes as shown in Schedule IV, viz.:—In class A, 643 reserves and portions of twenty-three others, of which the total area is 3,535,548½ acres. In class B, seven reserves, of which the total area is 54,745 acres. The timber upon reserves in these classes is permitted

to be felled on payment of license fees at rate of 10s. and 15s. per month respectively. In class C, 224 reserves and portions of twenty-eight others, comprising an area of 1,865,371½ acres, for which a royalty is charged in addition to the license fee. Sixteen reserves and portions of five others are proclaimed State forests, upon which the right to fell timber on defined portions, for a term, is sold by auction or by tender; the timber being subject to a royalty specified when the right is offered for competition.

This royalty is fixed according to the quality, accessibility, and other circumstances affecting the value of the timber.

The felling of trees on timber reserves, is subject to limitations as to the minimum girth and other restrictions to prevent, as far as practicable, wilful waste. It is reported that in five or six years there will be ready for felling, on the Murray River forest reserves, an immense number of red gum piles fully 60 feet in length, these will be worth to the Department at least 25s. each; and the value of this timber is shown by the fact that for beams measuring 12 in. x 12 in., and 25 feet in length mill-owners get from £4 10s. to £6; in some instances more than one such beam being obtained from a tree.

Schedule V shows the number and area of reserves under the supervision of each forest ranger.

Particulars of the situation, area, and class of each timber reserve and State forest will be found in Schedule VII, and particulars of lands exempted from operation of wood-cutters and cedar licenses are furnished in Schedule VI. The demand for timber on the forest reserves is found to increase as the Crown lands become alienated, either by sale or conditional lease giving the right of purchase, which shuts out the timber-getter from such lands. This demand is likely to be the greater because purchasers often proceed to ringbark all trees on their holdings, including even those which would prove useful, so that timber afterwards required for improvements has to be drawn long distances. It may, however, be remarked that a few isolated trees left scattered here and there on ringbarked country, do not appear to thrive, they are better left growing together in fair-sized clumps.

#### THINNING OUT TIMBER ON TIMBER RESERVES.

The forest rangers having drawn attention to the desirability of thinning out the young timber, which after the matured trees are felled, spring up so thickly on some of the more valuable reserves, especially the red gum and pine forests in the Murray River Districts; it was recommended that £1,000 should be placed upon the Estimates toward this work, which recommendation was approved, and the money voted for the year 1890. In some cases the Crown lessees are permitted to destroy useless timber on the reserves, their object being to improve the grazing capability of the land. This is done at their own cost, but under the special supervision of the Department.

During the year, permission was granted to thin out timber on an area of 31,450 acres situated on five reserves.

#### PLANTATIONS AND FOREST NURSERY.

Plantations of timber trees are situated on the Dorrigo and Nulla Nulla Creek reserves, and at Cootamundra, particulars of these and of the State Forest Nursery at Gosford are supplied by the Inspector of Forests in his report appended hereto.

#### PRICKLY-PEAR DESTRUCTION.

The business connected with the administration of the Prickly-pear Act of 1886 was transferred from the Ministerial control of the Secretary for Lands to that of the Colonial Secretary, by *Gazette* notice of 26th September, 1889.

Forty-eight notices were served requiring owners of "private land" within the meaning of the Prickly-pear Destruction Act to eradicate prickly-pear on their holdings.

All lands for which such notices have been served have since been frequently inspected, and the reports of the inspectors show that in a large number of cases the destruction of the growing plant has been completed; in the remainder, with a few exceptions, it is proceeding satisfactorily. It will, however, be a work of years before the pest is effectually eradicated, as seeds in the ground are continually germinating.

Nine contracts for destroying the prickly-pear on Crown lands, comprising an area of about 1,200 acres, were let at a cost of £126 19s. One contractor refused to proceed; the other contracts were satisfactorily completed. Tenderers differ widely in their estimates of the cost of such work; in one instance, the prices asked ranged from £18 to £672, none of these being satisfactory, fresh tenders were invited, which ranged up to £257; the work has since been completed for £30.

Tenders were invited for lease under the Prickly-pear Destruction Act for twenty portions, comprising an area of 6,253 acres; eleven of these portions, comprising 2,826 acres, have been let for terms varying from five to ten years, at a total rental of £20 5s. No tenders were received for the remaining portions.

Prickly-pear has spread extensively on the watershed of the Hunter River and its tributaries, on the Upper Gwydir River and on parts of the Barwon River. In the Hunter River district there are large areas of rough, rocky, or inferior land, which it has been found impossible to let on lease, the cost of eradication being estimated up to £4 per acre, and it has been represented that £100,000 would not be more than sufficient for the work. A scrub exterminator has been tried with success, but stock have to be excluded from the land under treatment, otherwise they are liable to be poisoned by eating the plants to which the exterminator has been applied;—this is a serious drawback.

Another specific which it is alleged stock will not touch is now being tested, and there is every reason to believe that it will be successful. The extensive areas of comparatively poor land on the Gwydir and the Barwon will be best dealt with by leasing in large areas. This could not be done under the Prickly-pear Destruction Act, as one of its provisions limits leases of Crown lands to areas not exceeding 640 acres; but the Crown Lands Act of 1889 provides for dealing with such lands as "scrub lands," and certain cases have been referred to the Department of Lands to be dealt with.

The plant has been used for food for a small number of stock, but there is a difference of opinion as to its value. It is giving considerable trouble in South Africa. Professor MacOwan, F.L.S., Director of the Botanical Gardens, Cape Town, makes the following remarks respecting its use as a fodder:—

"VALUE OF PRICKLY-PEAR AS FODDER FOR SHEEP AND OSTRICHES:—I am aware that the plant has been occasionally turned to account in seasons of drought, when food and water are equally scarce. But it is essential that the spicules be removed, and this necessity renders the exploitation of *Opuntia* as a food both tedious and costly. There is scarcely another way of utilizing it except by very careful singeing every section at a blazing fire. Certainly, every spicule may thus be removed, but as each joint has to be separately picked up, exposed to the flame and turned over, just as in toasting bread,

bread, the plan seems amateurish and unpracticable. Possibly two brush cylinders, running at different speeds, might clean off the spicules as aptly as the fire, but the invention has yet to be brought out. Nevertheless, I know of a small and very valuable clump of thoroughbred stock in the Karoo saved in a hard season solely by the use of the Opuntia, rendered harmless by being well blazed with torches of Kersse-bosch. After passing through the fire, the sections were thrown into a turnip cutter set to cut very coarse. A little salt sprinkled over the mass made a rapid mess, for which the imported ram and his progeny fought like dogs over a bone. I do not think one bit the more for this incident, however, that the plan is practicable on any scale but that of an experiment or a famine-dodge.

What you can do with ordinary appliances for a little lot of, say, twenty head of special stock, is as much out of your reach as a horn of the new moon when you have to find food for, say, 1,500. Still, I am far from saying the pestilential Opuntia may not be made, by some clever person, to pay for its footing and something more."

The Inspector of Forests' report is appended.

I have, &c.,  
W. F. PIPER.

SCHEDULE I.

Particulars of Revenue—Year ended 31st December, 1889.

State Forests and Reserves under Classes A, B, and C—	£ s. d.	£ s. d.
State forest block licenses .....	562 10 0	
Permit licenses, Class C .....	407 0 0	
Timber cutters licenses, Class A and B (without royalty) .....	1,706 5 0	
Miscellaneous .....	33 15 0	2,709 10 0
Royalty—		
State forest block license—at per 100 superficial feet .....	3,646 17 8	
Regulations of 18th August, 1885, or 2nd December, 1889, at per 100 superficial feet .....	4,980 1 5	
Regulations 44 of 18th August, 1883, or 29th December, 1889, at per tree .....	478 18 10	9,105 17 11
Crown Lands—		
Woodcutters' licenses .....	3,134 0 0	
Cedar licenses .....	1,193 10 0	
Proceeds of sale of seized timber .....	378 4 6	4,705 14 6
		£16,521 2 5

NOTE.—Licenses to quarry stone, &c., issued in addition to the above during the year, £518.  
Rent for leases under Prickly-pear Act of 1886, £47 18s. 6d.

SCHEDULE II.

REVENUE from State Forests and Reserves.

County.	Name of Forest or Timber Reserve.	Quantity.	License Fees			Royalty.			Total.	Description of Timber.		
			£	s.	d.	£	s.	d.				
		Super. ft.	Royalty, at per 100 superficial feet.									
			£	s.	d.	£	s.	d.	£	s.	d.	
Bourke .....	Dulah .....	301,105	20	0	0	153	2	8	173	2	8	Pine.
" .....	Matong .....	335,901	217	10	0	126	0	3	343	10	3	"
" .....	Gannam .....	165,493	9	0	0	82	15	3	91	15	3	Pine.
Baradine .....	Robertson .....	5,065	4	0	0	1	5	4	5	5	4	Ironbark.
Bland .....	Weddin .....	164,802	31	10	0	41	9	3	72	19	3	Ironbark and pine.
Bland and Harden .....	Burthong .....		1	0	0				1	0	0	
Cadell .....	Moama .....	1,221,356	23	0	0	763	6	8	786	6	8	Red gum.
" .....	Mora .....	503,000	88	0	0	254	12	1	342	12	1	Ironbark and pine.
Camden .....	No. 209 .....	5,645	3	0	0	3	10	9	6	10	9	
Cooper .....	Darlington .....					22	0	0	22	0	0	Red gum.
" .....	Yarrangerry .....	140,502	4	10	0	70	5	3	74	15	3	Pine.
Dampier .....	Wagonga .....	103,849	7	0	0	25	19	3	32	19	3	Spotted gum.
Denison .....	Roomanoomana .....	46,971	50	0	0	29	7	1	79	7	1	Red gum.
" .....	Mulwala .....	3,454,964	130	0	0	1,602	0	4	1,732	0	4	"
" .....	Barooga .....	958,590				399	2	1	399	2	1	"
" .....	Wahgunyah .....	61,398	30	0	0	30	13	11	60	13	11	Pine.
Fitzroy .....	Dorrigo .....		24	10	0				24	10	0	
" .....	Orara .....		7	10	0				7	10	0	
Macquarie .....	Cowarra .....	176,621	8	0	0	28	0	4	36	0	4	Blackbutt ironbark, Mahogany, tallow-wood, and grey gum.
Mitchell .....	No. 8,232 .....		3	0	0				3	0	0	
Northumberland .....	Sugarloaf .....	72,228	9	0	0	21	6	9	30	6	9	Spotted and blue gum.
" .....	Ouinbah .....	136				0	13	0	0	13	0	Ironbark and mahogany.
" .....	Olney .....	119,160	16	10	0	32	15	0	49	5	0	Turpentine.
Pottinger .....	Nea .....	55,350	15	10	0	13	16	9	29	6	9	Ironbark, spotted, grey and blue gum, blackbutt and tallow-wood.
" .....	Doona .....	28,950	4	10	0	7	4	9	11	14	9	Pine.
Rous .....	No. 545 .....	11,725	4	0	0	2	6	4	6	6	4	Cudgerie and beech.
St. Vincent .....	Tomaga .....	73,244				17	15	7	17	15	7	Spotted gum and blackbutt.
Townsend .....	Gulpa Island .....	391,008	31	10	0	244	17	10	276	7	10	Red gum.
" .....	Millewa .....	1,908,484	49	10	0	1,191	18	6	1,241	8	6	"
Urana .....	Colombo Piney Ridge .....	10,400	1	0	0	5	4	0	6	4	0	Pine.
" .....	Morundah .....	220,000	13	0	0	110	0	9	123	0	9	"
Wakool .....	Koondrook .....	2,705,016	95	10	0	1,090	11	6	1,186	1	6	Red gum.
" .....	Campbell's Island .....	723,528	18	0	0	452	4	0	470	4	0	"
" .....	Barham .....	2,257,476	50	0	0	1,184	9	1	1,234	9	1	"
		16,225,207	969	10	0	8,808	14	4	9,778	4	4	

## SCHEDULE II—continued.

County.	Reserve.	Quantity.	License Fee.	Royalty.	Total.	Description of Timber.
				Royalty at per tree.		
		No. of trees.	£ s. d.	£ s. d.	£ s. d.	
Cadell .....	Backwater Creek	16	.....	2 0 0	2 0 0	Box.
Clarence .....	Lawrence .....	80	.....	20 0 0	20 0 0	Hardwood.
" .....	Glen Ugie .....	50	.....	12 10 0	12 10 0	Hardwood and ironbark.
Cumberland .....	Bottle Forest .....	30	.....	6 0 0	6 0 0	Blackbutt and turpentine.
Denison .....	No. 1639 .....	17	.....	17 0 0	17 0 0	Red gum.
Fitzroy .....	Cloud's Creek .....	47	.....	160 10 0	160 10 0	Cedar, gum, and pine.
" .....	Dorrigo .....	83	.....	133 0 1	133 0 1	Cedar.
" .....	Orara .....	9	.....	9 0 0	9 0 0	"
Gloucester .....	Myall and Wallis Lake .....	194	.....	14 11 0	14 11 0	Hardwood.
Pottinger .....	No. 2,125 .....	35	.....	1 15 0	1 15 0	"
" .....	Doona .....	12	.....	0 12 0	0 12 0	Pine.
St. Vincent .....	Currambene .....	5	.....	1 5 0	1 5 0	Blackbutt.
Wakool .....	Campbell's Island .....	63	.....	31 10 0	31 10 0	Red gum.
	Sundry Village Reserves.	331	.....	69 5 9	69 5 9	
		972	.....	478 18 10	478 18 10	
				Without Royalty.		
	Permits .....		1,811 15 0	.....	1,811 15 0	
	Class A and B .....		33 15 0	.....	33 15 0	
	Miscellaneous .....		.....	.....	.....	
			1,845 10 0	.....	1,845 10 0	
Totals—License fees .....					27,09 10 0	
Royalty .....					9,105 17 11	
					11,815 7 11	

## SCHEDULE III.

## PROSECUTIONS undertaken by Forest Rangers.

Offence.	Number of Prosecutions.	Number of Convictions.	Amount of Penalty.
Illegally cutting or removing timber .....	144	125	£ s. d. 162 19 1
Quarrying, or removing other materials .....	12	11	2 16 10
Trespass on Crown lands .....	8	3	0 15 0
	*164	139	166 10 11

\*Exclusive of prosecutions by other Crown Lands bailiffs.

Number of cases in which timber, or other material, has been seized .....	121
Number of cases in which claims have been preferred to seized material .....	21
Number of cases in which claims have been confirmed .....	14

## SCHEDULE IV.

## RETURN showing total number and class of Timber Reserves.

	No. of Reserves.	Area in acres.
Reserves in Class A, Regulations 7 and 8, including 23 partly in Class C .....	666	3,535,548½
Reserves in Class B, Regulations 7 and 8 .....	7	54,745
Reserves in Class C, Regulations 9 and 10, including 5 partly proclaimed State Forests .....	252	1,865,371¼
State Forests .....	21	97,723¼
Total number of the reserves from sale after making deductions for those in two classes .....	918	.....
Total estimated area reserved .....	.....	5,553,388½

## SCHEDULE V.

AREA and number of Reserves under the supervision of the Forest Rangers.

Locality.	Forest Ranger.	No. of Reserves.	Area in acres.
Richmond and Tweed Rivers	T. H. Green (temporarily)	37	147,321½
Upper Richmond	T. H. Green, Casino	29	364,886
Northern New England and east part of Gwydir.	E. J. Devereil, Glen Innes, and Assistant-ranger W. Byron, Inverell.	42	331,109
Clarence	F. P. Huxham, Grafton	20	158,174½
Nambucca and Bellinger Rivers	W. Mecham, Boat Harbour	9	165,377½
Kempsey	W. Macdonald, Kempsey	7	83,203½
Gunnedah and Tamworth	H. W. Powell, Gunnedah	28	244,880
Armidale and Walcha	R. L. Siddins, Armidale	66	302,933½
Port Macquarie	G. R. Brown, Port Macquarie	15	67,063½
Myall and Gloucester Rivers	A. Rudder, Boral	2	2,615½
Hunter River	E. Coberoft, Singleton	19	106,831½
Mudgee and Cassilis	P. Cullen, Mudgee	19	51,531½
Dubbo	Assistant-ranger W. Coulier, Dubbo	19	223,310
Condobolin	T. Kidston, Condobolin	30	166,899½
Upper Lachlan	R. Stevenson, Cowra; Assistant-rangers R. J. Cork, Forbes, and J. G. Postlethwaite, Grenfell.	86	312,382½
Penrith and Hartley	I. Noake, Penrith	17	146,095½
Lower Nainoi and west part of Gwydir.	T. H. B. M'Gee, Narrabri, and Assistant-ranger G. King, Coonamble.	60	848,704½
Brisbane Water and Wollombi	J. Martin, Gosford, and Assistant-ranger F. E. Brunker, Cooranbong.	17	85,607
Mittagong and Camden	H. O. Rotton, Bowral	23	11,301½
Shoalhaven, Monaro, and South Coast	J. S. Allan, Ulladulla, and Assistant-ranger T. Musgrave, Eden.	39	170,815½
Queanbeyan	The Crown Lands Bailiff	74	126,090½
Gundagai, Albury, Wagga Wagga, and Tumbarumba.	J. S. Taylor, Wagga Wagga	17	66,687
Narrandera and Urana	J. G. Coulell, Narrandera	67	592,789
Murray, Edward, and Wakool Rivers	J. A. Manton, Moama, assisted by Rangers O. Wilshire, Deniliquin; S. Payten, Tocumwall, J. Guilfoyle, Moama, Assistant-ranger W. Cousins, Koondrook.	76	255,359
Silverton	Acting Rangers at Silverton and Broken Hill	75	456,756½
Cumberland	J. M'Keown, Petersham, Cumberland Ranger	11	32,150
Miscellaneous	Not under special supervision	1	6,000
		13	27,012½
		918	5,553,388½

## SCHEDULE VI.

RETURN showing lands exempted from the operation of wood-cutters and cedar licenses.

In addition to the lands specified in the 4th Timber Regulation of 2nd December, 1889, the following lands have been notified as exempted from the operation of wood-cutters and cedar licenses:—

County.	Parish.	Area.	Date of Gazette Notice.	Particulars of Land.
Clarence	Elland, Clarenza, and Southampton		24 Sept., 1886	All Crown Lands within the population boundary of South Grafton.
Cook	Jamieson		25 „ 1888	Reserves for recreation, Nos. 100, 101, and 102
Cumberland	Southerland*		24 Dec., 1877	All Crown reserves in the parish.
Do	Bulgo, Heathcote, and Southend		4 Mar., 1885	Crown Lands.
Do	Londonderry		29 Oct., 1877	All Crown Lands in the Parish.
Do	Hunter's Hill and Field of Mars	6,235	4 Nov., 1879	Field of Mars Common.
Do	Hunter's Hill*	170	22 Dec., 1879	Lunatic Asylum Reserve.
Do	Botany		23 Nov., 1886	Crown Lands lying south of Church and School Lands, and the Bunnerong Estate.
Denison and Hume.			9 Dec., 1886	All pine, on lands for which permission to ringbark has been granted in the Land District of Corowa.
Dampier	Noorooma	240	5 Mar., 1886	Reserve No. 440.
Gloucester†	Wang Wauk, Nerong, &c.	217,600	1 „ 1889	Crown Lands between the A. A. Company's grant the Wollombia River and the Ocean.
Leichhardt	Euroka and Yeandah	4,703	8 Dec., 1884	On the bank of Barwon River.
Macquarie	Torrens		2 June, 1885	Within the population boundary of Port Macquarie.
Mountamba		2,870	11 Sept., 1888	The wool-shed, ram, and horse paddocks, and the out-station horse paddock.
Northumberland	Awaba, Toralba, and Stockrington	3,080	22 Feb., 1887	Reserves 83b, 105, and 106.
Pottinger	Dobbleda	30	2 Oct., 1885	Reserve No. 7.
Rous		175	18 Dec., 1887	Reserve No. 545.
Urana		640	28 June, 1887	Reserve No. 4, Colombo Dam.
Wynyard	Wagga Wagga	1,000	19 Aug., 1884	Travelling Stock Reserve, No. 3,027
Yancowinna	Alma and Soudan		28 Oct., 1887	Within 2 chains of the Gum Creeks, on homestead lease No. 86-5.
Do	Do		8 Nov., 1887	Within 2 chains of the Gum Creeks, on homestead lease No. 86-4.
Young		1,600	20 June, 1870	Part of Wilcanna Population Reserve (census of 1871).
			14 Oct., 1878	Lord Howe Island.

\* Timber cutting prohibited.

† Timber cut under timber-cutters licenses class A, Regulations 7 and 8.

SCHEDULE VII.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres	Timber and General Remarks.
Arrawatta	Weean	Inverell	958 Mount Gagan	A	1,600	Ironbark and pine of fair quality.
"	Bonshaw	Inverell and Tenterfield	1,336	A	5,950	Ironbark, red gum, box, apple, pine, and bloodwood.
Ashburnham	Mandagery and Murga	Molong	4	A	4,000	Ironbark and stringybark.
"	Gunningbland and Nelungalong	Parkes	1,147	A	3,500	Pine—good quality.
"	Terrara, Coonambra, Bendogandri, and Banbury.	Forbes, Parkes, & Molong	1,403	A	12,548½	Ironbark and stringybark.
"	Dulladerry, Terrara, and Bunbury	Molong and Parkes	1,730	A	6,500	Ironbark and stringybark.
"	Dulladerry and Terrara	Molong	1,731	A	2,300	Ironbark and stringybark.
"	Wangan	Forbes	2,030	C	190	Red gum, and yellow box.
"	Troubalgie, Dowling, and Wise	"	2,048	A	16,320	Pine—good quality.
"	Mogong and Goumbla	Molong	3,813	A	9,670	Ironbark, stringybark, box, and pine.
"	Forbes	Forbes	4,335	A	410	Also for travelling stock and camping.
Ashburnham & Cunningham	Yarragong, Corridgery, and Ganning	"	7,969	A	930	Red gum and pine.
Argyle	Currowang	Goulburn	151	A	365	White and brittle gum, stringybark, and apple-tree.
"	Cookbundoon and Eden Forest	"	225	A	7,000	Stringybark, mountain ash, blue, grey, red, and brittle gums, box, and peppermint.
"	Bungonia	"	1,999	A	4,400	Stringybark and blue gum.
Argyle and Murray	Merigan and Mulwaree	Goulburn and Queanbeyan	170	A	3,200	Gum, stringybark, and mountain ash.
Auckland	Yowaka	Eden	1	A	720	Mountain ash, stringybark, blackbutt, bloodwood, and black and red pine.
"	Bimmil	"	15	A	16	Mountain ash, stringybark, blackbutt, and bloodwood; also for public recreation.
"	Pericoe	"	16	A	536	Ribbon gum, mountain ash, stringybark, and box.
"	Numbugga	Bega	17	A	4,000	Mountain ash, stringybark, spotted gum, sassafras, grey box, messmate, ribbon gum, apple, and black wattle.
"	Yowaka and Bimmil	Eden	771	A	2,375	Blackbutt, Woollybutt, grey gum, mountain ash, and bloodwood.
"	Bournda	Bega	825	A	350	Bloodwood, stringybark, blackbutt, black ash, woollybutt, white gum, honeysuckle, and she oak.
"	Colombo	"	911 Glenbog	A	7,600	Mountain ribbon and white gum, messmate, woollybutt, stringybark, and silver wattle.
"	Werriberri	"	991	C	1,000	Ribbon and mountain gum, stringybark and mountain ash.
"	Mumbulla, Bega, and Brogo	"	996 Brogo River	C	350	River oak in the bed of the Brogo River.
"	Mumbulla	"	1,003	C	2,920½	Stringybark, white gum, box, peppermint spotted, gum, ironbark, river oak, and wattle.
"	Brogo	"	1,012	A	319	Stringybark, apple-tree, red gum, and ribbon gum.
"	Bournda, Kamaruka, and Wallagoot	"	6,273	A	6,500	Stringybark, box, mountain ash, swamp gum, woollybutt, bloodwood, and green wattle.
"	Wyndham, Yurammie	Eden and Bega	8,559, Myrtle Creek	A	2,027	Mountain ash, messmate, blue gum, stringybark, cat-tail ash, and mountain gum.
"	Onupa	Eden	8,827	A	3,650	Mountain ash, messmate, mountain gum, stringybark, and box.
Auckland and Wellesley	Mila, Lawson, Gulgin, Bondi	Eden and Bombala	385, Mila	A & C	6,240	Mountain ash, ribbon and white gum, messmate, peppermint; 1,440 acres under Class C.
"	Bredbendoura, Mogila, Cathcart, Crewab	Bombala and Bega	1,045	A	11,800	Messmate, white gum, ribbon gum, cat-tail, white ash, hickory, and black and silver wattle.
Baradine	Gora and Rundle	Coonabarabran	9	A	8,320	Ironbark, pine, and box.
"	Teni, Tallaba, Minnon, Moglewit, Bullirawa, Merimborough, and Tunia.	Narrabri	1,272	A	46,896	Ironbark and pine.
"	Yarrigan	Coonabarabran	1,872	A	2,600	"
"	Minnon, Dubbo, Merimborough, Etsa, Cubbo, Bandio, Boorimah, and Duneverian	Narrabri	4,522	A	61,800	Ironbark, pine, and oak.
Baradine and Leichhardt	Kennibri, Teridgerie, White, Miller, Urawilkie, Urawilkie North, Ceelnoy, Merebene, Gidgenbar, Terembone, Walcha, Gincee, Yarraman, Gwabegar, Buhroy, Yarren, Midgee, and Wambadule.	Coonabarabran, Coonamble, and Narrabri.	1,430, Ceelnoy	A	299,520	Ironbark and pine.
Baradine and White	Merimborough, Bundill, Dunwerian, Coghill, and Moberoi.	Narrabri	8	A	23,040	Ironbark, pine, and oak.

	Merimborough, Belmore, Capp, Coghill, Cook, Anson, Nuable, Dampier, Crowie, Quinn, Bohena, Boral.		1,273, Robertson	C	137,000	
Bathurst	Lucan and Wangoola	Cowra and Carcoar	84	A	3,300	Stringybark, blue gum, and box.
	Wangoola	Cowra	87	A	985	Stringybark.
	Bracebridge	Carcoar	91	A	2,400	Stringybark, mountain gum, box, and apple-tree.
	Galbraith, Lowry, and Caloola	Bathurst	179	A	862	Stringybark.
	Tintern	Cowra	184	C	2,923	Pine; good quality.
			3,814	A	744	Stringybark, gum, box, and apple.
			4,376	A	40	Stringybark.
			8,873	A	40	Adjoins F.R. 184.
Benarba	Milburn	Morree	814, Keelo	C	2,500	Pine and carbene.
	Banarway		1,297	A	700	Pine, bloodwood, and carbene.
	Caidmurra and Myall		1,381	A	1,400	Pine, gum, and bloodwood.
	Boonery		1,382	A	1,320	" "
			5,362	A	1,552	Pine.
Benarba and Stapylton	Umbri		2,122	A	22,800	Pine and bloodwood.
	Bundora, Newcastle, Kunopia, Tyrell, Boronga, Paleranga, and Willimil.					
Beresford	Wolumila and Bingiera	Cooma	10	A	2,050	Cabbage gum, peppermint, oak, and pine
	Cooma and The Brothers		157, Cooma	A	1,769½	White gum and box.
	Murrumbucka		266	C	960	White gum, apple-tree, and pine.
	Bulgandramine		287, Bulgandramine	C	2,500	Cabbage and white gum.
	Callaghan		397	A	240	Peppermint and white gum.
	Gladstone		438A	C	20½	
	Dangelong		460	A	195	Cabbage gum.
	Colingdon		622	A	1,116	White gum, peppermint, and box.
	Umaralla		653	A	1,200	White gum, peppermint, and pine
	Dangelong		716	A	1,019	Cabbage and white gum.
	Montagu		717	A	534	
	Big Badja		9,943	A	660	Cat-tail, mountain ash, and gum.
			877	A	2,240	
Beresford and Wallace	Jillimatong and Bradley		1,016	A	2,350	White gum and peppermint.
Bland	Warralonga	Grenfell	1,413, Warralonga	A	604½	Belar, white box, and boree.
	Caragabal		1,400, Caragabal	A	570	Pine, bull oak, and box.
	Boonabah		1,574, Boonabah	A	512	Pine, bull oak, and box.
	Wyria, Bimbella, and Back Creek	Forbes and Grenfell	1,825	A	5,480	Pine, ironbark, and red gum.
	Eurabba and Euroka	Grenfell	1,830A	A	3,260	Pine, bull oak, red gum, and box.
	Weedallion	Young	1,831, Weedallion	A	3,440	Pine, white box, red gum, and bull oak.
	Carraburrama	Grenfell	2,068	A	837	Pine.
	Minijary, Caragabal, and Jingerangle		2,185	A	1,400	White box, belar, bull oak, and pine.
	Dingi Dingi and Stockinbingal	Cootamundry	2,190	A	1,240	Pine.
	Caragabal and Berendebba	Grenfell	2,330	A	1,160	Pine, bull oak, and box.
	Yerai	Young	2,745	A	3,080	Pine, red gum, bull oak and box.
	Wargin	Grenfell	2,864	A	724	Pine and red gum.
	Combaning and Trigalong	Cootamundry	3,056	A	4,061½	Pine, white and yellow box, bull oak, and red gum
	Back Creek	Grenfell	3,973	A	6,040	Pine.
	Jingerangle		9,658	A	2,54½	White and yellow box, belar, bull oak, and pine.
Bland and Bourke	Walladilly, Thanawring, Cullingerai, Ingalba, Northcote, Quandary, Langi-Kal-Kal.	Wagga Wagga and Cootamundry.	10,231	A	7,800	Ironbark.
Bland and Clarendon	Sebastopol, Trigalong, and Walladilly		3,082	A	333	
Bland and Monteagle	Euroka, Narowie, Bimbi, and Weddin	Grenfell	1,855, Weddin	C	34,560	Pine, ironbark, stringybark, and red gum.
Bland and Harlen	Congon and Jindalee	Cootamundry	1,274	C	3,260	Ironbark and stringybark.
Bligh	Bobadeen	Cassilis	62, Bobadeen	A	882	Ironbark and box.
	Collaroy		110, Collaroy	A	400	Box and ironbark.
			111	A	700	Ironbark and box.
	Turill		124	A	2,248	Ironbark.
	Warung and Gunna		142	C	1,970	Red gum and stringybark.
	Warung		143	C	2,150	" "
	Munmurra		158	A	12,646	Ironbark, pine, and red gum.

SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres.	Timber and General Remarks.
Bligh	Worobil	Wellington	2,379	A	1,143	Box, ironbark, and red gum.
	Warung	Cassilis	9,325	A	400	Stringybark.
Bligh and Lincoln	Bolaro and Rouse	Dubbo and Cassilis	1,598	A	360	Box and ironbark.
Bligh Pottinger, and Napier	Brennan, Lowe, and Warung	Coonabarabran and Gunnedah.	646, Brennan's Gap	C	5,440	Stringybark.
Brisbane	Watt and Campbell	Cassilis	953	C	3,602½	Red gum, ironbark, and box.
"	Wentworth	"	96	A	1,358	Box and red gum.
"	Myrabluan	Scone	154	A	135	Ironbark and box.
"	Wingen	"	179	A	760	Ironbark, gum, and apple.
"	Brawboy and Manbus	"	183	A	400	Ironbark, pine, and box.
"	Park	"	221	A	1,800	Ironbark.
"	Cherson	"	229	A	251½	Ironbark and box.
"	Wybong	"	3,275	A	1,750	Ironbark and grey box.
Brisbane, Buckland, and Parry.	Parnell, Loder, Crawney, Tenni, and Lincoln.	Murrurundi and Tamworth.	1,266, Crawney	A	10,581	Stringybark.
Bourke	Yarrangerry	Wagga Wagga	1	C	640	Pine—This is in effect an extension of No. 3,048.
"	Kindra	"	23	C	1,500	Pine.
"	Cottee and Coolamon	"	24	C	6,998	"
"	Ganmain, Koekibitoo, and Hooke	"	1,251, Ganmain	A & C	12,786	Pine and box; 9,246 acres, class C.
"	Elhott, Koekibitoo, and Matong	"	1,421, Matong	S F	13,289	Pine.
"	Robertson	"	1,439, Currajong	C	25,555	Pine and white box.
"	Ardlethan, Davidson, and Arah	"	2,548, Clear Paddock	A	10,240	Pine.
"	Aslibridge, Devlin, and Dulah	"	2,652, Dulah	A & C	61,873	Pine; 173 acres in class A.
"	Davidson, Kildary, and Langi-Kal-Kal	"	2,761	A	7,400	Pine and white box.
"	Beaconsfield and Trickett	"	2,784	B	8,440	Ironbark.
"	Northcote and Ingalba	"	2,785	B	16,000	"
"	Mandamah	"	2,786A	A	4,530	Pine.
"	Ramsay and Yithan	"	3,041	A	6,600	Pine and ironbark.
"	Yarrangerry	"	3,048	C	3,901	Pine and white box.
"	Ganmain	"	3,924	A	1,420	White and yellow box.
"	Kindra and Berry Jerry	"	8,171	A	2,730	White and black pine and white and yellow box.
"	Hooke and Ganmain	"	8,984	A	4,500	Pine and box—This is included in F.R. No. 9,035.
"	"	"	9,035	C	6,115	"
"	Currawarranna	"	9,453	A	830	"
"	Buddigower	"	10,232	A	1,550	Ironbark.
"	Kildary	"	10,233	A	1,070	"
"	Langi-Kal-Kal and Kildary	"	10,234	A	670	"
"	Clermiston	"	10,380	A	776	Ironbark and box.
Bourke and Cooper	Willandra and Jillett	Narrandera and Wagga	1,654	A	11,520	Pine.
Burnett and Murchison	Adams, Dumboy, Delingera, and Wyndham	Bingera and Warialda	1,373, Gineroi	A	30,000	Ironbark and pine.
Blaxland	Uranaway	Liliston North	3,556	A	1,200	Pine, box, and mallee.
"	Creamy Hills and Moora	"	7,417	A	3,840	Pine and box.
Boyd	Uri	Narrandera	180	C	1,400	Red gum.
"	Carabury	"	182	C	1,280	"
"	Coleambally	"	1,731	C	1,566	Black and white pine and box.
"	Argoon	"	1,754	C	1,692½	"
"	Mycotia	"	1,755	C	640	"
"	"	"	1,756	C	1,052½	"
"	"	"	1,757	C	538	"
"	"	"	1,780	A	2,745	"
"	"	"	1,781	A	640	"
"	Argoon	"	1,782	A	412½	"
"	"	"	1,783	A	640	"
"	"	"	1,785	A	693	"
"	Eunanbrennan	Hay	1,884	C	937	Box.

8

	Carabury	Narrandera	1,905	A & C	2,327	Red gum, 87 acres under Class A.
	Waddi	"	1,997	C	1,207 1/2	Black and white pine and box.
	"	"	1,998	A	2,023 1/2	Pine and box.
	Boona	"	2,238	A	2,163 1/2	Black and white pine and box.
	Waddi	"	2,273	C	1,200	Red gum.
	Banandra	"	2,526	A	460	Black and white pine.
	Ourendumbee	"	2,527	A	640	"
Buckland	Werrie	Tamworth	2,003	A	707	Ironbark.
Buckland and Parry	Carroll, Balbinboon, and Moorowarra	Tamworth and Gunnedah	5,038	A	1,690	Pine.
Buccleuch	Weejasper	Tumut and Yass	2,341	A	23,040	Mountain ash, stringybark, blackbutt, ribbon and white gum, and box.
"	Cooleman	Tumut	2,926	A	5,500	Messmate, stringybark, spotted gum, white and cabbage gum, black-sally and cherry.
"	Bramina	Queanbeyan	3,150'	A	7,680	Stringybark.
"	Adjanbilly and Wyangte	Tumut	3,177	Red Hill C	11,200	Messmate, stringybark, and ribbon gum.
"	Talbingo and Jounama	"	3,234	A	8,000	Messmate, eucalypt, stringybark, ribbon gum, and apple-tree.
"	Nanangroe	Gundagai	8,091	A	160	"
"	The Peaks	Tumut	9,513	A	7,000	Mountain ash.
"	Brungle	Gundagai and Tumut	9,738	A	60	"
Buller	Boomi, Mearime, Burgess, Tooloom, Capeen, Claribel, and Pocupar.	Tenterfield and Casino	4	A	6,700	Cedar, pine, &c.
"	Acacia Creek	Tenterfield	590, Acacia Creek	A	1,200	Pine, red and grey gum, white and scrub box, oak and peppermint.
"	"	"	1,439	A	3,800	Pine, stringybark, blue and red gum, silky oak, and peppermint.
Buller, Rous, and Drake	Mummulgun, Dyaaba, Tomambar, Babyl, Sherwood, Black Camp, Peacock, &c.	Casino	1,120, Hogarth Range	A	80,788	Ironbark, blue and red gum, tallowwood, bloodwood, and blackbutt.
Buller and Clive	Barney Downs and Boonoo Boonoo	Tenterfield	1,624	A	3,200	Stringybark, messmate, blue and red gum, white box, peppermint, and woollybutt.
Buller, Clive, and Drake	Cavendish, Timbarra, Girard, and West Fairfield.	Casino and Tenterfield	4,406	A	14,300	Woollybutt, messmate, stringybark, grey, white, and red gum, sassafras, yellowwood, corkwood, and red cedar.
Cadell	Toorangabby and Perricoota	Deniliquin	2,420	A	1,450	Red gum.
"	Moama and Bama	"	3,252, Backwater Creek.	C	6,500	"
"	Bama, Moira, and Gulpa	"	3,253, Moira	C & SF	36,738	Red gum; 12,510 acres proclaimed as the Moira State Forest.
"	Toorangabby, Tomara, Burrumbury, Tantonan, and Thule.	"	3,254, Moama	C	51,200	Red gum.
"	Perricoota	"	3,255	C	810	"
Camden	Wollongong	Wollongong	38A, Illawarra	C	580	Mountain ash, swamp mahogany.
"	Burrawang	Berrima	43A	C	59	Woollybutt, white box, and turpentine.
"	Jamberoo and Kiama	Kiama	78	C	202	Turpentine, messmate, and white box.
"	Jamberoo	"	112	C	200	Turpentine, messmate, and white box.
"	Wallaya	Nowra	119, The Cliffs	C	4,840	Leather-jacket, woollybutt, swamp mahogany, messmate, box, ribbon, gum, cedar, and brush timbers.
"	Bunberrra	"	121A	C	110	Leather-jacket, ash, beech, box, and brush timbers.
"	Wallaya and Broughton	"	122	C	440	Leather-jacket, messmate, woollybutt, box, sassafras, and brush timbers.
"	Broughton	"	155	C	15	Leather-jacket, sassafras, beech, messmate, woollybutt, and brush timbers.
"	"	"	156	C	52	"
"	"	"	157	C	60	"
"	Yarrawa	Berrima	167	A	100	Box, messmate, beech, sassafras, and myrtle.
"	Broughton and Wallaya	Kiama	168	C	2,968	Woollybutt, messmate, leather-jacket, sassafras, box, and brush timbers.
"	Cambewarra	Nowra	172	A	170	Leather-jacket, turpentine, messmate, and brush timbers.
"	"	"	173	C	100	Leather-jacket, messmate, box, cedar, turpentine, and brush timbers.
"	Cambewarra and Bunberrra	"	174	C	350	Leather-jacket, sassafras, messmate, box, and brush timbers.
"	Jamberoo and Kangaloon	Kiama and Berrima	175	C	1,600	Blackbutt and messmate.
"	Burrawang	Berrima	177	A	105	Box and messmate.
"	Kembla and Calderwood	Wollongong	179	A	100	Messmate and mountain ash.
"	Calderwood	"	180	A	120	Messmate, sassafras, beech, and brush timbers.
"	"	"	181	A	320	White box, messmate, sassafras, beech, and sallywood.
"	Yarrawa	Berrima	184	A	7 a. 24 p.	Brush timbers; also for public recreation.
"	Cambewarra	Nowra	197	A	23 a. 16 p.	"
"	Wallaya	"	199	A	50	White box and messmate.

## SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres.	Timber and General Remarks.	
Camden	Wallaya	Nowra	200	A	60	White box and messmate.	
	Kiama	Kiama	201	A	100	Turpentine, messmate, and white box.	
	"	Kangaloon	Berrima	202	A	150	Blackbutt and messmate.
	"	Bugong	Nowra	203	A	250	Leather-jacket, messmate, box, turpentine, woollybutt, cedar, and brush timbers.
	"	Durrawang	Berrima	204	A	250	White box, messmate, and brush timbers.
	"	"	"	205	A	300	Peppermint, mountain ash, white box, and messmate.
	"	Yarrawa	"	206	A	325	"
	"	Bugong and Cambewarra	Nowra	207	A	650	Turpentine, box, messmate, ironbark, woollybutt, and stringybark.
	"	Cambewarra	"	209	C	1,000	Messmate, box, cedar, woollybutt, turpentine, and brush timbers.
	"	Harro	"	211	A	34	Messmate, stringybark, woollybutt, turpentine, and brush timbers.
	"	Yarrawa	Berrima	216	A	4a. 37p. Acres.	Brush timbers.
	"	Bugong	Nowra	218	A	45	"
	"	Cambewarra	"	219	A	50	Messmate, gum, turpentine, and brush timbers.
	"	Wallaya	"	220	A	375	Swamp mahogany, woollybutt, ribbon gum, and brush timbers.
	"	Burrawang	Berrima	231	C	370	Grey gum, bloodwood, and white gum.
	Clarence	Cambewarra	Nowra	5,658	C	400	Brush timbers.
		Wollongong	Wollongong	6,503	C	120	Scrub; also for ferry purposes.
Stuart and Lawrence		Grafton	24	A	2,600	Blue and spotted gum, oak, ironbark, blackbutt, stringybark, tallowwood, bloodwood, and mahogany.	
Banyabba		"	26	A	1,230	Spotted and grey gum, ironbark, stringybark, blackbutt, bloodwood, tallowwood, and oak.	
Clarence River		"	38	C	.....	Islands in the Clarence River.	
Banyabba, Lawrence, and Ashley		"	242, Lawrence	C	11,350	Ironbark, spotted gum, blackbutt, grey gum, stringybark, bloodwood, mahogany, flooded gum, and beech.	
Tindale and Coldstream		"	243, Coldstream	C	7,600	Spotted gum, blackbutt, ironbark, mahogany, tallowwood, and bloodwood.	
Glen Ugie		"	244A, Glen Ugie	C	7,676	Oak, tea-tree, spotted gum, ironbark, grey gum, box, bloodwood, and mahogany.	
Great Marlow		"	260, Alamy Creek	C	71	Ironbark, tallowwood, beech, mahogany, and grey gum.	
Southgate		"	353, Southgate	C	4,480	Ironbark, spotted and grey gum, bloodwood, tallowwood, and blackbutt.	
Elland and Lanitza		"	406A, Clarence	B	3,921	Spotted gum, box, ironbark, red and grey gum.	
Woodford		"	979, Woodford Island	A	740	Box, bloodwood, mahogany, ironbark, tallowwood, and spotted gum.	
Richmond		"	1,039	A	560	"	
Chapman		"	2,123, Coalbrook	C	13,380 <sup>7</sup>	Ironbark, red and spotted gum, blackbutt, bloodwood, stringybark, and flooded gum.	
Clarence and Richmond		Banyabba, Camira, and Myall	Grafton and Casino	27	A	3,520	Blue gum, spotted gum, stringybark, and bloodwood.
	Banyabba, Richmond, Woombah, Gibberagee, Ashby, and Myall	"	1,101, Richmond Range	A	19,016	Spotted gum, ironbark, stringybark, blackbutt, grey gum, tallowwood, mahogany, and bloodwood.	
Clarke	Rampsbeck, Allingham, Aberfoyle, and Kangaroo	Armidale	886	A	1,280	Stringybark.	
	Nowland and Warner	"	967	A	2,320	"	
"	Avondale	"	1,051	A	1,720	"	
"	Big Hill, George, Clarke, Styx, Jeogla, Serpentine, and Cunnawarra	"	1,662	C	45,000	Stringybark, messmate, tallowwood, blue, spotted, and grey gum, cedar, and brush timbers.	
Cooper	Snowy and Serpentine	"	1,663	C	17,000	Stringybark, blackbutt, and blue gum.	
	Euratha and Munduburra	Narrandera	1	A	11,700	Black and white pine and box.	
	Grong Grong	"	310, Bundidgerie	C	2,240	Red gum and box.	
	Bolaro	"	1,881	A	3,240	Black and white pine.	
	Sandy Creek	"	2,211	A	14,720	"	
	Jondaryan and Wyangan	"	2,382	A	5,700	Pine, box, and bull oak.	
	Bingar, Binya, and Stanbridge	"	2,740, Binya	C	29,360	Pine.	
	Coolaragang and Cuba	"	2,984, Darlington	C	1,020	Red gum.	
	Cuba and Hulong	"	2,985, Hulong	C	5,098	Red gum and box.	

	Dallas		2,986, Dairy Point East	C	300	Red gum.
	Dallas, Gogeldrie, and Yarangery		2,987, Gogeldrie	C	6,560	Red gum and box
	Yarangery		2,988, Yarangery	C	3,820	"
	Coolaragang		2,992, Cuba	C	880	Red gum.
	Dallas		2,993, Dairy Point	C	2,200	"
	Yalgogoring		3,032	A	3,200	Pine.
	"		3,033	A	1,300	"
	"		3,035	A	1,350	"
	Bolaro		3,036	A	4,200	"
	"		3,037	C	3,200	"
	Barralong		4,157	A	605	"
	Conapaira		4,158	A	840	"
	Sim's Gap		4,159	A	1,920	"
	Conapaira East		4,160	A	3,600	"
	Conapaira South		4,161	A	3,840	"
	Conapaira, Conapaira East, and Conapaira South					
Clarendon	Sebastopol	Wagga Wagga	3,081	A	40	Box.
Harden and Clarendon	Burra, Muttama, Ulandra, and Mitta Mitta	Cootamundry & Gundagai	2,284, Mitta Mitta	C	1,920	Stringybark and white box.
"	Bongongalong and North Gundagai	Gundagai	2,693	A	320	White box, stringybark, and apple-tree.
Cook	Irvine	Windsor	33	C	160	Mountain ash, blackbutt, gum, ironbark, and stringybark.
"	Linden, Kedumber, and Cooba	Penrith	157	A	4,800	Mountain ash, stringybark, gum, turpentine, leather-jacket, sassafras, and peppermint.
"	"	Windsor	201	C	61	Mountain ash, peppermint, grey gum, sassafras, and stringybark.
"	"	"	202	C	24	Mountain ash, sassafras, stringybark, and peppermint.
"	Strathdon and Warragamba	Penrith	1,966	A	4,600	Ironbark, mahogany, turpentine, and stringybark.
"	Strathdon	"	6,260	A	952	Within boundaries of F.R. No. 1,966.
"	"	"	8,283	A	730	"
"	"	"	10,083	A	2,560	"
"	Kurradjong and Buralow	"				
Courallie	Weah Waa	Moree	4	A	50	
"	Bundoowithilee	"	948	C	800	Pine.
"	Weebullabulla	"	949	A	1,556	"
"	Carore	"	1,059	C	2,700	Pine and box.
"	Weah Waa	"	1,300	A	2,200	Pine, box, and brigalow.
"	Terry-hie-hie, Downs, and Pringle	Bingara	2,335	A	15,500	Pine and ironbark.
"	Berrygill and Perrergee	"	2,336	A	7,500	"
"	Fletcher, Bowman, and Ellis	Moree and Bingara	2,364	A	15,800	Pine, ironbark, and bloodwood.
Cowley	Congwarra	Queanbeyan	426	A	3,200	Ribbon and brittle gum, stringybark, box, and swamp oak.
"	Naas	"	667, Honeysuckle	A	640	Ribbon, white and brittle gum, stringybark, and box.
"	Yarrara	"	668 Naas Valley	A	640	Stringybark, gum, and box.
"	Urayarra	"	725	A	6,500	Stringybark and mountain ash.
"	Gurrangora	Cooma	871	A	960	Mountain ash, grey gum, and stringy bark.
"	Orroral	Queanbeyan	888	A	640	Ribbon and brittle gum.
"	Booroomba	"	2,673	A	1,140	Ribbon gum, messmate, peppermint, and white gum.
"	Mullion	Yass	3,005	A	3,180	Ribbon and swamp gum, ash, stringybark, and yellow box.
Cowper	Bonglega	Bourke	1,202	A	2,269	Pine.
"	Goulburn and Runnymede	"	2,236	A	1,400	"
Cumberland	Bulgo and Heathcote	Campbelltown	110, Bottle Forest	C	5,739	Ironbark, blackbutt, turpentine, and bangally
"	Maroota	Windsor	9,056	A	6,000	Swamp mahogany, blue gum, tea-tree, stringybark, ironbark, bloodwood, forest oak, red apple, rock apple, and wattle.
Clive	Capoompeta	Glen Innes	2	A	3,000	Woollybutt, messmate, grey and white gum.
"	Dickson and Forest Land	Tenterfield	1,378a	A	13,600	Tallowwood, bloodwood, messmate, woollybutt, stringybark, red and grey gum, and sassafras.
"	Boroo, Capoompeta	Glen Innes	2,698	A	1,696	Messmate, woollybutt, stringybark, grey and blue gum.
"	Booroo	Tenterfield & Glen Innes	6,338	A	40	Within F. R., No. 2,698.
"	Booroo, Jondol, Goolamanger, and Morven	Tenterfield	8,928	A	11,000	Messmate, woollybutt, stringybark, grey and blue gum, and scrub timbers.
Clive and Gough	Angoperan and Parkes	"	1,337	A	14,000	Woollybutt, messmate, red and grey gum.
"	Parkes, Scott, and Eastern Water	Tenterfield & Glen Innes	1,448	A	14,200	Messmate, woollybutt, blue and grey gum, sassafras, and honeysuckle.
"	Garrett, Butterleaf, and Parkes	Glen Innes	4,745	A	4,400	Woollybutt, messmate, blue and grey gum, stringybark, sassafras, whitewood, oak, and peppermint.

SCHEDULE VII—continued.

County.	Parish.	Land District	Number and Name of Reserve.	Class.	Approximate Area in Acres.	Timber and General Remarks.
Clyde	Carinda and Quabothoo	Brewarrina	7,335	A	4,240	Pine.
Clyde and Leichhardt	Gidgerygah, Devon, Gilwarry, and Carinda	Walgett	3,421	A	12,150	"
Cunningham	Badjeribong	Forbes	1	A	161	Red gum.
"	Murda and Condobolin	Condobolin	1,262, Condobolin	A	3,300	Pine, wilga, yarran, rosewood.
"	Gunning	Forbes	1,538	A	4,400	Pine.
"	Taratta and Mowabla	Condobolin	1,981	A	3,700	Pine and box.
"	Mount Knobby and Taratta	"	1,985	A	3,450	Pine.
"	Mulgutherie	"	7,677	A	240	Red gum.
"	Cookey's Plains and Gunningbland	Parkes	8,664	A	11,520	Pine.
"	Tinda and Tollingo	Condobolin	8,904	A	800	"
"	Emu Plains and Murda	"	9,593	A	1,210	"
Dampier	Bodalla	Broulee	2, Amhurst Island	C	25	Spotted gum and mahogany; stunted and only useful for shelter.
"	Nooroona	"	4, Mount Dromedary.	A	3,800	Mountain ash, messmate, peppermint, white-top, and brush timber.
"	Bergalia	"	16	...	4,180	Ironbark, peppermint, redwood, blackbutt, bloodwood, stringybark, and box.
"	Bodalla	"	249, Turose	C	380	Spotted gum, ironbark, blackbutt, mahogany, and box.
"	Bermagui	"	305, Bermagui	A	2,700	Ironbark, stringybark, white box, blackbutt, spotted and white gum, peppermint, messmate, bloodwood, and wattle.
"	Wagonga	"	307	A & C	7,835½	Spotted gum, blackbutt, ironbark, messmate, redwood, box, and red gum; 4,200 acres in Class A.
"	"	"	2,058	C	87	Spotted gum.
"	Tanja	Bega	2,975	A	1,600	Ironbark, spotted gum, peppermint, stringybark, mountain ash, messmate, and white box.
"	Barra	Broulee	6,216	A	1,870	Ironbark, spotted gum, stringybark, redwood, bloodwood, and box.
"	Bermagui	"	7,059	A	236	Ironbark, stringybark, spotted gum, mahogany.
"	"	Bega	7,060	A	105½	Ironbark, stringybark, swamp mahogany, and spotted gum.
"	Bergalia	Broulee	9,248	A	2,800	Ironbark, spotted gum, blackbutt, mountain ash, redwood, stringybark, woollybutt, bloodwood, and red or grey gum.
"	Murrab	Bega	10,183	A	2,369	Ironbark, peppermint, grey box, spotted and ribbon gum, and mahogany.
Darling	Dinawirindi	Tamworth	3, Manilla	A	3,200	Pine.
"	Hoblen	"	1,270	A	12,800	Stringybark.
"	Halloran	"	1,737	A	3,900	Box and gum.
"	Ironbark and Tiabundie	"	9,736	A	7,500	Ironbark and stringybark.
Darling and Murchison	North Barraba and Tiabundie	Bingera and Tamworth	1,585	A	3,840	Box.
Denham	Murkadool	Walgett	1,818	A	640	Pine and box.
Drake	Timbarra	Casino	248, Timbarra	C	31,360	Stringybark, red gum, ironbark, messmate, bloodwood, box, and mountain ash.
"	Mookimer and Rodham	"	537, Mount Neville	C	38,400	Red gum, bloodwood, ironbark, stringybark, yellow box, green wattle, forest oak, beech, apple-tree, tallowwood, and brush timbers.
"	Alice	"	913	A	500	Stringybark, yellowbox, ironbark, bloodwood, red gum, forest oak, mahogany, and blackbutt.
"	Picarbin	"	929	A	80	Red and white gum, stringybark, blackbutt, apple-tree, yellowbox, ironbark, forest oak, mahogany, and tea-tree.
"	Albert and Richmond	Glen Innes	6,264	A	9,005½	Cedar, beech, sassafras, tallow, rosewood, brown and blue gum, and scrub box.
"	Dandalura	"	6,368	A	640	"
"	Puhoi and Cangi	"	6,369	A	18,000	"
"	Coombadjha, Dandalura, Albert, and Richmond.	"	9,999	A	4,250	Red cedar, beech, sassafras, coachwood, tallow, myrtle, scrub, box, ironbark, and stringybark.
Drake and Richmond	Pickapene, Coongbar, Alice, Wyon, and Busby.	Casino	379, Pickapene	C	10,185	Hoop-pine, gum, ironbark, peppermint, stringybark, apple-tree, beech, white cedar, silky-oak, and spotted gum.
Drake, Rous, and Richmond	Shannon, Mummulgum, and Sandilands	"	995, Shannon Brook	A	11,200	Gray, red, and spotted gum, ironbark, apple-tree, mahogany, yellowwood, mountain ash, stringybark, bastard box, beech, mountain pine, and cedar.
Dudley	Stuart	Kempsey	5	A	40	Flooded gum, bloodwood, turpentine, blue and gray gum, and stringybark.

	Kalateenee		112, Maria River	A	2,453	Blackbutt, mahogany, tallowwood, bloodwood, gray gum, blue and flooded gum, ironbark, turpentine, and forest oak.
	Mowies, Comara, Cunawarra, Botum-burra, Nulla Nulla, Pee Dee.		158, Styx	C	80,000	Bloodwood, mahogany, tallowwood, gray gum, turpentine, flooded gum, scrub box, blackbutt, stringybark, rosewood, red gum, forest oak, beech, and red cedar.
	Stuart, Bell-book, and Gordon		3,753	A	16,000	Blackbutt, gray gum, mahogany, bloodwood, tallowwood, stringybark, blue gum, turpentine, spotted, flooded, and red gum, forest oak, rosewood, and red cedar.
Dudley and Raleigh	Stuart		6,321	A	40	This is identical with forest reserve No. 5.
	Tanban, Baraganyatti, Unkya, Allgomer, Warrell, and Yarrabandine.		110, Allgomer	A	53,998½	Blackbutt, mahogany, gray, blue, and flooded gum, tallowwood, bloodwood, turpentine, ironbark, box, forest oak, and stringybark.
Denison	Cottadidda	Corowa	107	C	270	Red gum and pine.
	Wahgunyah		1,591, Wahgunyah	SF	4,120	Pine.
	Savenake and Warmatta		1,592, Savenake	C	640	"
	Boomanoomana		1,639, Boomanoomana	SF	400	Red gum.
	Wahgunyah		2,384	A	180	Pine.
	Turramia		2,386	C	370	Red gum.
	Wahgunyah		2,868	A	400	Pine.
	Gereldery		3,119	A	375	"
	Warmatta		3,144	SF	740	Pine and oak.
	Mulwala		3,208, Mulwala West,	SF	1,340	Red gum.
	Boomanoomana		3,209, Boomanoomana	SF	960	"
	"		No. 4.			
	"		3,210, Boomanoomana	SF	1,841½	"
	"		No. 2.			
	"		3,211, Boomanoomana	SF	108	"
	"		No. 3.			
	Cottadidda		3,212, Cottadidda,	C	300	"
	"		No. 1.			
	"		3,213, Cottadidda,	C	280	"
	"		No. 2.			
	"		3,214, Cottadidda,	C	150	"
	"		No. 3.			
	Barrooga		3,215, Barroogo	C & SF	2,500	Red gum; 1,350 acres proclaimed a State Forest.
	Mulwala and Turramia		3,216, Mulwala	SF	4,500	Red gum.
	Cottadidda		3,340	C	105	Pine.
	Toomwal		3,241	C	400	Red gum.
	Woperana		3,242	C	360	"
	Turramia		4,504	C	48	"
Durham	Goorangoola	Singleton	79, Ravensworth	B	1,184	Red ironbark, spotted red gum, and box.
	Butterwick	Maitland	158, Hinton	A	400	Blue, grey, and spotted gum, ironbark, box, and forest-oak.
	Savoy	Singleton	174, Grass-tree	A	472	Ironbark and spotted gum.
	Dyrring and Broughton		195	C	1,250	Spotted gum, blackbutt, and blue gum.
	Mount Royal and Liebeg		196	C	10,000	Blue gum, box, stringybark, red gum, turpentine, and ironbark.
	Boonabilla and Carrow	Paterson	201	A	22,442	Messmate, red gum, forest oak, stringybark, flooded gum, turpentine, and red cedar.
	Allyn, Coloma, and Holywell	Paterson and Dungog	202	A	48,000	
	Coloma	Paterson	2,199	A	80	Within Forest Reserve, No. 202.
	Gotha, Glendon, and Carrow	Singleton	3,496	A	6,994	Red gum, forest oak, stringybark, box, and tea-tree.
	Allyn	Paterson	8,291	A	40	
	Boonabilla		8,292	A	40	
	Chalmers and Beltrees	Scone	10,222	A	7,500	Stringybark, red gum, and cedar.
Ewenmar	Tacklebang	Dubbo	1,073	A	760	Pine.
	Warric	Coonamble	1,556	C	1,480	"
	Gawah		9,130	A	1,259	Belah, pine, and oak.
Ewenmar and Gregory	Galargambone and Tailby		1,138	A & C	3,600	Pine; 1,040 acres in Class C.
Fitzroy	Coff and Moonee	Grafton and Bellingen	136, Moonee	A	14,090	Blackbutt, tallowwood, mahogany, grey and blue gum, ironbark, turpentine, and flooded gum.
	Ermington	Grafton	239, Chambigne Creek	C	3,200	Pine, spotted gum, ironbark, stringybark, red gum, and forest oak.

SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres	Timber and General Remarks.
Fitzroy	Dorrigo, Clarence, Jardine, Herborn, and Cope.	Bellingen and Grafton	354, Clouds Creek	C	48,000	Red gum, box, stringybark, forest oak, pine, bloodwood, blackbutt, beech, tallowwood, rosewood, mountain ash, and cedar.
"	Tyringham and Dorrigo	Bellingen	355 Glen Fernic Creek	C	5,560	Pine, stringybark, tallowwood, forest oak, reilgum, rosewood, tulipwood, beech, and cedar.
"	Coff, Moonce, Wonga Wanga, and Comlaroi	"	642 Orara	C	6,705½	Ironbark, flooded gum, red mahogany, tallowwood, blackbutt, turpentine, blue gum, pine, beech, rosewood, coachwood, sassafras, bean, and cherry.
"	Chambigne	Grafton	665	A	8,640	Ironbark, spotted and red gum, box, stringybark, forest oak, and pine.
"	Hyland	Armidale and Bellingen	2,152	A	7,000	Stringybark and blue gum.
"	Woogoolga and Corindi	Grafton	2,439	A	4,680	Blackbutt, tallowwood, messmate, red mahogany, bloodwood, ironbark, spotted gum, grey gum, and forest oak.
"	Leigh	"	6,732	A	450	Cedar plantation within the Dorrigo Forest Reserve.
Fitzroy and Raleigh	Bonville, North Bellinger, and Fitzroy	Bellingen	121 Bellinger	A	17,162	Blackbutt and tallowwood, ironbark, turpentine, flooded gum, and beech.
"	Fenton, Bligh, Leigh, Allan, and Bostobrick.	"	377 Dorrigo	C	23,880	Cedar, pine, rosewood, beech, mountain ash, tulip wood, bean, plum, sassafras, and grey gum.
Farnell		Wilcannia	1 Morphitt's Crk.	C	1,100	Timber within 2 chains of the creek.
Farnell and Mootwingee	Byjerkerno and Caloola	"	6,668	C	1,050	Within the banks, and within 2 chains of the banks of Euriovic, Byjerkerno, Candah, and Caloola Creeks.
Finch	Yarraman	Walgett	4	A	1,867½	Pine.
"	Blossome, Dunbar, and Deripas	"	8	A	5,550	Pine, box, and carbeen.
"	Bukkulla	"	16	A	1,200	Box and belar.
"	Baloon	"	525	A	2,560	Box, belar, and pine.
"	Mooni	"	526	A	2,160	Belar.
"	Dalbrandi	"	744	A	2,380	Pine.
"	Deripas	"	745	A	1,920	"
"	Langloh and Birben	"	838	A	2,560	"
"	Dunumbrol	"	892	A	624½	Box and belar.
"	Dunumbrol and Somerville	"	893	A	4,776	Box, pine, and belar.
"	Dunumbrol	"	894	A	947½	Box and belar.
"	Bukkulla	"	6,257	A	225	Pine, box, and carbeen.
Forbes	Morongla	Cowra	1,143, Cowra	C	5,440	Pine.
"	Mulgandry and Eraso	Forbes	1,306A	A	3,705	"
"	Mulgandry and Bandon	"	1,350A	A	2,720	"
"	Broula	Cowra	2,880	A	724	"
"	Omna, Birangan, and Warraderry	Forbes	3,013	A	5,820	Pine and ironbark.
"	Birangan and Bogalong	Grenfell	3,115	A	2,980	Pine.
"	Wheogo	"	9,582	A	1,735	Ironbark, white box, pine, and bull oak.
Forbes and Gipps	Tallabynn and Carrawandool	Forbes	1,361	A	10,200	Pine and box.
"	Jemalong and Jemalong West	"	9,849	A	225	Red gum.
Forbes and Montegale	Eualdrie and Weddin	Grenfell	2,895	A	4,700	Ironbark, stringybark, red gum, and pine.
"	Warrumba and Yambira	"	3,176	A	900	Ironbark, stringybark, pine, and box.
Flinders	Minalon	Parkes	4	A	3,360	Pine, box, and bull oak.
"	Currajong, Red Gilgais, and Talgong	"	5	A	15,360	Pine.
"	Babinda and Gumbinc	"	2,086	A	6,600	"
"	Babinda, Babego, and Gumbinc	"	9,057	A	13,270	"
Franklin	Wirringa	Hillston	2,695	A	225	Stunted box, required for shelter.
"	Goolagummi, Terry, Kongong, and Gonowlin	"	2,711	C	7,160	Pine.
"	Kongong and Bellatherie	"	9,739	A	960	"
Georgiana	Rockley	Bathurst	43A	A	600	Stringybark, red gum, white box, and apple-tree
"	Isabella and Bumarang	Bathurst and Lithgow	94	A	1,693	Stringybark.
"	Garrynian	Lithgow	2,383	A	4,400	Mountain ash, gum, and blackbutt.
"	Gillindieh	Carcoar	5,499	A	6,340	Stringybark.
"	Ycwrangara	"	7,558	A	670	Stringybark and red box.
Gipps	Merribooka, Wilga, Crown Camp, and Cookaburrangong.	Condobolin	4	A	7,670	Pine and box.

	Nerang, Cowal, and Moora Moora	Forbes and Condobolin	6	A	1,560	Pine.
	Cadwo	Forbes	1,175	C	1,250	Red gum.
	Yarnel and Weelah	Condobolin	1,237	C	3,840	Pine, box, and gum.
	Ina	Forbes	1,303	C	657½	Pine.
	Towyal	"	1,436	C	345	Red gum.
	Jemalong West, Towyal, Wilbetroy, and West Plains.	"	1,581	A	4,500	Pine.
	Wamboyne	Condobolin	1,875A	A	2,901	Pine, ironbark, box, and yarren.
	Moonbia	"	2,662	A	3,300	Gum, box, and bull oak.
	Cadwo	"	3,211	A	2,800	Gum.
Gloucester	Beryan and Talawald	Manning River	46A Forster	A	29,700	Blackbutt, tallowwood, red, flooded, blue, spotted, and grey gums, forest mahogany, brush and forest box, ironbark, bloodwood, stringybark, and turpentine.
	Sutton and Thornton	Raymond Terrace	71	A	2,240	Bloodwood, gum, mahogany, ironbark, and blackbutt.
	Stockton	Newcastle	171 Port Hunter	C	375½	Brush—required to prevent sand drifting into the harbour.
	Beryan	Manning River	8,797	A	161½	Adjoins F.R. No 46A.
Gresham	Bucearumbi	Grafton	753	A	1,000	Ironbark, stringybark, spotted gum, grey scrub, box, grey gum, forest oak, and tallowwood.
	Urania and Springbrook	Glen Innes	1,542 Boyd River	C	6,300	Stringybark, messmate, woollybutt, tallowwood, cedar, pine, and blue, red, add grey gums.
	Urania, Springbrook, and Barool	"	1,608	A	24,960	Cedar, tallowwood, stringybark, mahogany, grey, blue, and red gums, sassafras, oak, ironbark, bloodwood, rosewood, and beech.
	Cowan	"	6,370	A	960	
	Brothers	"	6,371	A	2,560	
	Alder and Marara	"	6,479	A	11,000	Cedar, pine, and hardwood.
Gordon	Cardington	Molong	3	A	750	Ironbark, stringybark, white box, and gum.
	Belmore, Greenbank, Strathorn, and Hyandra.	Molong and Dubbo	1,096 Harvey's Range Creek.	C	38,400	Ironbark, stringybark, and red and white gum.
	Benya and Warraberry	Molong	1,365	A	6,480	Ironbark and stringybark.
	Cardington	"	3,060	A	125	Ironbark.
Gordon and Narromine	Calooma and Belmore	Dubbo	1,117	C	2,880	
Gregory	Dynong	Coonamble	1,069	A	470	Belar.
	Gandymungydell	"	1,355	A	2,150	Pine, oak, and gum.
Gregory and Leichhardt	Gandymungydell, Tallegar, and Neinby	"	28	A	2,500	Pine, gum, and oak.
Gough	Macintyre	Inverell	9	A	600	White gum, sally, stringybark, and wattle.
	Yarraford, Louis, Boyd, and Wellington	Glen Innes	746, Rangers Valley	A & C	15,238	Stringybark and peppermint: 130 acres in Class C.
	Mount Mitchell and Mlangothlin	"	1,085	A	355	Stringybark, red and white gum.
	Clive	"	1,185A	A	2,150	Stringybark, box, and wattle.
	Robertson and Diehard	"	1,433	A	12,800	Messmate, tallowwood, stringybark, red and grey gums, woollybutt, cedar, beech, and sassafras.
	Wellingrove	"	1,555A	A	835	Stringybark, gum, and ironbark.
	Bald Nob, Mitchell, and Diehard	"	3,446	A	23,000	Stringybark, blackbutt, messmate, woollybutt, and blue gum.
Gowen	Eringanorin, Breelong, Mundar-Dilly, Biralbung, and Yalcogin.	Coonamble	1,690	C	35,000	Ironbark, pine, and oak.
Goulburn	Woomargama and Mountain Creek	Albury	2,108, Mountain Creek	A	7,900	Stringybark and red box.
	Hume	"	2,430	A	13,000	Stringybark, peppermint, grey and yellow box, and apple-tree.
	Forest Creek and Pulletop	"	3,157	A	5,250	Stringybark, red box, and cabbage-gum.
Goulburn and Selwyn	Craven, Glenroy, and Yarara	"	2,422, Glenroy	A	9,700	Stringybark, ribbon gum, and messmate.
Goulburn and Mitchell	Jerra Jerra, Pulletop, and Maclean	Wagga Wagga and Albury	3,017	C	9,370	Stringybark.
Harden	Childowla	Roorowa	1	A	1,015	Stringybark, messmate, white gum, and yellow box
	Bowring and Woolgarlo	Yass	1,561	C	3,000	Stringybark, blue gum, ironbark, and box.
	Jindalee	Cootamundry	1,798, The Ironbarks	A	1,000	Ironbark.
	Childowla	Burrova	2,502	A	2,630	Stringybark, messmate, and blue gum.
	Bookham, Berrima, and Talmo	"	2,514A	A	4,282	Stringybark, white and yellow box.
Harden and Monteagle	Willawong, Marina, Moppity, and Douglas	Young and Burrova	2,393	A & C	6,333	Stringybark, pine, and box; 96 acres in Class A.
Hardinge	Clerk and Single	Inverell	3	A	3,000	Stringybark, messmate, woollybutt, gum, box, peppermint, and apple.
	Williams	Armidale	634	A	750	Stringybark and red gum.
	Barlow	"	635	A	1,500	Stringybark, ironbark, and red gum.
	Skinner and Williams	"	795	A	4,660	Stringybark, yellow box, and black wattle.
	Mackenzie	"	796	A	5,760	Stringybark.

SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres	Timber and General Remarks.
Hardinge	Baker	Armidale	877, Cameron's Creek.	A	3,200	Stringybark, ironbark, and red gum.
"	New Valley and Chigwell	"	878	A	4,540	Stringybark, messmate, woollybutt, ironbark, and box.
"	Aston	"	939	C	600	Stringybark.
"	Yarrowick	"	990	A	2,008	Stringybark, red gum, pine, and ironbark.
"	Torryburn	"	991	A	1,370	Stringybark, ironbark, and yellow box.
"	Honeysuckle	"	1,016	A	1,120	Stringybark and yellow box.
"	Morse	"	1,129	A	280	Pine and stringybark.
"	Single and Clerk	"	1,261	A	4,000	Stringybark, woollybutt, messmate, and red gum.
"	Cameron	"	1,371	A	1,520	Stringybark, white box, and ironbark.
"	Torryburn	"	1,652	A	1,050	Stringybark, white box, and ironbark.
"	Buchanan and New Valley	Inverell	1,634	A	5,180	Stringybark, red and white gum, pine, ironbark, and peppermint
"	Skinner	Armidale	1,683	A	1,210	Stringybark and yellow box.
"	St. George	"	1,684	A	2,560	Stringybark, ironbark, and yellow box.
"	Everett	"	1,689	A	1,450	Stringybark.
"	Torryburn	"	2,827	A	2,500	Ironbark, white box, and stringybark.
"	Barlow	"	10,133	A	1,106	Stringybark, ironbark, box, and red gum.
Hardinge and Inglis	Roumalla and Retreat	"	719	A	1,400	Stringybark, red gum, and Cypress pine.
Hardinge and Sandon	Bakala, Roumalla, and Looanga	"	1,537	A	6,400	Stringybark.
Hardinge and Sandon	Sabraon and Sandy Creek	"	1,132	A	160	Stringybark.
Hawes	Woko	Walcha	7,974	A	1,230	Cedar, rosewood, and blue gum.
"	Woko, Dewitt, and Cobb	"	7,975	A	5,440	"
Hawes and Vernon	Salway, Fletcher, Yarrowitch, Rushbrook, Mukki.	"	1,293	A	38,880	Stringybark, woollybutt, blue gum, and messmate.
Hawes and Parry	Nandle, Dungowan, Vant, Rogiun, Yerowin, Scott, and Myall.	Tanworth and Walcha	1,541	A	13,070	Woollybutt, stringybark, messmate, and gum.
Hume	Quat Quatta	Corowa	19	A	437	Red gum and box.
"	Morebringer	"	1,607, Morebringer	C	320	"
"	Gordon	"	1,714, Coreen	S F	2,030	Pine.
"	Collendina	"	1,788, Collendina	C	270	Red gum.
"	Collendina and Corowa	"	1,854, Traveller's Point.	C	720	"
"	Quat Quatta	"	2,068	C	29½	"
"	Henty and Comer	Albury	2,201	A	5,031	"
"	Sandy Ridges	Corowa	2,637	A	640	Pine.
"	"	"	2,638	A	230½	"
"	Henty	Albury	3,003	A	675½	Yellow and white box and she oak.
"	Burrangong	Urana	3,108	A	355½	Box.
"	Sherwyn	Albury	3,117	A	200	Flooded gum.
"	Quat Quatta	Corowa	3,125	A	47	Red gum.
"	Sherwyn	Albury	3,248	A	45	"
Hunter	Grono, Colo, and Hawkesbury	Windsor	58	A	6,120	Blackbutt, ironbark, stringybark, mahogany, oak, turpentine, blood-wood, and gum.
"	Woolgan and Capertee	"	5,612	A	22,000	Ironbark, gum, turpentine, stringybark, and cedar.
Inglis	Congi	Armidale	918	A	2,500	White gum, peppermint, and stringybark.
"	"	"	944	A	1,640	"
"	Moonbi and Perry	Tanworth	1,269, Moonbi	A	17,900	Gum, stringybark, apple, and pine.
"	Winton	"	1,536	A	1,280	Stringybark.
"	Congi	"	1,578	A	270	This is a narrow strip of land between timber reserves 918 and 944.
"	Attunga	"	10,133	A	2,300	Pine.
Inglis and Vernon	Aberaldie and Scott	Armidale and Walcha	897	A	960	Stringybark.
"	Scott and Boulton	"	898	A	1,987	Stringybark and black wattles.
"	Bergen-op-Zoom, Ohio, and Congi	"	1,008	A	2,040	Stringybark.
Inglis and Sandon	Sandon and Congi	Armidale	1,233	A	800	Stringybark and black wattle.
Jamieson	Bunna and Markham	Narrabri	4	A	3,000	Belar.
"	Bobbiwa	"	6	A	2,100	Pine, oak, belar, and ironbark.

315-C

	Tarlee and Keera		1,267	Tarlee	A	7,000	Belar.
	Woolabra, Gehan, Manamoi, and Waterloo		1,268	Eckford	A	26,800	Belar, box, and pine.
	Dobikin		1,571		A	120	Myall.
Jamieson and Murchison	Paleroo, Caroda, Pringle, Cough, and Cowinangarah.	Bingera and Narrabri	1,318	Rocky Creek	A	24,960	Ironbark and stringybark.
Kennedy	Meryula and Hartington	Parkes	4		A	8,480	Pine, box, and bull-oak.
"	Carolina	"	7		A	1,200	Pine, box, belar, and bull-oak.
"	Strathorn	"	2,092		A	2,950	Box, forest gum, pine, and bull-oak.
"	Carolina	"	2,093A		A	1,700	Box, pine, bull-oak, and rosewood.
"	Albert	"	4,188		A	1,040	Box, ironbark, and pine.
King	Alton	Burrowa	2,070		A	1,200	Stringybark, ironbark, and gum.
"	Newham	"	7,158		A	1,700	Pine.
"	Graham	"	7,248		A	4,000	Stringybark, pine, and mountain gum.
"	Kember	"	7,970		A	1,000	Pine, ironbark, stringybark, box, and red gum.
Leichhardt	Carwell	Coonamble	21		A	1,700	Pine and box.
"	Quanda Quanda and Carwell	"	22		A	1,500	Pine.
"	Urawilkie and Willaga	"	831	Urawilkie	A	2,600	Pine and box.
"	Neinby	"	1,167		A	1,440	Pine.
"	Warraba East	"	1,173	Urawilkie West	A	2,500	Oak, pine, box, and ironbark.
"	Carwell and Baronne	"	1,416		A	5,040	Ironbark.
"	Carrarbear	"	1,657		A	960	Pine.
"	Toooloon and Nelgourie	"	1,720		C	880	"
"		"	9,155		A	1,050	"
Lincoln	Murrungundie, Bald Hill, and Yarrinderry	Dubbo	629A		C	10,850	Box and ironbark.
"	Ballimore	"	1,034		A	1,600	Ironbark.
"	Bolaro	"	1,597		A	840	"
"	Dubbo	"	1,671		C	20	Yellow box; required for shade and shelter.
"		"	1,672		C	20	Gum and yellow box.
"	Lincoln	"	1,688	Breelong	S F	9,160	Ironbark and pine.
"	Lincoln, Breelong, Breelong South, and Balladoran.	"	1,689		C	37,630	Ironbark.
"	Breelong	"	2,001		A	370	This is an extension of F.R. No. 1,689.
"	Beni	"	3,997		A	6,000	Ironbark.
Macquarie	Ralfe, Burrawan, and Queen's Lake	Port Macquarie	33	Cowarra	A & C	7,260	Tallowwood, ironbark, flooded, blue, and grey gum, blackbutt, brush box, forest mahogany, turpentine, spotted gum, and bloodwood; 4,860 acres under class C.
"	Cairncross and Redbank	"	34	Redbank	A	10,000	Tallowwood, ironbark, brush box, flooded gum, blackbutt, grey and blue gum, bloodwood, forest mahogany, and turpentine.
"	Stewart	Manning River	73		A	2,580	Tallowwood, blackbutt, ironbark, flooded gum, grey and blue gum, brush box, bloodwood, mahogany, rosewood, and turpentine.
"	Taroc	"	80		A	150	Gum, blackbutt, and ironbark; suitable for fuel only.
"	Beraunghi and Lincoln	"	100	Maria	A	7,472	Blackbutt and tallowwood.
"	John's River	"	144		A	12,262	Tallowwood, blackbutt, ironbark, flooded gum, grey and blue gum, brush box, bloodwood, red and white mahogany, turpentine, spotted gum and rosewood.
"	Macquarie	"	233	Ocean	C	340	Tallowwood, blackbutt, ironbark, flooded gum, blue and grey gum, brush box, bloodwood, and turpentine.
"	Cairncross	Port Macquarie	234		S F	610	Blackbutt, tallowwood, ironbark, brush box, flooded gum, grey and blue gum, bloodwood, forest mahogany, and turpentine.
"	Queenslake and Burrowa	"	235		C	3,840	Tallowwood, blackbutt, ironbark, flooded gum, grey and blue gum, brush box, bloodwood, turpentine, and stringybark.
"	Wingham	Manning River	4,208		C	4	White cedar, gum, and plum.
"	"	"	4,225		C	6½	Brush timber for ornament.
"	"	"	4,226		C	7½	"
"	Knorrit	"	8,235		A	20	Red cedar and brush timbers.
"	Redbank	Port Macquarie	9,216		A	122	This is in effect an extension of the Redbank Forest, No. 34 Reserve.
"	Younga South	"	475		A	2,880	"
Manara		Wilcannia	1		C	1,900	Timber, within 2 chains of Stephen's Creek.
Menindie	Cuddell, Gillenbah, Wood, and Corobimilla	Narrandera	1,890	Gillenbah	C	12,608	Pine and box.
Mitchell	Milbrulong	Wagga Wagga	2,722	Mittagong	A	6,200	Pine.
"	Wanberrima	"	2,936		A	3,300	"

SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres.	Timber and General Remarks.
Mitchell ..	Burrandana and Westby .....	Wagga Wagga .....	3,063 .....	A	8,307	Stringybark, red box, and apple.
" ..	Mundowry and Berry Jerry .....	" .....	3,232, Berry Jerry .....	C	11,200	Red gum.
" ..	Hanging Rock, Burke, and Vincent .....	" .....	8,232, Hanging Rock .....	C	8,050	Stringybark, black, white, and mountain pine, currawang, and myall.
" ..	" .....	" .....	8,874 .....	A	1,350	Stringybark and red box.
Mitchell and Wynyard ..	Livingstone, and Coffin Rock .....	" .....	1,873 .....	A&C	2,160	Stringybark and ironbark ; 1,280 acres in class C.
" ..	Woomahrigong and Sandy Creek .....	" .....	1,874 .....	A&C	3,686	" " " " 1,824 " "
" ..	Livingstone, Burrandana, and Coffin Rock .....	" .....	3,293 .....	A	12,800	Ironbark, stringybark, cabbage gum, and apple tree.
Mitchell and Urana .....	Wangh, Clyde, Wood, and Birrigo .....	Narrandera and Urana .....	3,053 .....	C	8,320	Pine.
Monteagle ..	" .....	" .....	6 .....	A	680	" .....
" ..	Dananbilla .....	Young .....	13 .....	A	200	Stringybark and pine.
" ..	Yuudoo .....	Boorowa .....	2,508 .....	A	1,100	Stringybark and box.
" ..	Dananbilla .....	Young .....	2,475 .....	A	1,200	Ironbark and pine.
" ..	Willawong and Gullalong .....	Boorowa .....	2,526, Calabash .....	A	1,800	Stringybark, pine, and box.
" ..	Bunbaldry .....	Grenfell .....	3,123 .....	A	4,000	Ironbark, pine, and stringybark.
Mouramba ..	" .....	Cobar .....	1,187 .....	A	1,280	" .....
" ..	" .....	" .....	1,196, Crowe Creek .....	A	640	Pine.
" ..	M'Gregor and Yanko .....	" .....	2,523 .....	A	2,430	" .....
" ..	Roset and Priory Plains .....	" .....	2,705 .....	A	2,867½	" .....
" ..	Flinders, Hartwood, Roset, Beloura, Hathaway, and Walker .....	" .....	2,091 .....	A	56,500	Pine and box.
Murray ..	Canberra and Weetangara .....	Queanbeyan .....	129, Canberra .....	A	420	Stringybark and gum.
" ..	Currandooly and Fairy Meadows .....	Queanbeyan and Braidwood .....	162 .....	A	2,420	Mountain ash, messmate, and gum.
" ..	Jinero, Ballallaba, and Ollalula .....	" .....	200 .....	A	400	Brown barrel, messmate, ribbon gum, and mountain ash.
" ..	" .....	" .....	" .....	" .....	" .....	" .....
" ..	Murroon, Warri, and Jinglemoney .....	Braidwood .....	8,681 .....	A	9,400	" .....
" ..	" .....	" .....	9,556 .....	A	882	" .....
" ..	Pialligo and Goorooyarroo .....	Queanbeyan .....	9,847 .....	A	1,340	Gum, box, and stringybark.
Murchison ..	Delongra .....	Bingera .....	954 .....	A	2,500	Pine, ironbark, box, and apple-tree.
" ..	Delingera .....	" .....	1,210 .....	A	100	" .....
" ..	Paleroe, Pringle, and Rusden .....	" .....	3,061, Lindsay .....	A	24,500	Stringybark, messmate, and gum.
" ..	Boomi, Rusden, and Lindsay .....	" .....	5,568 .....	A	6,000	Stringybark and messmate.
Nandewar ..	Bollol, Leard, and Wean .....	Narrabri .....	1,263, Back Creek .....	A	20,800	Pine, ironbark, box, and belar.
" ..	Narrabri, Moonbill, and Killarney .....	" .....	2,372, Narrabri .....	A	6,400	Pine, ironbark, and forest oak.
" ..	Tulenumba, Yarrari, Vickery, Wean, and Brentry .....	Gunnedah .....	3,974 .....	A	17,300	Pine and ironbark.
Narramine ..	Mullah Back, and Triangi .....	Dubbo .....	2,728 .....	A	2,690	Pine, box, oak, and belar.
" ..	Triangi, Temoin, Goan, and Willidah .....	" .....	2,727 .....	A	4,560	Pine, box, and belar.
" ..	Hervey and Mingelo .....	Parkes .....	9,972 .....	A	5,000	Pine, box, and yarran.
Narran ..	" .....	Brewarrina .....	770 .....	A	1,920	Gidgea and pine.
" ..	Gunnawarra and Yarkieta .....	" .....	1,132 .....	A	4,640	Pine and gum.
Nicholson ..	Griffiths .....	Hillston .....	2,831A .....	A	1,920	Pine, box, yarran, belar, dogwood, and mallee.
" ..	Russell, Sinnot, Moneton, and Chirnside .....	Hay .....	2,865 .....	A	5,601	Pine, box, gum, and yarran.
" ..	Russell .....	" .....	3,732 .....	A	315	Pine.
Northumberland ..	Congewai, Corrabare, and Dora .....	Wollombi .....	46, Warrawolong .....	C	16,000	Blackbutt, blue, grey, and spotted gum, tallowwood, turpentine, mahogany, forest oak, and ironbark.
" ..	Belford .....	Singleton .....	50A, Belford .....	C	2,832½	Ironbark, spotted and grey gum, and stringybark.
" ..	Gosford .....	Gosford .....	63, Hogan's Brush .....	A	990	Turpentine, forest mahogany, blue gum, and ironbark.
" ..	Mulbring and Teralba .....	Maitland and Newcastle .....	69A, Sugarloaf .....	C	6,400	Spotted, blue, and gray gum, mahogany, stringybark, ironbark, turpentine, and blackbutt.
" ..	Olney, Stowe, Congewai, Dora, and Mandolong .....	Gosford .....	70, Olney .....	C&SF	33,186	Spotted, grey, and blue gum, blackbutt, tallowwood, mahogany, turpentine, forest oak, and ironbark ; 9,700 acres proclaimed a State Forest.
" ..	Gosford, Kincumber, and Tuggerah .....	" .....	124 .....	A	4,160	Blue and spotted gum, turpentine, forest mahogany, and ironbark.
" ..	Eglinton and Narara .....	" .....	128 .....	C	1,280	Blue gum, turpentine, mahogany, box, ironbark, bloodwood, and blackbutt.

	Ourinbah		129, Ourinbah	C	6,560	Forest mahogany, spotted, blue, and grey gum, turpentine, blackbutt, and ironbark.
	Narara		126	A	440	Blue gum, turpentine, mahogany, and forest oak.
	Wyong		143	A	2,030	Blackbutt, grey and spotted gum, swamp and forest mahogany, turpentine, and ironbark.
			207A	A	66	Grey gum, turpentine, swamp mahogany, forest oak, and apple-tree.
			216	A	9,760	Blackbutt, spotted, grey, and blue gum, mahogany, turpentine, and ironbark.
	Congewai, Quarrybylong, and Dora	Wollombi	217	A	3,000	Blackbutt, spotted, grey, and blue gum, mahogany, turpentine, and ironbark.
	Gosford	Gosford	3,797	A	65	The Gosford State Forest Nursery.
	Mangrove		5,310	A	970	Ironbark, bloodwood, stringybark, flooded gum, turpentine, forest and she oak, apple-tree, and white gum.
	Mandolong		5,873	C	40	Within the boundaries of the Olney Forest Reserve.
	Wyong		6,720	A	20	
	Dora	Newcastle	9,242	A	700	This is in effect an extension to the Olney Forest Reserve, No. 70.
Phillip	Price and Botobolar	Mudgee	30, Botobolar	C	5,115	Stringybark, box, and ironbark.
	Arthur and Dungeree	Mudgee and Rylstone	106, Apple-tree Flat	A	8,386½	Box, stringybark, and ironbark.
	Wollar	Mudgee	125	A	120	Box and slaty gum.
	Moolahben		128	A	264½	Ironbark and stringybark.
	Simpson and Nullo	Rylstone	163	A	890	Sassafras, white-wood, red gum, and cedar.
	Simpson, Nullo, Pomang, and Never Never		6,337	A	3,616	Stringybark, mountain ash, and blue gum.
Pottinger	Benclabri, Dabbledah, and Gullendaddy	Gunnedah	16	B	8,600	Pine and ironbark.
	Gill, Milbe, and Wondoba		17	A	9,660	Pine.
	Brigalow and Goolly		18	A	4,100	
	Doona	Murrumbidgee	743, Doona	A & C	6,160	Pine and ironbark; 40 acres in Class A.
	Curlewis	Gunnedah	1,027, Long Point W.	A	2,000	Pine.
	Trinkev and Calala		1,261, Trinkey	A	12,800	Ironbark and pine.
	Denison and Denison West		1,271, Denison	A & C	29,710	Ironbark and pine; 3,750 acres in Class A.
	Black Jack	Gunning	1,641, Black Jack	A	900	Ironbark and pine.
	Nea, Cliff, and Breeza	Gunnedah	1,665, Nea	C	19,070	Pine.
	Bomera		2,124	B	9,600	Ironbark and pine.
	Bundulla, Brennan, and Moredevil		2,700	A	6,800	Stringybark.
	Wondoba		3,947	A	2,877	Pine.
	Walla Walla		6,488	A	2,975	Pine and ironbark.
Parry and Vernon	Ainstey, Vernon, and Aberbaldie	Walcha	896	A	3,997½	Stringybark.
	Walcha, Glen Morrison, and Ingleba		1,277	A	400	
	Walcha and Glen Morrison		1,282	A	90	Stringybark and blackbutt.
Raleigh	Unkya	Kempsey	70, Unkya	C	3,300	Grey, flooded, spotted, and blue gum, turpentine, ironbark, blackbutt, bloodwood, scrub box, mahogany, tallowwood, oak, stringybark; within the boundaries of the Allomera Forest Reserve.
	Newry, Valley Valley, and Nambucca	Bellingen and Kempsey	111, Nambucca	A	20,190½	Blackbutt, tallowwood, bloodwood, and mahogany.
	Nambucca	Bellingen	4,780	A	2,500	Blackbutt, tallowwood, blue gum, ironbark, scrub box, and brush timbers; originally formed part of the Nambucca Forest Reserve.
	Bonville		7,569	A	400	
Robinson	Weltie, Yanda, Narri, Rochford, Bee, and Rankin	Cobar	633	A	62,040	Box, belar, pine, and yarran.
	Mullimat, Mopone, Kaloogleguy, and Billagoe		634	A	16,120	Coolybar box, ironwood, pine, mulga, and yarran.
	Hoskins, Canbelego, Davies, Linton, and Nyngan		635	A	63,840	Coolybar box, ironwood, pine, mulga, mallee, and yarran.
Richmond	Myrtle	Casino	9	A	2,300	Ironbark, blue and red gum, tallowwood, bloodwood, blackbutt, mountain ash, stringybark, and forest oak.
			10	A	1,100	Ironbark, tallowwood, peppermint, swamp mahogany, mountain ash, forest oak, bloodwood, and honeysuckle.
			11	A	2,800	Spotted and red gum, ironbark, tallowwood, mahogany, bastard box, mountain ash, swamp and forest oak.
	Whipore and Myrtle		12	A	4,800	Red gum, blackbutt, ironbark, tallowwood, peppermint, mountain ash, and bastard box.
	Whipore		13	A	2,800	Ironbark, stringybark, blackbutt, mahogany, peppermint, tallowwood, mountain ash, and oak.

SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres.	Timber and General Remarks.
Richmond	Camira and Powerpa	Casino	14	A	1,500	Ironbark, blue and red gum, tallowwood, bloodwood, blackbutt, stringybark, and forest oak.
"	Nandabah	"	15	A	2,750	Ironbark, blue and red gum, tallowwood, bloodwood, and blackbutt.
"	Tatham	"	45A	S F	500	Gum, ironbark, and stringybark, and brush timbers.
"	Busby and Mongogaric	"	246A	A	18,700	Ironbark, blue and red gum, tallowwood, mahogany, forest oak, pine, cedar, and blackbutt.
"	Ellangowan and West Coraki	"	625, Coraki	C	3,900	Ironbark, red and grey gum, mahogany, tallowwood, blackbutt, and box.
"	Gibberagee and Tabimoble	"	894	A	6,400	Blackbutt, ironbark, box, spotted gum, mahogany, tallowwood, forest oak, and stringybark.
"	Myrtle	"	973, Sandy Creek	A	1,200	Red, white, and spotted gum, ironbark, blackbutt, box, and mountain ash.
"	Ellangowan and Darke	"	974, Nandabah	C	3,285	Ironbark, blue and red gum, tallowwood, bloodwood, blackbutt, &c.
"	Doubleduke and Donaldson	Lismore and Casino	895A	A	7,680	Spotted, red, and white gum, stringybark, blackbutt, mahogany, ironbark, tallowwood, and box.
"	Darke, Ellangowan, and West Coraki	Casino	1,137	A	12,610	Stringybark, blue, grey, and red gum, ironbark, tallowwood, bloodwood, and mahogany.
"	Tatham	"	4,441	S F	168	This is an extension to the Tatham State Forest.
Rous	Tuckurimba	Lismore	3	A	20	
"	Cudgen and Condong	Murwillumbah	16, Cudgen	A	896	
"	"	"	38	C	.....	Islands in the Clarence, Richmond, and Tweed Rivers.
"	Billinudgil and Moobal	"	61	A	3,000	
"	Moobal	"	62	A	2,700	
"	Dunoon, North Lismore, Whian Whian, Blakebrook.	Lismore	249, Terania Creek	C	19,201½	Tallowwood, bloodwood, grey and flooded gum, brush and forest box, forest mahogany, blackbutt, ironbark, and turpentine.
"	Nullum	Murwillumbah	250, Tweed River	C	18,044	Bean, beech, scrub box, tallowwood, cedar, rosewood, silky oak, bloodwood, and red gum.
"	Terranora	"	256, Chindera	C	396	Bean, box, teak, cudgery, pine, cedar, and forest oak.
"	Newribar	Lismore	258, Broken Head	C	1,280	Grey box, pine, blackbutt, tallowwood, and turpentine.
"	"	Murwillumbah	335, Stott's Island	C	350	Fig-trees and brush; in the Tweed River.
"	Newribar	Lismore	768	A	160	
"	Meerschaum and Pimlico	"	864, Uralba	A	930	Tallowwood, mahogany, bloodwood, yellowwood, and ironbark.
"	Jasper and Clunes	"	1,030	A	2,852	Blackbutt, bloodwood, grey and flooded gum, brush box, forest mahogany, ironbark, turpentine, and tallowwood.
"	Teven	"	1,036	A	46	Will probably be required for a trigonometrical station.
"	Berwick	"	1,123	A	1,980	
"	Teven	"	1,126	A	312	Cedar, beech, and teak.
"	Unungar, Findon, and Coughal	Casino	1,152	A	19,200	Pine, red spotted gum, box, ironbark, stringybark, mountain ash, mahogany, bloodwood, and cedar.
"	Terranora	Murwillumbah	1,165	A	2,300	Recommended for revocation.
"	Kynumboon	"	1,171	A	4,000	Grey box, tallowwood, bloodwood, white gum, ironbark, and beech.
"	Dumbible	"	1,172	A	1,680	Bloodwood, tallowwood, and gum.
"	Lismore	Lismore	1,173	A	810	Teak and beech.
"	Murwillumbah	Murwillumbah	1,177	A	1,400	Grey box, tallowwood, and bloodwood.
"	Meerschaum	Lismore	1,182	A	180	
"	"	"	1,183	A	190	
"	Wollumbin	"	1,184	A	800	
"	Teven	"	1,187	A	50	
"	"	"	1,188	A	600	
"	"	"	1,191	A	50	
"	Pimlico	"	1,191	A	50	
"	Tuckombil	"	1,194	A	80	
"	"	"	1,195	A	100	
"	Byron	"	1,198, Byron Bay	C	4,900	Pine and hardwood.
"	Whian Whian	"	1,200	A	1,570	
"	Bexhill	"	1,202	A	120	
"	Tuckombil	"	1,211	A	130	
"	Mummulgun	"	2,425	A	5,200	
"	Berwick and Terranora	"	4,262	A	1,314	

	Chillingham, Tyalgum, Worendo, Loadstone, and Cougal.		4,353, Macpherson Range.	C	74,240	Red gum, mahogany, Moreton Bay pine, beech, cedar, quondong, box, ironbark, stringybark, tallowwood, bean, box, bloodwood, and rosewood. This is in effect an extension to the Macpherson Range Forest Reserve.
	Cougal	Casino	4,354	A	240	
	Byron	Lismore	6,929	A	80	
	Berwick	Murwillumbah	7,925	A	240	
	Chillingham		9,737	A	420	This is an extension to the Tweed River Forest Reserve.
Roxburgh	Cullen Bullen	Lithgow	60	A	4,523½	Stringybark, mountain gum, and blackbutt.
	Jesse	Bathurst	77	A	5,120	Blackbutt, stringybark, and white gum.
	Wells, Clandulla, and Mead	Rylstone	8,064	A	2,850	Stringybark and ironbark.
	Wells, Clandulla and Rylstone		8,672	A	2,880	
Sandon	Exmouth and Tilbuster	Armidale	880	A	3,840	Stringybark and red gum.
	Wentworth and Clevedon		881	A	4,760	Stringybark.
	Springmount, Tilbuster, and Wentworth		929	A	3,609	
	Booroolong, Dumaresq, Duval, and Exmouth		1,023	A	7,698	Stringybark and red gum.
	Booroolong		1,024	A	3,940	Stringybark.
	Enmore and Merigalah		1,040	A	3,200	Stringybark, red gum, and black wattle.
	Hillgrove		1,251	A	1,483	Stringybark, red gum, white box, and peppermint.
	Dumaresq and Albert		1,264	A	800	Stringybark, red gum, and yellow box.
	Urotah		1,419	A	1,200	Stringybark and black wattle.
	Enmore		1,429	A	4,350	
	Enmore, Lawrence, Merigalah		1,487	A	17,800	Stringybark, white box, and red gum.
	Armidale		3,443	A	213½	Stringybark.
	Shasta, Ferryman, and Hargrave		4,768	A	17,000	Stringybark, blackbutt, red and blue gum and box.
	Gyra		5,547	A	254	Stringybark and black wattle.
	Tiverton, Mihi and Enmore		6,226	A	1,200	
	Yarrowyck		6,489	A	3,400	Stringybark, blackbutt, and yellow box.
Sandon and Vernon	Eastlake, Laurence, Enmore, Ohio, Europambela, and Winterbourne.	Walcha and Armidale	1,430	A	8,960	Stringybark, red gum, yellow box and black wattle.
Selwyn	Glenken	Albury	6	A	2,486	Messmate, stringybark and white gum.
	Tooma and Maragle		2,104	A	4,000	Stringybark.
	Maragle		2,106	A	2,760	
	Bogandyera, Welaregang		2,382, Welaregang	A	17,260	Stringybark, messmate and apple-tree.
	Burra, King, Beaumont		2,538, Burra Creek	A	7,998	Messmate, ribbon gum, eurabbie and mountain ash.
	Maragle and Hay		2,855	A	1,950	Stringybark.
Selwyn and Wynyard	Hillas, Selwyn, Courahyra, King, Buddong, Beaumont and Yellowin.	Albury and Cooma	1,951, Bago	A & C	64,500	Mountain ash and messmate; 45,500 acres under Class C.
Stapylton	Careunga	Morice	1,306	A	2,700	Belah.
St. Vincent	Currambene, Nowra	Nowra	33, Currambene	C	4,480	Spotted gum, bloodwood, blackbutt, stringybark, peppermint, and ironbark.
	Yerriyong, Jerrewangala		44, Turpentine Range	C	7,180	Turpentine, messmate, bloodwood, ironbark, and blackbutt.
	Farnham and Cudmurah	Milton	45, Red Head	C	12,200	Bloodwood, spotted gum, blackbutt, mahogany, turpentine, ironbark.
	Tomaga, Mogendoura and Mullendaree	Moruya	99, Tomaga	S F	6,080	Spotted gum, ironbark, blackbutt, mountain ash, peppermint and redwood.
	Albert, Benandra, &c.	Moruya and Milton	103, Nelligen	A	44,484	Stringybark, spotted, blue, red, and mountain gums, messmate, bloodwood, ironbark, blackbutt, woollybutt, sassafras, mahogany, and turpentine.
	Woodburn	Milton	129	A	500	
	Monga, Milo, Seymour, and Coghill	Braidwood	166	A	14,720	Mountain gum, mountain ash, white-top, messmate, water gum, blackwood and sassafras.
	Tianjarra and Jerrawangala	Milton	172	A	25,392	Mountain ash, messmate, mountain gum, sassafras, stringybark, and bloodwood.
	Mogendoura	Moruya	174	C	6,550	Ironbark, stringybark, and bloodwood.
	Goba, Mullendaree, and Tomaga		6,215	C	5,300	Ironbark, spotted gum, blackbutt, redwood, stringybark, bloodwood, and mountain ash.
	Farnham	Milton and Nowra	6,480	C	1,570	
	Mogendoura	Moruya	10,311	A	220	Ironbark, &c.
Sturt	Brengagee, Wowong, and Benerambah	Hay	2,989, Wowong	C	4,200	Red gum.
	Benerambah		2,990, Benerambah	C	600	
Tandora		Wilcannia	1	C	720	Includes the timber within 2 chains of the Yancowinna Creek.
			2	C	368	Includes the timber within 2 chains of the left bank of Stephen's Creek.
Tara	Moorna	Wentworth	383, Moorna	C	305	Pine.
	Taranga		525	A	295	

SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres.	Timber and General Remarks.
Townsend	Powheep	Hay	2	A	429½	Pine, box, and dogwood.
"	"	"	3	A	444½	Box.
"	Conargo	Deniliquin	7 Conargo	A	954	Pine.
"	Edgar	Hay	15	A	192	"
"	Palmer	"	16	C	84½	"
"	Mundiwa	Deniliquin	1,404, Deniliquin	C	1,524½	Pine, box, and myall.
"	Ronald	Hay	1,458, Uroley	C	3,400	Pine and box.
"	Morago, Kerranakoon, and Banangalite	Deniliquin	1,792, Morago	C	4,549½	Red gum and box.
"	Palmer	Hay	1,851, Wargam	C	1,280	Box and pine.
"	Dunkeld	"	1,879, Steam Plains	C	1,080	Pine and myall.
"	Moultrassie	"	1,880	C	3,840	"
"	Edgar	"	1,901	C	1,941	Pine.
"	Campbell	"	1,902	C	1,239½	"
"	Euroka	"	2,262	A	320	Gum, pine, box, myall, and willow.
"	Wureep	"	2,747	A	791	Box; required for shade and shelter.
"	Banangalite	Deniliquin	3,031, Baratta	A	651	Red gum.
"	Wureep	Hay	3,034	C	189	Stunted box, pine, and willow.
"	"	"	3,035	A	360	Stunted box.
"	Edgar	"	3,156	A	800	Pine and myall.
"	Nallam and Boyco	Deniliquin	3,263, Gulpa Island	C	13,500	Red gum.
"	Derrulaman	"	3,264, Tuppal	C	4,200	Red gum and stunted box.
"	Towool, Bullatella, Coronalla, Bungooka, Tawarra, Narratoola, and Wonnuc.	"	3,265, Milliwa	SF & C	68,502	Red gum; 6,400 acres proclaimed a State forest; the remainder class C.
Townsend and Wakool	Werai, Yadabal, Cochran, Balpool, Chowar, Barraba, Tynong, Nyang, Jimaringle, Boyd, Wandaradgit, Toweruk, Worobyan, Neimur, Wetuppa, Mallan, Yadchow, and Coobool.	"	2,125, Neimur	C	34,332	Red gum.
"	Balpool, Yadabal, Werai, Colimo, and Tumudgery.	"	3,262, Edward River	C	38,406	Red gum.
Urana	Yamma	Urana	1,456, Yamma	C	1,920	Red and white pine.
"	Broome	"	1,648, Broome	C	320	Pine.
"	Butherwa	"	1,695, Brookong	C	4,800	"
"	Waloona	"	1,716, Waloona	A	1,280	"
"	Yanko South	"	1,778	C	282½	"
"	"	"	1,779	C	551½	"
"	"	"	1,780	C	1,256	"
"	Morundah and Lake	"	1,790, Colombo, Piney Ridge	C & A	10,655	Pine; 575 acres under class A.
"	Clyde and Morundah	"	1,833, Morundah	C	11,630	Pine.
"	Yanko	"	1,835	C	1,075	"
"	Widgiwa and Urana	"	2,049	C	465½	"
"	Widgiwa	"	2,103, Boundary Gums	C	40	Red gum; required for shade and shelter.
"	Yanko	"	2,138	A	508	Pine.
"	"	"	2,130	A	623	Box.
"	Palmer	"	2,216	C	1,500	Pine.
"	"	"	2,217A	C	1,760	"
"	Osborne	"	2,317, Osborne	A & C	16,616	Pine; 5,191 acres under class C.
"	Mair-Jimmy	"	2,587	A	3,100	Pine and box.
"	Boororbanilly	"	2,588	A	3,380	"
"	Lake, Morundah South and Mucra	"	2,598	A	6,065½	"
"	Clyde and Boree Creek	"	2,613	C	7,950	"
"	Palmer and Boregorry	"	2,806	A	6,720	Pine.
"	Butherwa	"	2,762	A	1,760	Pine and box.
"	Clear Hill	"	2,925, Clear Hill	A	1,900	"
"	Gunambil	"	3,052A	A & C	4,152½	Pine and box 336½ acres under Class C.

	Palmer		3,105	C	3,340	Pine.
	Widgiewa		6,863	A	213 $\frac{1}{2}$	"
	Watt		7,645	A	154 $\frac{1}{2}$	Gum.
Vernon	Ella	Walcha	1	A	6,700	Stringybark and blue gum.
	Emu and Fenwick		931, Big Hill	A	1,440	Stringybark.
	Boulton		1,006	A	1,560	Stringybark and black wattle.
	Fenwick		1,124	A	1,200	Stringybark and red gum.
	Shelving		1,125	A	1,170	"
			1,126	A	720	Stringybark, red gum, and black wattle.
	Winterbourne and Ella		1,204	A	7,500	"
	Winterbourne, Gill, and Ella		1,354	A	25,360	Stringybark, yellow box, and black wattle.
	Norton		1,616	A	1,100	Stringybark.
	Fenwick		2,568	A	536	Stringybark and messmate.
	Tiara and Norton		9,142	A	1,815	Stringybark and hickory.
Wakool	Noorong, Gonn, Moorongatta, Belmore, Cobwell, and Beremegad	Deniliquin	1,445A, Wakool	C & A	21,577 $\frac{1}{4}$	Red gum; 350 acres under Class A.
	Winter		1,454	C	1,600	Scrub.
	Murran, Toolmah, and Coobool		1,786, Melool	C	5,440	Red gum.
	Wetuppa, Canninyeuk		1,787, Jeegur	C	11,933	Red gum and stunted box.
	Yarrein, Nyang, Benjee, Liewa, Moulamein South, Moolpa, Kyalite, Gerabbit, Barrabu, Woorooma, Berambong, Nicmur, Mallan, Yadchow, and Burrawang.		1,790, Edward River	A & C	11,471 $\frac{1}{2}$	Red gum; 643 acres under Class A.
	Mallee		1,834	C	10	Red gum.
	Thelaka	Hay	2,032, Thelaka	A & C	696	Pine and yaman; 536 acres under class C.
	Nunnagoyt	Deniliquin	2,066, Campbell's Island.	C	6,400	Red gum.
	Belmore		2,887	A	312 $\frac{1}{2}$	"
	Wetuppa		3,103	C	4,944	Pine.
	Gonn, Nunnagoyt, Barham, Whymoul, Danberry, Cangan, and Tiltit.		3,258, Koondrook	C & S F	76,853	Red gum; 21,396 acres proclaimed as the Barham State Forest.
	Gnue		3,259	C	1,320	Red gum.
	Mellool		3,260	C	1,890	"
			3,261	C	2,240	"
	Nunnagoyt		3,268	A	5,400	"
Walgiers	Merrimajeel	Hay, North	2,573, Corong	S F	480	"
	Howatson	Hillston, North	3,018	C	120	Required for shade and shelter.
			3,019	C	320	"
	Murnia	Hillston	3,020	C	80	"
Wallace	Myalla	Cooma	201A, Myalla	A	1,600	White gum and peppermint.
	Wulvye		233	C	960	Messmate, white gum, and peppermint.
	The Peak		335, The Peak	C & A	650	White gum, peppermint, and apple-tree; 250 acres under class A.
	Gordon		379	A	700	Cabbage gum.
	Wallgrove		433	A	260	White gum.
	Bulgandra and Coolamatong		517	A	336	"
	Lake and Buckenderra		523	A	1,280	"
	Gordon		678	A	110	White gum and peppermint.
	Beloka		720	A	870	"
	Marrinumbula		726	A	526 $\frac{1}{2}$	Apple-tree, white gum, and peppermint.
	Adamnaby		760	A	500	White gum.
	Coonhoonbula		818	A	500	White gum and peppermint.
	Coonhoonbula		819	A	1,100	Pine, white gum, and black wattle.
	Cabramatta and Chippendale		822	A	3,300	Mountain ash and white gum.
	Numbula		827	A	600	Cabbage gum.
	Townsend		901	A	500	White gum.
	Arable and Myalla		902	A	450	Peppermint and white gum.
Waradgery	Beloka		10,079	A	160	"
	Mungadal, Hay, Hay South, and East Waradgery.	Hay	2, Hay Common	C	12,998	Red-gum and box.
	Dowling		1,623, Thelangering.	A	2,400	Gum.

SCHEDULE VII—continued.

County.	Parish.	Land District.	Number and Name of Reserve.	Class.	Approximate Area in Acres.	Timber and General Remarks.
Waradgery	Ulongo	Hay	1,823, One-tree	C	1/2	A landmark on an immense plain.
"	Wirkenbergal	"	2,697	A	574	"
Westmoreland	Konangaroo and Jonolan	Lithgow	22 Council Chambers Flat.	A	15,360	Stringybark, white gum, peppermint, box, and mountain ash.
"	Alfred and Bindo	"	23, Lippy's Creek	A	11,520	Mountain ash, blackbutt, grey gum, stringybark, and peppermint.
"	Balfour and Swatchfield	"	36	A	1,411 1/2	Stringybark, ironbark, red and white gum, and box.
"	Bindo	"	83, Bindo	A	1,520	Blackbutt, mountain ash, stringybark, grey gum, and peppermint.
"	Vulcan, Mozart, and Balfour	"	90	B	7,000	Mountain ash, blackbutt, and gum.
"	Bindo	"	100	A	2,284 1/2	Blackbutt, peppermint, and gum.
"	Speedweel, Cyclops, Gangerang, Tartarus, Murruin, and Merlin.	Lithgow and Camden	101, Koromung	A	62,000	Stringybark, ironbark, turpentine, spotted and grey gum, box and cedar.
"	Swatchfield	Lithgow	9,064	A	12	This is in effect an extension to Forest Reserve, No. 36.
Wellesley	Maffra	Cooma	250, Maffra	A	3,290	Box and cabbage gum.
"	Burnina	Bombala	270A, Burnina	A	206	White and cabbage gum.
"	Burrinbucco	"	282A	C	4,000	Cat-tail, messmate, stringybark, ribbon and white gum, hickory, and wattle.
"	Ironmungy	"	356	C	200	Cabbage gum.
"	Waugetlic	"	366	A & C	809 1/2	Cabbage gum; 151 1/2 acres, under Class A.
"	Boco	Bombala	382	A	1,340	White and cabbage gum.
"	Wellsmore	"	384	A	570	Blackbutt, messmate, and white gum.
"	Bungarby	"	390	A	1,280	Cabbage gum, peppermint, and box.
"	Gecar	"	411	C	420	Cabbage gum and honeysuckle.
"	Cambalong	"	422	A	1,000	Cabbage gum, box, and pine.
"	Bungarby and Peters	Cooma	428, Snowy River	C	4,600	Pine, box, peppermint, and wattle.
"	Cathcart	Bombala	457	A	240	White and cabbage gum.
"	Nelson	"	491	A	40	"
"	Hayden	"	727	A	5,109	Ribbon gum, peppermint, cabbage gum, black sally, and oak.
"	"	"	728	A	370	Cabbage gum, black sally, and ribbon gum.
"	Jettiba	Bombala	747	A	300	White gum, cabbage gum, and peppermint.
"	Ashton	"	828A	A	750	Blackbutt, mountain ash, stringybark, bloodwood, peppermint, and white gum.
"	Lawson	"	1,075	A	4,000	Mountain ash, ribbon gum, messmate, peppermint, hickory, cat-tail, and white gum.
"	Meringo and Merriangah	"	874	C	2,350	Ribbon and white gum.
"	Burrinbucco and Coolumbooka	"	905	A	360	Messmate, mountain gum, and peppermint.
White	Goona, Nuable, and Crowie	Narrabri	2	A	32,000	Ironbark, pine, and oak.
"	Gurleigh	"	1,788	A	2,000	Pine.
"	Nuable, Cook, Coghill, and Molluroi	"	4,523	A	21,130	Ironbark, pine, and oak.
Wyuyard	Murriguldrie	Wagga Wagga	1,705, Murriguldrie	C	14,000	Ironbark, stringybark, and red gum.
"	Gregardo and Woomahrigong	"	1,871	C	1,280	Ironbark and stringybark.
"	Gregardo	"	1,872	C	640	"
"	Bulalgee and Carabost	"	1,918, Carabost	A & C	26,400	Messmate, stringybark, and box; 4,000 acres under class A.
"	Ellerslie, Green Hills, Dutzon, and Hillas	Tunnot	2,040, Adelong	A	74,025 1/2	Stringybark, messmate, box, and apple-tree.
"	Ellerslie, Euadera, and Bangus	"	2,097, Euadera	A	8,980	Stringybark.
"	Woomahrigong	Wagga Wagga	3,009	A	2,708	Ironbark and stringybark.
"	Hillas	"	5,358	A	2,600	Stringybark.
Yancowinna	Umberumberka, Bomangaldry, Bray, Nardin, and Nadbuck	Wilcannia	4	C	960	"
"	"	"	5	C	10,240	"
"	"	"	6	C	10,240	"
"	Albert and Victorie	"	7	C	2,560	"
"	Lewis, Mt. Gipps, Stephen, Pictou, Cathcart, Moorhail, Bolarra, Tara, Stratford, Maharatta, Coombaralla, & Charlemont.	"	8	C	1,444	The timber within 2 chains of Stephen's Creek.
"	Mt. Gipps, &c.	"	9	C	1,568	The timber within 2 chains of Yancowinna Creek.

## Annual Progress Report for the Year 1889.

Report of the Inspector of Forests to The Principal Under Secretary.

Forest Conservancy Branch, Colonial Secretary's Department,

Sir,

Sydney, 20 May, 1890.

I have the honor herewith to submit my Annual Progress Report upon the Forest Conservancy Branch of this Department for the year 1889.

I have, &c.,

JOHN DUFF,  
Inspector of Forests.

### *Catalpa Plantation, Railway Reserve, Cootamundra.*

Arrangements were made with the trustees of Albert Park, Cootamundra, for their employees to keep this plantation (area about 6½ acres), clear of weeds, and in good condition, for the annual sum of £35, and Mr. Forest Ranger Stevenson reports that the work referred to has been properly performed, and that the trees, with few exceptions, are progressing satisfactorily. The catalpa trees in this reserve are producing seeds freely annually, and a large quantity of seeds were collected and forwarded to the State Forest nursery, Gosford, for raising a stock of young trees for planting in other forest reserves.

The sum expended upon this plantation for the year was £35 16s.

### *Cedar plantations on Dorrigo Forest Reserve and Forest Reserves Nos. 5 and 3,753, Bellinger and Macleay Rivers.*

Owing to unavoidable causes no planting was done in any of the reserves referred to during the year 1889, the work being confined to the clearing of saplings and scrub from around the self-sown and planted cedar trees on the Dorrigo Forest Reserve, upon which one man was employed during the year.

Authority has been obtained, and arrangements made for fencing, ploughing, harrowing, and planting about 24½ acres on Coghlan's Plain, Dorrigo Forest Reserve with red cedar and alternate rows of evergreen trees, to shade and shelter the cedars from sun, wind, and frost, until they are strong enough to do without protecting; and upon this site over 100 acres of land upon which there is no timber, stumps, or scrub, is available for cedar planting.

Tenders have been invited for the fencing, ploughing, and harrowing of the 24½ acres, upon which 24,200 trees can be planted at 6 feet apart.

The sum expended upon the Dorrigo cedar plantation for the year was £125 4s.

It is proposed to continue the clearing of saplings and scrub, fencing, and planting of cedar on forest reserve No. 3,753, on Nulla Nulla Creek, Macleay River.

### *Plantation on Hogan's Brush Forest Reserve No. 63, near Gosford.*

The catalpa trees in this plantation, area about 6 acres, were so severely injured by wallabies continuously eating off their leaves, young branches, and bark as to render them useless, were removed, and replaced chiefly with red cedar and other trees, which the wallabies do not interfere with, the number of trees planted in lieu of the catalpas being 1,300.

About 26 of the catalpa trees which were not permanently damaged were fenced around, in order to test their future growth, and the suitability or otherwise of the rich, moist, sheltered, brush forest lands for the cultivation of this tree, and I understand that they have since made satisfactory progress.

Altogether there are over 3,000 trees of various genera and species in this plantation, including 800 red cedar trees, which are growing rapidly and vigorously.

The amount expended upon this plantation in planting trees, clearing off weeds and undergrowth, &c., during the year was £64 4s., and in a few years hence, when the trees are tall and dense enough to check the growth of weeds, &c., and not be damaged thereby, comparatively little expense will require to be incurred upon the plantation.

### *Wattle Plantations on Southern Railway Reserves.*

No expenditure has been incurred on these plantations during the year, and from an inspection recently made by me of that portion of the plantation situated between Bowral and Campbelltown, I am of opinion that although a number of the wattle trees are large enough for bark stripping for tanning purposes, it would not be advisable or remunerative to dispose of the bark of the wattles, owing to the small number of trees available, and to them being of most value as ornamental trees on the railway lines.

### *Proposed New Plantations.*

In addition to the two reserves near Wagga Wagga, of 55 and 100 acres respectively, and the 24½ acres on the Dorrigo forest reserve, Bellinger River, authorized to be fenced, ploughed, harrowed, and planted with cedar, an area of 20 acres on forest reserve No. 6,720, Jilliby Jilliby Creek, parish of Wyong, county of Northumberland, has been authorized to be fenced, ploughed, harrowed, and planted.

The preparation and planting of the reserves named will be as much as can be proceeded with this year, and will more than absorb the whole of the available stock of trees at the State Forest Nursery. Numerous other sites for plantations have been recommended by the district surveyors, forest rangers, and myself, most of which will require to be carefully inspected, with the view of deciding whether they are or not suitable for plantations, and the kinds of trees that are adapted for the soil, climate, and situation of each area selected for planting; and as it is not desirable to form numerous small scattered plantations, owing to the large cost of preparing, fencing, and planting same, as well as to the expense of supervising and keeping same in order, which in small plantations would be disproportionate to the value of the timber grown thereon when mature. It is desirable that all plantations should, as far as practicable, embrace a large area, and be capable of being extended from time to time as required.

*State Forest Nursery, Gosford.*

The principal work performed at the nursery during the year, has been the construction of a deep wide drain from the lowest portion of the nursery to Narara Creek, which was rendered necessary, owing to the heavy flood in May, 1889, completely swamping a portion of the low-lying planted land, to which access was thereby rendered impossible for a lengthened period, and many of the plants were killed or seriously damaged in consequence.

Ten chains of fencing on the eastern boundary of the nursery were levelled to the ground by the strong flow of water against it, and had to be re-erected and supported with guys, but as the flood referred to was an unusually heavy one, and the large drain now being constructed to convey storm-water to the creek, no recurrence of a similar nature may be anticipated. Open drains connecting with the large main drain have also been formed outside the boundary fences wherever required, and altogether about 2 miles of drains were constructed.

About 5 acres of land have been cleared of timber, and stumped, and 1½ acres of said area trenched, and ready for rowing out cuttings and seeds of timber trees in nursery beds. A border 12 feet wide was cleared of timber and scrub, trenched, and planted, on the eastern boundary of nursery.

The road from the railway-station to the nursery has been repaired, and culverts and drains formed thereon where required.

A windmill and Douglass hand-pump were erected, and pipes laid down to convey water from two wells to the plant sheds and grounds, the wells having also been deepened, and lined with bricks.

A plant-shed or bush-house, 100 feet long by 18 feet wide, was erected, which is now full of useful and ornamental trees and shrubs.

The trees in the nursery, which are available for planting in the forest reserves, and exchanging during the present winter and ensuing spring, amount to the total number of 51,000, consisting of 31,000 in nursery rows, 15,000 in pots, and 5,000 in boxes, including the following genera and species, viz:—Gums (*Eucalyptus*), embracing most of the useful indigenous and other species of timber trees of commercial value; red cedar (*cedrela toona*); catalpa speciosa; elms (*ulmus montana*, and *U. suberosa*); oaks (*quercus robur*, *Q. suber*, *Q. virens*, *Q. ilex*, *Q. lusitanica*, *Q. pseudo-suber*, *Q. tanzin*, *Q. coccinea*, &c.); pines (*pinus halapensis*, *P. pinea*, and *P. ponderosa*); white deal or damson (*podocarpus spinulosa*); turpentine (*syncarpia laurifolia*); white box (*tristania conferta*); white cedar (*melia composita*); poplars (*populus* of sorts); olive (*olea europæa*); kurrajong (*sterculia diversifolia*); Pittosporums of sorts; figs (*ficus rubiginosa* and *F. macrophylla*); Norfolk Island and Moreton Bay pines (*araucaria excelsa*, and *A. Cunninghamii*); spruce (*abies excelsa*); sycamore (*acer pseudo-platanus*); laburnum (*cytisus laburnum*); and various other species of useful and ornamental trees and shrubs.

About 100,000 seedling trees are now ready to row out in nursery beds, pot, or plant in boxes for next year's planting out in the forest reserves. Altogether the work at the nursery and Hogan's Brush Plantation has progressed rapidly and satisfactorily, which reflects credit upon the overseer, Mr. John M'Coig, and the workmen employed under him.

The amount expended upon the nursery for labour, tools, and other materials, &c., for the year amounted to £1,044 8s.

*Inspection of Forest Reserves, Plantations, and office work for the year, 1889.*

During the year I inspected and recommended two town reserves, near Wagga Wagga, areas about 55 and 100 acres respectively, to be utilized for plantations of timber trees; also the Osborne and Brookong Forest Reserves, county Urana, the Ironbark Forest Reserves, Nos. 2,784 and 2,785, county of Bourke, upon the former of which reserves an area of 2,387 acres was surveyed into blocks, and recommended by Mr. Surveyor M'Kay to be revoked, and submitted for sale or selection. Upon many parts of the area referred to the ironbark timber was equally plentiful, and of as good quality as on any other portion of the reserve, although the blocks recommended for revocation embraced the best of the land for agricultural and pastoral pursuits, therefore for the foregoing and other reasons I recommended that no part of the reserve be revoked. Inspected the Bygoo Forest Reserve, No. 3,041; Kurrajong Forest Reserve, No. 1,439; Dulah Forest Reserve, No. 2,652 (all in the county of Bourke); Billabong Forest Reserve, county Goulburn (since cancelled); North East Mangoplah Forest Reserve, No. 3,293, county of Wynyard and Mitchell; Forest Reserve, No. 3,157, county of Goulburn and Mitchell; and the Gillenbah Forest Reserve, No. 1,890, county of Mitchell, the latter of which reserves the residents of Narrandera and district had petitioned to be revoked, and thrown open for settlement, but as the Narrandera-Jerilderie Railway runs through the reserve, and it contains the largest quantity and best quality of pine timber in all stages of growth in the district, in which pine timber is annually becoming more scarce and valuable, and the reserve being in the vicinity of immense treeless plains I deemed it advisable, in the interests of forest conservation and the public, to strongly recommend that the reserve be retained intact. Inspected the State Forest Nursery, Gosford; Hogan's Brush Forest Reserve, No. 63, and plantation thereon, near Gosford; Eglinton and Narara Forest Reserves, No. 128; Kincumber Forest Reserve, No. 124; Ourimbah Forest Reserve, No. 129; Teralba Forest Reserve, No. 105; Wyong Forest Reserves, Nos. 143 and 144; Belford Forest Reserve, No. 50A; Sugarloaf Forest Reserve, No. 69A; Warrawalong Forest Reserve, No. 46; Olney Forest Reserve, No. 70, all in the county of Northumberland; and Forest Reserves, Nos. 78, 112, 57, and 110, in county of Camden, upon many of which reserves I furnished reports *re* their present condition, with recommendations *re* tree-planting and their future management.

I inspected the Catalpa Plantation, Cootamundra; the sand-drifts, Newcastle and Wollongong, and the plantations at Jenolan Caves, in the latter of which I supervised the planting of about 300 trees and shrubs, the sowing of a collection of about fifty species and varieties of flowering annual and perennial plants, digging of plantations, pruning and staking of trees and shrubs therein, and the repairing of roads, &c.

Whilst at Jenolan Caves I inspected the Kowmung Forest Reserve, No. 101, county Westmoreland, where there is a large quantity of red cedar growing in the deep ravines, from which, owing to the lofty perpendicular cliffs surrounding the valleys it would be impossible to remove the cedar, unless it was previously cut into boards, and hoisted to the summit of the cliffs by machinery. The scenery at the Kowmung, about 25 miles distance from Jenolan Caves, is truly grand, varied, and picturesque, equaling anything hitherto seen by me in the Colony, and it is worthy of consideration if it would be desirable to reserve a large area for the preservation of the rich vegetation and other natural features of the locality, which

which would be a favourite resort for visitors to Jenolan Caves if a road was made from the caves thereto, an undertaking which would be easily and cheaply accomplished, as the road would pass through Council Chamber's Flat and Lippy's Creek Forest Reserves the greater part of the distance, and these reserves being lightly timbered, all that would be required to be done would be to remove the timber and scrub from the track.

Inspected Council Chamber Flat and Lippy's Creek Forest Reserves Nos. 22 and 23 respectively, county Westmoreland, upon which the timber, although not of large dimensions, is the best obtainable in the district.

My office duties consisted chiefly of perusing forest rangers and other reports, and furnishing recommendations thereon, compiling reports upon forest reserves, areas for plantations, and specifications for the work to be done thereon, as well as report upon all other subjects requiring to be dealt with; receiving, cleaning, naming, and putting in bags collections of seeds received from the forest rangers and kindred departments; preparing collections of plants and seeds to be despatched to the State Forest Nursery, Gosford; and collections of plants, seeds, and dried specimens of trees, shrubs, grasses, and fodder plants to forward to other departments in exchange for plants, seeds, and specimens received, as per lists appended.

*Ringbarking useless trees, thinning out saplings, and eradicating useless scrubs in forest reserves during the year 1889.*

Permission was granted to Messrs. Goldsborough & Co. to ringbark useless trees, thin out saplings, and destroy useless scrubs on forest reserve No. 2,211, area 14,720 acres, county of Cooper, the reserve being situated on the South Yalgogrin Pastoral Holding, and the work was commenced in January last.

Permission was granted to Mr. Caldwell to ringbark useless trees, thin out saplings, and destroy useless scrubs on 964 acres of timber reserve No. 2,745, county of Bland, situated on the Moonbucca Pastoral Holding, and upon which the work was commenced in March last.

Permission was granted to Mr. Pearce, upon whose conditional purchase license, No. 4,170, forest reserve No. 1,830, county Urana, is situated, to ringbark the useless trees and destroy the useless scrubs upon an area of 1,075 acres, but the work has not yet been commenced.

Permission was granted to Messrs. Edols & Co., lessees of Burrawang Pastoral Holding, county of Cunningham, to ringbark the useless trees, thin out the saplings, and destroy the useless scrubs on forest reserve No. 8,661; area, 11,520 acres, but the work has not yet been commenced.

Permission was granted to Mr. D. T. Wilson, lessee of North Bolero Block A Pastoral Holding, to thin out the pine, box, bull oak, and other saplings, and destroy useless scrubs on Forest Reserve No. 3,032, county of Cooper, area 3,200 acres, but the work has not yet been commenced.

The whole cost of ringbarking the useless trees, thinning out the saplings, and destroying the useless scrubs, as well as of paying the salary of an inspector for each reserve to be operated on, is defrayed by the pastoral lessees of the holdings upon which the reserves to be cleared are situated, these inspectors being appointed by the Department to supervise the workmen employed in clearing on the reserves, and see that only useless trees are destroyed, that the best saplings are left growing at the specified distances apart, and that only useless scrubs are eradicated.

*Donations of plants, seeds, &c., received in the year, 1889.*

- 22nd March, 1889.—Received from Charles Moore, Esq., F.L.S., Director, Botanic Gardens, Sydney—1 package red cedar seeds (*cedrela toona*).
- 22 March, 1889.—Received from W. R. Guilfoyle, Esq., F.L.S., Director, Botanic Gardens, Melbourne—7 packages of oak and other seeds, 22 samples of papers, and 61 samples of fibres prepared from indigenous and other plants by Mr. Guilfoyle, also a descriptive catalogue of the above specimens.
- 25th March, 1889.—Received from J. S. Edgar, Esq., F.R.H.S., Curator, Botanic Gardens, Rockhampton—1 package eucalyptus microtheca, 1 package eucalyptus citrodora, and 1 package cassia brewsterii seeds.
- 10th April, 1889.—Received from J. E. Brown, Esq., F.L.S., Conservator of Forests, Adelaide—1 lb. seeds of eucalyptus corynocalyx (sugar gum.)
- 16th May, 1889.—Received from J. S. Edgar, Esq., F.R.H.S., Curator, Botanic Gardens, Rockhampton—1 package eucalyptus raveretiana seeds.
- 6th June, 1889.—Received from G. S. Perrins, Esq., F.L.S., Conservator of Forests, Melbourne—1 package quercus suber (cork oak) seeds.
- 19th June, 1889.—Received from Wm. R. Guilfoyle, Esq., F.L.S., Director, Botanic Gardens, Melbourne—Seeds of 7 species of oak, chiefly American evergreen species.
- 8th July, 1889.—Received from Mr. Forest Ranger Powell, Gunnedah—19 lb. seed of kurrajong-tree (*sterculia diversifolia*).
- 7th September, 1889.—Received from Charles Moore, Esq., F.L.S., Director, Botanic Gardens, Sydney—300 plants of miscellaneous indigenous, and exotic timber, and other trees.
- 24th September, 1889.—Received from Wm. R. Guilfoyle, Esq., F.L.S., Director, Botanic Gardens, Melbourne—73 plants miscellaneous exotic flowering shrubs, &c.; also 40 species miscellaneous exotic tree and shrub seeds.

*Plants, Seeds, &c., sent away during the year 1889.*

- 26th January, 1889.—Sent to Professor Muller, Technological Professor, High School, Hanover, Germany—56 species Australian and New Zealand seeds.
- 1st February, 1889.—Sent to J. S. Edgar, Esq., F.R.H.S., Curator, Botanic Gardens, Rockhampton—21 species Australian seeds.
- 26th February, 1889.—Sent to Baron Muller, K.C.M.G., F.R.S., Government Botanist, Melbourne—106 dried flowering specimens of trees, shrubs, &c., from the Bellinger River, Jenolan Caves, and Lachlan Districts.
- 27th February, 1889.—Sent to the Overseer, State Forest Nursery, Gosford—22 species indigenous timber tree seeds.
- 1st March, 1889.—Sent to J. E. Brown, Esq., F.L.S., Conservator of Forests, Adelaide—25 species indigenous timber tree seeds.
- 1st March, 1889.—Sent to Wm. R. Guilfoyle, Esq., F.L.S., Director, Botanic Gardens, Melbourne—18 species indigenous tree and shrub seeds.

- 2nd March, 1889.—Sent to T. Kirk, Esq., F.L.S., Chief Conservator of Forests, Wellington, New Zealand—26 species indigenous timber tree seeds.
- 27th March, 1889.—Sent to Charles Moore, Esq., F.L.S., Director, Botanic Gardens, Sydney—32 species indigenous tree and shrub seeds, and 12 samples of eucalypt, acacia and pine gums and resins.
- 30th March, 1889.—Sent to the Trustees, Hyde Park, Sydney—24 species indigenous tree and shrub seeds.
- 3rd April, 1889.—Sent to Charles Moore, Esq., F.L.S., Director, Botanic Gardens, Sydney—7 species New Zealand and other tree and shrub seeds.
- 3rd April, 1889.—Sent to the Overseer, State Forest Nursery, Gosford—27 species indigenous and other timber tree seeds.
- 4th April, 1889.—Sent to the Overseer, State Forest Nursery, Gosford—16 oz. cedrola toona (red cedar) seeds, received from Mr. F. R. Brown, Port Macquarie.
- 19th June, 1889.—Sent to the Overseer, State Forest Nursery, Gosford—10 species of indigenous and American timber tree seeds.
- 21st June, 1889.—Sent to the Overseer, State Forest Nursery, Gosford—7 species of American and other evergreen oak (*quercus*) seeds.
- 15th July, 1889.—Sent to Dr. Franklin B. Hough, Ph. Dr., First Chief of Forestry Division, Department of Agriculture, Washington, United States of America—62 species of indigenous and New Zealand timber tree seeds.
- 17th July, 1889.—Sent to G. S. Perrins, Esq., F.L.S., Conservator of Forests, Melbourne—31 oz. kurrajong tree seeds (*sterculia diversifolia*).
- 17th July, 1889.—Sent to J. E. Brown, Esq., F.L.S., Conservator of Forests, Adelaide—34 oz. kurrajong tree seed (*sterculia diversifolia*).
- 24th September, 1889.—Sent to the Overseer, State Forest Nursery, Gosford—73 plants of miscellaneous flowering shrubs and plants, received from the Director, Melbourne Botanic Gardens.
- 18th October, 1889.—Sent to the Overseer, State Forest Nursery, Gosford—34 species of indigenous, New Zealand, and other timber tree seeds.
- 18th October, 1889.—Sent to Charles Moore, Esq., F.L.S., Director, Botanic Gardens, Sydney—12 species miscellaneous tree and shrub seeds.
- 18th October, 1889.—Sent to the Trustees, Hyde Park, Sydney—12 species miscellaneous tree and shrub seeds.
- 18th October, 1889.—Sent to Wm. R. Guilfoyle, Esq., F.L.S., Director, Botanic Gardens, Melbourne—25 species miscellaneous tree and shrub seeds.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

GROWTH OF CEDARS IN THE MACLEAY AND  
BELLINGER DISTRICTS.  
(INFORMATION RESPECTING.)

*Ordered by the Legislative Assembly to be printed, 18 September, 1890.*

*[Laid upon the Table in answer to Question No. 4 of 16 September, 1890.]*

Questions.

- (4.) Growth of Cedars in the Macleay and Bellinger Districts:—*Mr. Stevenson*, for *Mr. O. O. Dangar*, asked the Colonial Secretary,—
- (1.) What sums of money have been expended in the Macleay District during the years 1887-8-9 in connection with the planting of cedars?
  - (2.) What result has attended the attempt to encourage the growth of cedars in that district?
  - (3.) The same information in regard to the Bellinger District?
  - (4.) In view of the expenditure and results, is it the intention of the Government to continue the system hitherto adopted, or what course do they intend to adopt?

Answers.

- (1.) 1887, £16 10s.; 1888, £21 4s.; 1889, nil.
- (2.) Owing to bush-fires and floods, the result has not been so satisfactory as was anticipated, but a considerable number of the young plants are growing well.
- (3.) 1887, £282; 1888, £285; 1889, £125 4s. The heavy timber overhead has retarded the growth to a great extent.
- (4.) The matter will be decided after inspection by the Director-General of Forests.



1890.

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NEW SOUTH WALES.

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# SECOND ANNUAL REPORT

OF THE

# BOARD OF WATER SUPPLY AND SEWERAGE,

BEING FOR THE YEAR

# 1889.

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Presented to Parliament by Command.

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SYDNEY : CHARLES POTTER, GOVERNMENT PRINTER.

1890.

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1890.

NEW SOUTH WALES.

## BOARD OF WATER SUPPLY AND SEWERAGE.

(ANNUAL REPORT FOR 1889.)

Presented to Parliament by Command.

To the Honorable the Secretary for Public Works,—

Sir,

The Board of Water Supply and Sewerage have the honor to submit to you their second annual Report.

2. During the past year a great improvement has been made to the supply of water to the city by laying larger trunk mains, also in removing the old-fashioned fire-plugs and inserting ball hydrants in their place; the Board have also inserted some screw-down hydrants, and contracted for the supply of 1,000 more to be placed at intervals throughout the main thoroughfares of the city.

3. The new Worthington pumps, and Babcock and Wilcox boilers, which were ordered in 1888 arrived; they are capable of forcing 12 million gallons in twenty-four hours to a height of 70 feet, and were erected under the supervision of Mr. T. H. Houghton, the engineer sent out by Messrs. Simpson & Co. (the manufacturers) for that purpose, and to superintend the working of them for six months. The foundations and buildings were designed by the Board's officers, and carried out by contract under their supervision. These engines take the place of the old rotative engines pumping to Paddington, and the Blake engines pumping to Woollahra, which are now not only inadequate to the present demand on them but are also worn out. A new 36-in. rising main will be laid from Crown-street to Paddington and Woollahra to enable the new engines to pump at their full capacity.

4. In their last Report the Board stated the advisability of having sufficient storage capacity of reservoirs to hold at least a day's supply, and have been trying to fix upon and secure a proper site; in this they have met with some difficulty owing to the fact that the site for the high-level reservoir, which had been marked out some years ago by the City Council, now forms part of the Centennial Park Reserve. The present intention is to have a 15 million gallon high-level reservoir at about 235 feet above high-water-mark level, as the Paddington and Woollahra Reservoirs are far too small for present requirements, also to construct a 20 million gallon reservoir at the same level as Crown-street Reservoir, to which the water will flow by gravitation, so that in case any accident occurred to either the present main trunk pipe or the one about to be laid the city would always have about two or three days' supply stored for distribution.

5. The daily consumption of water was 8,820,000 gallons, showing an increase of 680,830 gallons over the previous year.

6. The length of new mains of different sizes laid during the year was 86 miles 1468 yards, which, at 254 persons per mile, is equal to over 22,000 supplied with water during the year.

7. A gang of men had been continuously employed in cleaning out the old mains with the spiral borer invented by the Board's Engineer for Water Supply, and by this means with very little cost their capacity is made almost equal to new mains. Some of these mains had been laid over fourteen years, and were corroded to such an extent that they were almost useless. The length of mains so cleaned was 16 miles 907 yards.

8. A table is appended (A) showing the amount of water which flowed into Sydney by gravitation, also the amount pumped to the various reservoirs, together with the temperature and rainfall, and it is interesting to notice the effect of the two latter on the consumption.

9. During the year the Board's attention was attracted to a rumour circulated in Melbourne that the Melbourne water contained germs of typhoid, which was, after a thorough examination, proved to be groundless. Thinking that sympathetic fears might be entertained by the inhabitants of Sydney with regard to their water supply, the Board caused a chemical analysis and microscopic examination to be made of water taken from the drinking-filters at Redfern Railway Station. The chemical analysis was conducted by Mr. Dixon, and the microscopic examination by Dr. Morris, which are most satisfactory, and are as follows:—

Sir, Technical College Laboratory, 301, Pitt-street, 13 November, 1889.

Following your instructions given me on the 16th of October, I that day went and got samples of water from the upper part of the filter (viz., unfiltered water) from the waiting-room at Redfern Railway Station. Part of this water I subjected to chemical examination with the result that it contained—

Suspended matter (oxide of iron, &c.)	...	...	...	...	0.31 grs. per gallon.
Chlorine in solution	...	...	...	...	2.80 "
Phosphates	...	...	...	...	None.
Inorganic ammonia	...	...	...	...	None.
Organic ammonia	...	...	...	...	0.03 parts per million.

Chemically this water is very pure and far in advance of the old Botany supply which used to contain very notable quantities of inorganic ammonia and often five times as much organic as this does.

The second portion of the sample I gave to Dr. Morris for microscopic examination as he makes a speciality of this work, and I now enclose his report. He has gone thoroughly into the matter and his report is as satisfactory as the chemical one. I may point out that the samples were taken in a way and place so as to insure as far as possible the presence of organisms.

Trevor Jones, Esq., Engineer to the Water and Sewerage Board.

I remain, &c.,  
WILL. A. DIXON, F.I.C., F.C.S.

My dear Sir,

27, Castlereagh-street, 12 November, 1889.

Herewith receive my micro-examination of the 4th, on a sample of water left by you on 16th October.

On my first examination of the water with high power I came across isolated endosporeous bacillus, resembling anthrax bacillus. After repeated examination I found this bacillus in thousands, as a colony living in decayed vegetable matter. This at once showed me that we had septic not a pathogenic bacillus to deal with.

They were in all stages of growth, from 1 to 5 spore, never exceeding 5. I kept them under observation for about fourteen days, to see whether they would take on any other form. I am now perfectly satisfied that this water does not contain any bacteria of a pathogenic type, such as would produce typhoid or anthrax; and I am of opinion that this water is a very good water for all household purposes. Trusting the enclosed report may be entirely satisfactory,

I am, &c.,  
WM. MORRIS.

W. A. Dixon, Esq.

Micro-examination of a sample of water given to me by Mr. Dixon, 16th October, 1889.

27, Castlereagh-street, 12 November, 1889.

The sediment, as seen through a half-inch objective, consisted of oxide of iron entangled in minute threads like processes (Beggiatoa) of vegetable matter diatoms, sponge spicules, water fleas, rotifers, and various other animalculæ, also fine crystallized grit which polarized under a Nichols' prism.

On subjecting it to a further examination with  $\frac{1}{2}$ -inch immersion objective ovoid bodies (probably eggs of some minute water fleas or acari), micrococci, bacteria, and minute algae, such as cladotrix, became visible.

Having

Having prepared and stained several specimens of the sediment, also the residue left on their cover glasses after evaporation, I mounted them for special examination with higher objectives in order to determine whether the bacteria were of a septic or pathogenic nature. I found that they belonged to the septic type (those which live in decomposed or organic matter), such as bacteria termo and bacillus subtilis, all of which are considered harmless, and invariably found in water where animal and vegetable matter is undergoing decay; in fact they are the minute scavengers of Nature.

I may state that the examination of these organisms were under my observation for about three weeks, fresh specimens being selected about every third day, and this was carried out specially to ascertain whether any of the microbes might alter their form, as in many cases they display considerable polymorphism. I am pleased to state that I did not detect any pathogenic microbes (those which characterise by their presence a special disease); therefore, as far as the bacteriæ are concerned, my opinion is that the water is a first-class sample.

The diatomæ consisted of six varieties, viz., ducyonema, synedra, coscinodiscus, epithemia, cyclotella, and pleurosigma. The sponge spicules were curved and needle pointed at both ends, but not so numerous as in the old Botany water. A good filter would intercept nearly the whole of these organisms.

The reason I have taken so long over this matter is that I wish to make it as exhaustive as possible, and if at any future time a pathogenic bacillus is supposed to be found in the water, before it is accepted as such I would advise that the said bacillus be artificially cultivated until a pure culture is obtained, then tested on some animal capable of taking the disease, then the animal ought to produce the typical symptoms and lesions of such a disease.

W. MORRIS, F.F.P.S.G. & F.R.M.S.L.

10. To enable persons who had one or two horses or cows, or who had small gardens, to obtain a supply of water for them without affixing a meter, the Board instituted the following fees, viz. :—10s. per horse or cow per annum (since reduced to 5s.), and 10s. per annum for every 750 superficial square feet of garden. This was found to work very well, being of great benefit to the ratepayers, and also a source of profit to the Board, as meters are not only an expense to the consumer but also to the Board in reading them and seeing that they are kept in proper order. There were 5,080 applications made and fees paid for horses and cows, and 419 for gardens.

11. The Profit and Loss account (B) is appended, which shows, after paying interest on the Nepean Scheme, on loans of 1888, on debentures, and also, after paying the expenses of management and maintenance of the Department, that there is a debit balance on the year's transactions of £5,718 0s. 4d. This, however, includes a sum of £2,446 8s. 8d. written off value of machinery as depreciation.

The expense of management, which has been hitherto borne by the Water Fund, will henceforth be to some extent divided with the Sewerage Fund.

12. Appended to this Report is a very interesting table (C), showing the comparative water supplies of the large towns in Great Britain and Adelaide, Melbourne, and Sydney. On an examination of this it will be seen that the rate charged the consumer by assessment is cheaper in Sydney than in any other town of similar magnitude.

13. During the latter part of the year the Water Supply and Sewerage Amendment Act No. 2 was passed, transferring to the Board all the sewerage works which had been carried out by the city and suburban Councils and by the Government, and giving the necessary powers to the Board to carry out a complete sewerage and ventilation system throughout the city and suburbs. The Sewerage and Health Board, composed of the following members, viz. :—M. P. Pell (Chairman), E. O. Moriarty, W. C. Bennett, Hon. J. B. Wilson, B. Palmer, F. Bell, and Dr. Alleyne, laid down the main scheme, which was approved of by Mr. W. B. Clarke, the construction of which will be still carried on by the Government, and when completed will be handed over to the Board, who will have to construct the subsidiary sewers and reticulation of streets with all house connections, together with the system of house and drain ventilation.

14. The Board appointed Mr. J. M. Smail, M. Inst. C.E., as their Engineer for Sewerage. Mr. Smail was Assistant Engineer of Sewerage in the Government

Sewerage

Sewerage Department, which position he had held for over ten years; previous to that he was for some years Assistant City Surveyor and Assistant City Engineer in the Corporation of the City of Sydney.

15. The Board have to record with deep regret the loss by death of one of their members, Mr. W. C. Bennett, M. Inst. C.E., who was of invaluable assistance to them in the initiation of their work, and at all times proved himself most willing to place his great professional services at the disposal of the Board, which were of incalculable benefit to them. Mr. R. R. P. Hickson, who succeeded Mr. Bennett in his position in the Government Service, was appointed by the Government to fill the vacancy thus regrettably caused.

16. During the year fifty-eight meetings of the Board were held, at which the attendance was as follows :—

	Present.	Absent.
T. Rowe, President ... ..	55	3
B. Palmer, Vice-President (City Member) ... ..	55	3
W. C. Bennett (Official Member) ... ..	22	7
R. R. P. Hickson " " ... ..	28	1
C. W. Darley " " ... ..	43	15
J. D. Young (City Member) ... ..	53	5
G. W. Lander (Suburban Member) ... ..	57	1
J. Graham " " ... ..	55	3

Mr. C. W. Darley, who was in Europe on leave of absence, returned at the end of March.

17. Owing to the repeated complaints made by the public of the position of the Board's offices at the northern end of Lower George-street being so far out of the way, and also because these temporary offices were not sufficient to accommodate the Sewerage Branch, the Board considered it desirable to request the Government to resume a piece of land in a central part of the city and build thereon suitable offices for them, which proposition, having met with the approval of the Government, was brought before Parliament and referred to the Public Works Committee; in the meantime the Board rented more favorably situated offices at 289, Pitt-street, near the corner of Park-street, to which they removed at the end of the year.

18. An analysis of accounts (D) and the report (E) of the Engineer for Water Supply, and the balance-sheet (B2) of the Accountant are attached hereto.

REGINALD BLOXSOME,  
Secretary.

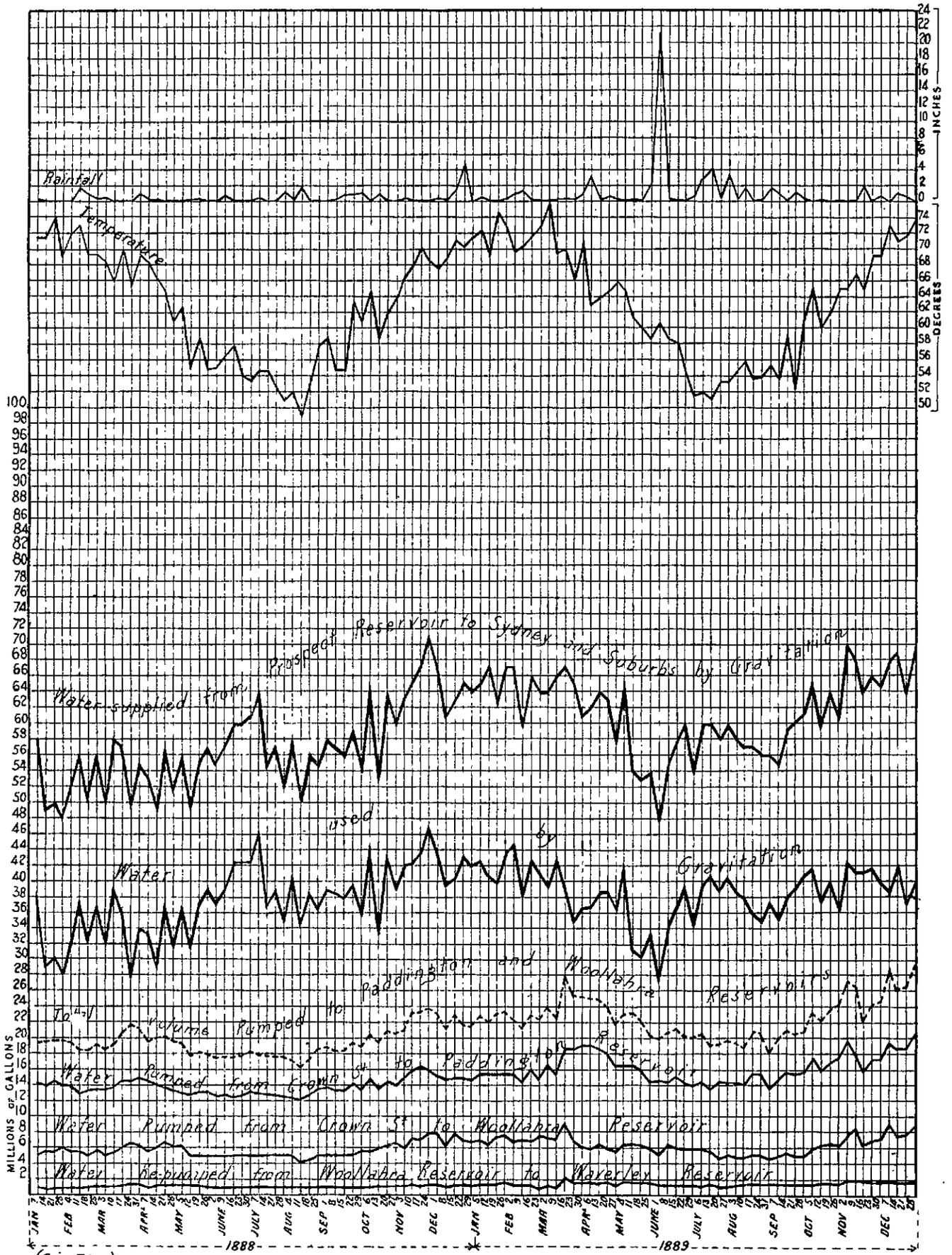
THOS. ROWE,  
President.

1 March, 1890.

A.

# BOARD OF WATER SUPPLY AND SEWERAGE SYDNEY

*Table showing the Volume of Water supplied Weekly from Prospect Reservoir by Gravitation to Sydney and Suburbs during the Years 1888 and 1889, the distribution of this Water by Gravitation and by Pumping, the Mean Shade Temperature and the Rainfall for each Week.*



(Sig. 74 -)





C

COMPARATIVE STATEMENT of Water Supplies in England, Scotland, and Ireland, from a Return laid upon the Table of the House of Commons, 7th June, 1888, and Water Supplies to Adelaide, Melbourne, and Sydney for the year 1888.

	Bradford.	Leeds.	Sunderland and S. Shields.	Newcastle.	Nottingham.	Bristol.	Manchester.	Liverpool.	Edinburgh.	Glasgow.	Dundee.	Dublin.	Belfast.	Adelaide, 1888.	Melbourne, 1888.	Sydney, 1888.
Population supplied.....	364,040	384,088	270,000	320,000	233,000	308,000	963,550	815,404	370,400	794,020	185,000	327,167	239,022	113,000	460,000	296,000
Daily supply .....	10 millions	11 millions	6 millions	11½ millions	4½ millions	6½ millions	20 millions	18½ millions	15 millions	42 millions	8 millions	15 millions	7½ millions	4½ millions	20½ millions	8½ millions
Cost of work .....	2,204,606	1,557,080	584,189	1,111,547	1,001,927	1,051,032	3,222,790	4,205,342	1,154,000	2,345,000	818,400	654,566	554,430	918,121	2,730,000	2,485,044
Income .....	112,744	91,609	55,829	84,619	59,800	80,500	221,000	216,711	84,238	163,923	42,851	57,611	34,717	59,213	188,212	132,138
Expenditure—Maintenance ...	15,617	13,607	4,119	14,899	20,967	14,328	35,792	70,666	20,614	44,436	} 8,776	} 15,238	} 12,766	} 8,546	} 7,787	} 12,930
„ Management ...	4,905	7,544	9,982	4,431	4,092	5,824	18,822	17,202	2,988	7,072						
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rate, £20—annual value ...	1 10 0	1 10 0	0 18 0	1 0 0	1 2 0	1 8 0	0 15 0	1 0 0	0 11 8	1 0 0	1 5 0	0 16 8	0 16 8	1 0 0	0 13 4	0 10 0
„ £50 „	3 5 0	3 5 0	1 8 0	2 0 0	2 5 0	3 0 0	1 17 6	2 10 0	1 9 2	2 10 0	3 2 6	2 1 8	2 1 8	2 10 0	1 13 4	1 5 0
„ £100 „	5 10 0	5 10 0	3 0 0	3 0 0	3 10 0	5 0 0	3 15 0	5 0 0	2 18 4	5 0 0	6 5 0	4 3 4	4 3 4	5 0 0	3 6 8	2 10 0
„ £150 „	7 10 0	7 10 0	4 10 0	4 10 0	4 15 0	7 4 0	5 12 6	7 10 0	4 7 6	7 10 0	9 7 6	6 5 0	6 5 0	6 11 0	5 0 0	3 15 0
By meter, per 1,000 gallons ...	Special ...	6d. to 9d.	Special ...	.....	6d. to 1s.	Special ...	.....	7d.	6d.	Special ...	Special ...	1s.	.....	1s. 3d. to 2s.	1s.	1s. 6d.
Per one bath or water-closet ...	8s. to 12s.	10s. 6d.	4s. to 10s.	6s. to 10s.	.....	10s.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
„ each additional ...	3s.	5s. 3d.	4s.	3s.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

6

## ANALYSIS OF ACCOUNTS.

## SUPPLY TABLE.

Year.	Average Daily Supply.	Total Supply for Year.	Number of Houses supplied.	Estimated Population supplied.	Average Daily Supply during year.		Mains.	
					Per House.	Per Head of Estimated Population.	Mains laid.	Mains cleaned.
	Gallons.	Gallons.			Gallons.	Gallons.	miles yds.	miles yds.
*1888 .....	8,144,160	2,972,621,623	61,718	296,216	132	27.49	53 803	4 890
1889 .....	8,820,000	3,219,244,159	7,924	326,035	120	27.05	86 1,468	16 907

## WATER RATES.

Year.	Outstanding Accounts on January 1st.	Gross Water Rates.	Total Charges	Less.		Gross Receipts paid to Treasury.	Less Refunds, &c., by Treasury.	Net Receipts.
				Polled down Houses, &c.	Unpaid Water Rates, &c.			
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
*1888 .....	62,037 19 0	70,793 0 2	132,771 8 11	912 5 0	41,739 13 3	90,089 0 11	957 14 6	89,131 15 5
1889 .....	41,789 13 3	112,384 14 9	184,324 8 0	2,607 4 9	34,672 3 2	147,915 0 1	1,105 6 9	145,939 13 4

## MAINTENANCE.

## MANAGEMENT.

Year.	Maintenance of Mains.	Wages and Expenses.	Coals.	Rents.	Total Maintenance.	President and Board fees.	Salaries.	Stationery and Printing.	Advertising and Incidental.	Total Management.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
*1888 .....	504 3 11	8,179 12 9	601 14 5	767 6 8	10,343 17 9	1,253 10 3	5,779 12 7	1,393 7 1	325 6 4	8,861 16 8
1889 .....	3,289 3 2	13,850 5 10	1,489 13 10	1,756 10 9	20,385 12 10	1,708 12 6	12,340 15 8	933 9 11	1,193 13 7	16,182 11 8

## GENERAL SUMMARY.

Year.	Not Receipts.	Total Maintenance and Management.	Interest.			Total Interest.	Balance for the Year.		Outstanding Accounts.
			On Loan Capital.	On Debenture Stock.	On Annual Loans.		Credit.	Debit.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
*1888 .....	89,181 15 5	19,205 14 0	59,076 7 3	4,800 0 0	.....	64,276 7 3	5,640 14 2	.....	41,789 13 8
1889 .....	145,989 13 4	36,568 4 0	99,998 10 0	4,150 0 0	1,478 9 6	110,627 5 5	.....	1,255 10 7	84,072 8 2
				15,000 0 0					

\* The management of the Sydney Water Supply was transferred to the Board on May 12th, 1888.  
 † £5,000 Debenture, which fell due during 1889.

## E.

Subject :—Yearly Report, Engineer for Water Supply.

Board of Water Supply and Sewerage,  
Sydney, 21 February, 1890.

I HAVE the honor to submit to the Board the customary yearly report of operations and progress of the Board's work in the above Department for the year 1889.

### Pipe-laying.

The year commenced with considerable activity, which was maintained throughout the year at the average rate of  $7\frac{1}{2}$  miles per month, of pipes of all sizes. By the middle of the year the bulk of the requirements of the most importunate applicants had been satisfied, after which the ordinary current extensions were proceeded with of extensions into new districts and the completion of those already commenced.

The Board's operations were occasionally impeded by the want of special castings, which evil the Board have provided for in the future by deciding to import in bulk the most generally-used types.

The pipes ordered under the Stanton Company's contract commenced to be delivered in May, a little before the contract time, and they continued to meet requirements until a consignment of pipes made for that company under sub-contract were found to be of a make much inferior to those made by the company itself, when, by authority of the Agent-General, an extension of time was given to the company, and a falling off in deliveries ensued, causing a little delay to the Board's operations.

### Interruption to Water Supply from Prospect.

On the 17th February an interruption to the supply from Prospect took place, arising from a flaw previously known to exist, but which suddenly took a threatening aspect, and the water was suddenly stopped, and resort was had to the Botany pumps, but not before considerable inconvenience was felt.

This incident strengthened the determination to construct a 100,000,000-gallon reservoir at the pipe-head, and to lay a duplicate 4-ft. main from Potts Hill to the city, which will render the city and suburbs practically safe against interruption to their water supply.

### New Outlet Works, Paddington.

The outlet works at Paddington, and the trunk main thence into the city, for the more liberal distribution of high-level water, sanctioned by the Board in 1888, were completed and in action by March, when a marked improvement in the supply to Darlinghurst, Surry Hills, &c., was evident, the higher levels of these localities having previously received for some time a precarious supply.

### Duplicate Main, Fitzroy-street.

The work of laying the duplicate 20-inch main in Fitzroy-street, and other work to the same end, for enabling both the Board's pumps to work at the same time, also sanctioned by the Board, was completed and at work in February, without which work it would have been practically impossible to meet the demands of subsequent months, as the consumption assumed greatly-increased proportions.

### New Worthington Engines.

The foundations for the new Worthington pumps and boilers were in readiness to receive that plant on its arrival, 15th September, the engineer deputed by Messrs. Jas. Simpson & Co. (Mr. Houghton) to erect the same having landed about a month previously, and by the end of the year the work was drawing to a close, the building of the engine and boiler houses and the chimney-stack, as well as the connections of the pumps to the reservoir and to the outlet pipes, having been carried on simultaneously without any serious inconvenience.

### Old Engines.

In the meantime the old pumping engines at Crown-street, with careful watching and frequent repairs, were enabled to meet the wants of the Board, but their unduly elevated situation restricted the efficiency of the trunk 42-inch main, which was designed only to deliver its full quota when flowing freely into the reservoir; but in order to bring the water within reach of these engines, it was forced, by the partial closing of the valve, to a height of about 12 feet above the reservoir, which limited the amount delivered. (For particulars of repairs, &c., to these pumps see Mr. Fyfe's report). The new pumps are fixed at such a level as to feed themselves without restricting the trunk main.

### Further Interruption.

On April 6th warning was received from Prospect that another interruption would take place to the supply, and immediately the Botany pumps were got in readiness to tide over the interruption, but they were only called into requisition on the 24th, when they met the temporary want without inconvenience to the public.

Screw-down

### Screw-down and Ball Hydrants.

On April the 9th a trial was made of the relative value for ejecting streams of water on fires of the ball form of hydrant, as compared with the "screw-down," resulting a very little in favour of the latter, so far as length of jet was concerned; but the claims of the "screw-down" in other respects were recognized by the Board, with the result that the Board ordered, locally, 1,000 ball hydrants for immediate use, and sent to England for a further 5,000, and 1,000 "screw-down" hydrants, the latter to be placed at specially important places in the city or suburbs.

### Dam, Centennial Park, carried away by heavy rains.

On May 25th very heavy rains fell, causing great damage in Centennial Park to one of the dams, but which was met by prompt measures.

### Flumes.

The flumes which had been erected for the temporary supply were dismantled and sold in May, to obviate the possible danger of their being blown down and causing damage.

### Ashfield supply.

There were parts of Ashfield which could not be reached by the gravitation scheme or the Paddington water; it was therefore determined by the Board to give Woollahra pressure to this locality on two or three days per week, pending the erection of a 100,000-gallon tank now about to be constructed. When this is finished, it will be filled at night, and will afford a constant supply to those elevated localities.

### General.

On the 22nd November the 30" trunk main, formerly used as a Botany pumping-main, but now partly used as a Woollahra pumping-main, fractured at the corner of Fitzroy and Crown Streets, but was repaired in twelve hours without serious interruption to the water supply.

A week later the same pipe broke at the corner of Albion and Crown Streets, but was promptly repaired.

At the latter part of the year it became doubtful whether the site for a 20,000,000-gallon high-level reservoir would be granted by Government; it therefore became necessary to explore for other sites.

An accident threatening the failure of the Blake pumps occurred on the 9th December, which, from its seriousness, caused a pressure to be brought upon the contractors to complete their connections to and deliveries from the new engines, which had already been erected, but so far the evil has not caused such failure.

In discussing the sewerage question of the Western Suburbs by the Public Works Committee, some doubts arose as to the adequacy of the Nepean scheme to afford water to meet that want; but on being assured that the scheme had been designed with all such wants in view, and that such wants would be freely met, that difficulty was considered disposed of.

During the year the Board granted the use of the high-level water for actuating elevators direct from the main in nine instances, and ruled that in future such rights could only be granted if the applicant provided tanks at such elevation as would actuate the lift, into which the water could flow in an equable stream, so that such machines would not cause sudden and frequent depletion of mains, to the detriment of the domestic and other uses.

### Power-lift Co.

A Power-lift Company is erecting works and laying pipes to actuate their machines, and are applying to the Board for water at a reduced rate, on account of the large quantity used; and I have thrown out the suggestion that some terms should be arranged for the Company to use water now running to waste at Botany, by using the Board's smaller pump, and connecting the Company's works with the Botany rising main, but so far no finality has been arrived at.

### Campbelltown.

The water was brought into Campbelltown during 1888, but the want of pipes prevented the extension by reticulation for a time. Specification for the completion of this work will shortly be submitted.

### Liverpool.

A scheme for the supply of Liverpool was approved and adopted by the Board, but while waiting for the arrival of pipes a new proposition was made by the Mayor of Liverpool, the claims of which had such merits that considerable delay was entailed in reconsidering the matter, and it has yet to be settled.

Quantity

Quantity of water pumped and coal consumed during the years 1879 to 1889 inclusive :—

				FROM BOTANY TO CROWN-STREET RESERVOIR.				
Year.				Water Pumped.				Coal Consumed.
1879	...	...	...	1,488,297,152 galls.	...	...	...	6,365 tons.
1880	...	...	...	1,522,843,440	„	...	...	6,320 „
1881	...	...	...	1,281,692,592	„	...	...	4,997 „
1882	...	...	...	1,364,004,000	„	...	...	4,808 „
1883	...	...	...	1,729,537,200	„	...	...	5,510 „
1884	...	...	...	1,590,107,040	„	...	...	5,754 „
1885	...	...	...	1,729,441,440	„	...	...	6,237 „
1886	...	...	...	1,864,123,400	„	(Nepean water partly received)		7,240 „
1887	...	...	...	1,047,638,880	„	„	„	4,040 „
1888	} No water was raised from Botany, as the Nepean scheme was complete.							
1889								

				FROM CROWN-STREET TO PADDINGTON AND WOOLLAHRA.			
Year.				To Paddington.	To Woollahra.		Coal Consume
1879	...	...	...	480,205,500 galls.	...	Nil. galls.	758 tons.
1880	...	...	...	511,906,510	„	„	599 „
1881	...	...	...	372,323,963	„	17,767,040	508 „
1882	...	...	...	453,060,680	„	36,410,630	559 „
1883	...	...	...	571,414,074	„	55,382,384	739 „
1884	...	...	...	569,034,960	„	83,867,744	817 „
1885	...	...	...	568,146,150	„	94,959,800	704 „
1886	...	...	...	585,848,540	„	124,994,480	972 „
1887	...	...	...	633,380,590	„	190,100,040	1,192½ „
1888	...	...	...	724,914,200	„	300,112,240	1,613¼ „
1889	...	...	...	843,068,150	„	339,163,150	1,683½ „

FROM WOOLLAHRA TO WAVERLEY.

1887—From April 2 to December 31,	19,317,700 gallons.	
1888—From January 1 to December 31,	61,236,931 „	181 tons.
1889—From January 1 to December 31,	86,679,780 „	197 „

J. TREVOR JONES, C.E.,

The Secretary, Board of Water Supply and Sewerage.

Engineer for Water Supply.

Sir,

The Waterworks, Crown-street, 2 January, 1890.

I have the honor to make the following report upon the working of all the pumping engines during the year just ended, 1889 :—

The main pumping engines at Crown-street works have been kept going daily throughout the year pumping to Paddington Reservoir. The western crank being completely broken through, a stronger strap had to be fitted on; and recently, to make it more secure, a strong malleable iron plate had to be fitted on to face of crank, securely fastened with steel bolts. A fracture in western fly-wheel has been made good with steel plates and bolts, well fitted and securely fastened. The ordinary examinations and repairs consistent with the constant running of the machinery have been carried out as required. It is fully three years since the main engines have had a thorough overhaul, which of course will cause it to be extensive when opportunity permits of its being done. The laying-up for general repairs is much needed, and will require to be done when the work can be taken up by the new pumps.

During the year the quantity pumped to Paddington Reservoir by these pumps was 843,068,150 gallons, showing an increase of 118,153,950 gallons on the previous year, and an increase on the corresponding quarter of the year previous of 37,137,950 gallons.

The Blake pumps have had new central valve-chambers fitted to them, also a new pump-rod; they have been working daily throughout the year; they are, however, showing unmistakable symptoms of general decay, and require careful watching to keep them up to their work; they have been doing fair work, considering their critical state, but cannot be depended on much longer to keep up the supply. During the year the water pumped by these pumps to the Woollahra Reservoir was 339,163,150 gallons, showing an increase of 39,050,910 gallons on the previous year, and an increase in the corresponding quarter of the year previous of 7,530,180 gallons. From the great increase in the quantity of water pumped it must be evident that we are in great straits to keep up the supplies with our limited resources.

The three boilers at these works supplying the main pumping engine and Blake pumps with steam—these, with their connections, were in good working order throughout the year, only requiring a limited renewal of feed-pipe.

The pump at Woollahra Reservoir was almost daily worked throughout the year, pumping to the Waverley Reservoir, and did its work satisfactorily. The repairs to this pump were of a limited and ordinary nature, necessary to its efficient maintenance.

The boiler in connection with this pump was in fair working order, and was daily in use throughout the year, with two days exception, when it had to be laid up to undergo the necessary internal and flue cleaning.

The pumps and boiler at the North Shore works have been working satisfactorily throughout the year. At the commencement of the year from two to three days' pumping per week was sufficient to meet the water requirements; but now, like other places, the demands on them have increased to such an extent

extent that it has been found necessary these last three months to pump every day. They were in good working order throughout the year, and required only the ordinary renewal of pump-valves, springs, packing, &c.

The Botany pumps were worked under steam several days on two different occasions in the early part of the year, and were turned round, each engine respectively, every week by hand. A boiler-fire has been kept banked during the whole time, and the banking changed periodically for the purpose of drying flues and keeping the external bottom of boilers dry.

J. Trevor Jones, Esq., Board Water Engineer.

I have, &c.,

J. FYFE, E.O.P.

RETURN of Water supplied and Coal consumed, January 1st to December 31st, 1889.

From	To	Water pumped.	Coal consumed.
		Gallons.	Tons. cwt. qr.
Crown-street .....	Paddington .....	849,068,150	663 1 0
" .....	Woollahra .....	339,163,150	1,020 8 0
Woollahra .....	Waverley .....	80,679,780	197 0 0

To Board Engineer.

J. FYFE, E.O.P.

STATEMENT of Repairs effected and Material used at Crown-street Waterworks for quarter ended 31st December, 1889.

A portion of defective feed-pipe taken out and replaced by 2½" steam-pipe and bends.  
 Window-blinds taken down, cleaned, painted, refitted, and again put into position.  
 7 new junk-ring bolts fitted to B. pump buckets.  
 4 dozen V.I. valves used to replace defective ones, B. pumps.  
 2 dozen springs " " "  
 1 junk-ring stud to main engine pump.  
 1 valve main pump, replaced defective one.  
 1 unfinished crank-shaft, in stock.  
 1 strong strap for defective crank, in stock.

To Board Engineer.

J. FYFE, E.O.P., 1/1/90.

STATEMENT of Stores received and consumed at Crown-street Waterworks for quarter ended 31st December, 1889.

Received during current quarter.	In Stock, 30th September	Consumed.	Remaining in Stock.
Assorted packing (general use) .....	10 lb. ....	10 lb. ....	
Square asbestos .....	10 " ....	10 " ....	
Neatsfoot oil, 15 gall. (main engines) .....		15 gall. ....	
V.I. valves (main engines) .....	8 .....	1 .....	7
Eaglebert lubricant, 81 gall. (general use) .....	25 gall. ....	80 gall. ....	26 gall.
Tallow, 1 cwt. (Blake pumps) .....		1 cwt. ....	
V. I. valves, 6 doz. " .....		4 doz. ....	2 doz.
Springs, 4 doz. " .....		2 " .....	2 "
Cotton-waste, 125 lb. (general use) .....	40 .....	165 lb. ....	
Marline, 2 skeins " .....		2 skeins .....	
Twine, 1 skein " .....		1 " .....	
Kerosene, 4 gall. " .....	3 gall. ....	7 gall. ....	
Tube-brush, 1 " .....	1 .....	1 .....	
Bathbrick, 2 " .....		2 .....	
Soft-soap " .....	60 lb. ....	40 lb. ....	20 lb.
Muriatic acid " .....	1 " .....	½ " .....	½ "
Blow-off pipes 1½ in. G.I. (boilers) .....	2 .....	1 .....	1
" bends " .....	3 .....	1 .....	2
Lees (general use) .....	1 cwt. ....		1 cwt.
Junk-ring bolts (Blake pumps) .....	7 .....	7 .....	
" studs (main engines) .....	2 .....	1 .....	1
Firing-shovels, 2 .....		In use .....	
Scrubbing-brush, 1 (general use) .....		1 .....	
Copper wire, 1 lb. " .....		½ .....	½
Canvas sun-screen .....		In use .....	
Gauge glass tubes, 3 (main engine) .....		1 .....	2
Sponge-cloths, 1 doz. ....		1 doz. ....	
Hose, 45 feet (general use) .....		In use .....	
Fire-clay, 2 cwt. for boilers .....		1 cwt. ....	1 cwt.
Assorted files, 1½ doz. (general use) .....		½ doz. ....	1 doz.
Hack saw frame, 1 " .....		In use .....	
Blacklead, 1 lb. " .....		½ lb. ....	½ lb.
Manilla 1 in. line, 1 lb. for sun-awning .....		1 " .....	
Escape-valve, Botany main .....		In position .....	
Flair broom and handle, 1 (general use) .....		In use .....	
Emery cloth, 1 quire " .....		1 quire .....	
Candles, 1 lb. " .....		1 lb. ....	
Pad-lock, 1 .....		In use .....	
Fire-rake, 1 .....		" .....	
Boiled paint-oil, 2 gall. (general use) .....		2 gall. ....	
Wood-axe, 1 .....		In use .....	

To Board Engineer.

J. FYFE,  
E.O.P., 2/1/90.

Sir,

Sir,

21 February, 1890.

I have the honor to submit Annual Report of works done during the year 1889:—

*Main-laying.*

1. During the year pipes of various sizes laid number 48,870, giving a total length of 86 miles 1,468 yards, making an average distance of 1 mile 1,179 yards per week. Upon the whole, the contractors have executed the work in a very creditable manner.

*Main-cleaning.*

2. During the latter part of the year a considerable length of mains has been cleaned in the suburbs, and a small quantity in the city. The condition of some of the mains prior to undergoing the process of cleaning was very bad, some being so foul as to be reduced to a diameter of  $\frac{1}{4}$ -in., and in some instances practically closed, the only supply being by percolation through the corrosion. Evidence of bad workmanship in jointing was also present; large quantities of lead were extracted from the mains. The system which I have adopted, by the introduction of an instrument while main-laying for the detection of foreign substances, practically precludes the possibility of a recurrence of such work. A marked improvement in supply has been made in localities where this work has been carried on, which has rendered the mains equal to new, thereby effecting a great saving.

*Water Supply.*

3. Notwithstanding the increased area reticulated, the supply has been successfully maintained.

*Inspections.*

4. Much useful work has been done by the Waste-water Inspectors, and a thorough system of house-to-house inspection carried on in city and suburbs, resulting in the detection of a large number of cases of evasion of payment of rates for stock, machinery, &c., also the suppression of much waste of water.

Engineer for Water Supply.

D. C. ROBERTSON,  
Inspector.

## SUMMARY of Work done during year 1889.

Mains laid ... ..	48,870 pipes = 152,828 yards = 86 miles 1,468 yards.	
Mains cleaned ... ..	16 "	907 "
Mains removed... ..	1 "	400 "
Mains repaired... ..		123 "
Private works paid for by plumbers and others for inserting branches and valves ... ..		90
Inspections made of premises... ..		72,537
Notices served to abate pollutions ... ..		108
"    "    pay special fees ... ..		3,961
"    "    affix meters ... ..		131
"    "    abate waste of water ... ..		1,443
No. of verdicts—85 (obtained for non-payment of fees) fines ... ..		£44 9s.
Leaks—Services cut off to prevent waste of water... ..		2,090
New meters tested before connections ... ..	1,165	
Old meters disconnected for adjustment ... ..	239	
		1,404
Horse-troughs supplied—		
City ... ..		1
Suburbs ... ..		40
		41
Gulley-shafts supplied—		
City ... ..		49
Suburbs ... ..		29
		78
Gas-engines supplied—		
City ... ..		32
Suburbs ... ..		5
		37
Main drillings to connect service—		
City ... ..		463
Suburbs ... ..		3,527
		3,990
Extensions from existing services—		
City ... ..		59
Suburbs ... ..		525
		584

ABSTRACT

ABSTRACT OF MAINS LAID during the Year 1889.

District.	Number of different sized Pipes.										Lengths of different sized Pipes.										Total No. of Pipes for District.	Total length of Mains for District.				
	3"	4"	6"	7"	9"	12"	15"	18"	20"	24"	30"	3"	4"	6"	7"	9"	12"	15"	18"	20"			24"	30"		
Alexandria .....		174	128										528	387										302	915	
Ashfield .....		4,230	2,851			41							12,849	8,636			175							7,122	21,659	
Balmain .....		1,531	527			80							4,668	1,619		241								2,138	6,528	
Burwood .....		924	1,017			662							2,807	3,035		2,019								2,603	7,911	
Campbelltown .....		138	149	9		4							413	441	25	14								300	893	
Camperdown .....														209											69	209
Canterbury .....			3			403							9	1,200											406	1,209
City .....	2	169	2,039			512				47			212	8		12	7							65	3,001	9,415
Concord .....			987			53							2,991	161											1,040	3,152
Darlington .....			154			1							469			5									155	474
East St. Leonards .....			721			700				178			2,190	2,149		542									1,608	4,881
Enfield .....			284										864												234	864
Five Dock .....			374			745				4			1,162	2,274		15									1,123	3,451
Glebe .....			555			107							1,662	327											662	1,989
Granville .....			1,517			1,216							4,632	3,664				3							2,734	8,299
Leichhardt .....			871			666				408			2,628	2,047		1,242									1,945	5,917
Macdonaldtown .....			282										864												232	864
Marrickville .....			1,797			2,115				300		11	716												4,939	15,491
Newtown .....			885			293							2,742	881											1,178	3,623
Paddington .....			129			292				30		13	476	152	18										1,110	3,824
Petersham .....			849			471				1		106	2,270	4											1,703	5,053
Prospect-Sherwood .....						118								356											119	358
Randwick .....			676			628				317		171	640												2,432	8,092
Redfern .....			418											1,283											418	1,283
Rockdale .....			20			74				335		987													1,416	5,300
St. Leonards .....	319	1,548	1,750			91				252		482													4,442	14,219
St. Peters .....			756			187						182													1,125	3,591
Strathfield .....			890			530								2,685	1,619										1,426	4,304
Victoria .....			658			1				133				1,997	3										792	2,402
Waterloo .....			319			379								961	1,147										698	2,108
Waverley .....			20			198								81	607										218	688
Woollahra .....			330			737						13		980	2,236										1,080	3,255
<b>Total for year</b> .....	<b>321</b>	<b>22,209</b>	<b>18,458</b>	<b>9</b>	<b>3,056</b>	<b>1,825</b>	<b>2,316</b>	<b>482</b>	<b>164</b>	<b>18</b>	<b>12,962</b>	<b>67,530</b>	<b>55,926</b>	<b>25</b>	<b>9,301</b>	<b>7,378</b>	<b>8,595</b>	<b>1,963</b>	<b>701</b>	<b>75</b>	<b>65</b>	<b>48,870</b>	<b>152,828</b>			

Grand Total, 48,870 pipes=86 miles 1,468 yards.

MAINS LAID, 1889.

District and Street.	No. and Size of Pipes.										Length of each size.	Length of main.	Total length for district.	Total No. of pipes for district.	
	3"	4"	6"	9"	12"	15"	18"	20"	24"						
<b>ALEXANDRIA.</b>															
Victoria-street .....		151									yds.	458	458	yds.	
Queen-street .....		23										70	70		
Huntly-street .....												226	226		
Mitchell Road .....												161	161		
<b>Total for year</b> .....		<b>174</b>										<b>528</b>	<b>387</b>	<b>915</b>	<b>302</b>
<b>ASHFIELD.</b>															
Croydon Road .....												8	175		
Do .....												167	188		
Prospect-street .....												188	188		
Hardie Avenue .....												133	133		
Milton-street .....												167	571		
Do .....												404	310		
Palace-street .....												310	310		
Prospect Road .....												598	610		
Do .....												12	297		
Edwin-street .....												297	297		
Nowranie-street .....												416	433		
Do .....												17	1,224		
Carlton Crescent .....												1,224	1,223		
Do .....												4	197		
Lorne-street .....												197	416		
Morris-street .....												416	295		
Wellesley-street .....												295	144		
Edward-street .....												144	202		
Do .....												202	79		
Arthur-street .....												79	1,314		
Do .....												1,314	264		
Short-street .....												264	245		
King-street .....												245	509		
Bartlett-street .....												509	700		
Thomas-street .....												700	168		
Regent-street .....												168			

MAINS LAID, 1889—continued.

District and Street.	No. and Size of Pipes.									Length of each size.	Length of main.	Total length for district.	Total No. of pipes for district.
	3"	4"	6"	9"	12"	15"	18"	20"	24"				
<b>ASHFIELD—continued.</b>													
Herbert-street		68								yds. 207	yds. 478	yds.	
Do			90							271			
Alt-street			66							206	206		
John-street			89							270			
Do		6								17	287		
Lang-street		2								5			
Do			110							330	335		
Church-street			129								375	375	
Duckarma-street			79							240	240		
Percy-street		42								124	124		
Marian-street		57								173	173		
Ramsay-street		4								15			
Do			93							281	296		
Liverpool Road			62							183	183		
Peirson-street		123								389	389		
Seaview-street		1								3			
Do			248							759	762		
Queen-street			161							505			
Do		10								33	538		
Victoria-street		189								572	572		
Canterbury Old Road		6								18			
Do			211							642	660		
William-street			77							229	229		
Loftus-street		54								164	164		
Grosvenor-street		106								323	323		
Norton-street		303								920	920		
Fleet-street		45								135	135		
Chapman-street		36								108	108		
Holborow-street			269							817	817		
Elizabeth-street		62								159	159		
Cromwell-street		106								322	322		
The Avenue		39								118	118		
Hordern Parade		36								109	109		
Highbury Parade		35								106	106		
Princes-street		38								120	120		
Carshalton-street		178								530	530		
Taringa-street		40								121	121		
Webb's Avenue		69								210	210		
Dalhousie-street			111							336	336		
Tillock-street		49								147	147		
Abigail-street		50								150	150		
Armstrong-street		63								194			
Do			4							13	207		
Hardy-street		275								822	822		
Harland-street		72								214	214		
Wilson-street		46								138	138		
Victoria Road		157								478	478		
Bland-street		171								522	522		
Curt-street		41								127	127		
Total for year		4,230	2,851		41					12,848 8,636 175	21,659	21,659	7,122
<b>BALMAIN.</b>													
Gow-street		16								48	48		
Punch and Gow Streets		13								40	40		
Abattoir Road		75								226	226		
Callan-street		70								214	214		
Hutchinson-street		38								116	116		
Oxford-street		62								191	191		
Prosper-street		48								142	142		
Bayville-street		45								134	134		
Terry-street		33								100	100		
Hampton-street		63								195			
Do			56							173	368		
Bay-street		41								126	126		
Foucart-street		131								396	396		
Hanover-street		53								160	160		
Llewellyn-street		60								177	177		
Mackenzie-street		75								227	227		
Little-street		12								35	35		
Sutton-street		18								60	60		
Pashley-street		53								162	162		
Queen's-place		18								56	56		
Margaret-street		46								141	141		
Booth-street		54								173	173		
Little's-lane		58								178	178		
Cardwell-street		59								182	182		
Macquarie-terrace		19								59	59		
Thomas-street		67								202	202		
Withercombe-street		44								122	122		
Robert-street		47								136	136		
Campbell-street		8								26	26		

MAINS LAYD, 1880—continued.

District and Street	No. and Size of Pipes									Length of each size.	Length of main.	Total length for district	Total No. of pipes for district.
	3"	4"	6"	9"	12"	15"	18"	20"	24"				
<b>BALMAIN—continued.</b>													
Cooper-street		40								124	124		
Collins-street		54								169	169		
Phoebe-street		24								73	73		
Little Stephen-street		37								114	114		
Carrieville-street		31								97	97		
Moodie-street			100							304	315		
Do		3							11				
Wellington-street			79							238	252		
Do		4							14				
Beattie-street		8								30	402		
Do			120						372				
Weston-street		4								12	663		
Do			133						410				
Do				80					241				
Glassop-street			39							122	122		
Total for year		1,531	527	80						4,668 1,619 241	6,528	6,528	2,138
<b>BURWOOD.</b>													
Boundary-street		3								9	490		
Do			85						258				
Do				71					223				
Young-street				177						541	692		
Do		48							146				
Do			2						5				
Grosvenor Crescent		113								339	339		
Meta-street		33								102	102		
Gibbs-street		45								139	139		
Redmyre Road			164							496	496		
Marwick-street		130								397	397		
Scale-street		36								110	110		
Cooper-street		141								430	430		
Albert-street		124								377	377		
Queen-street		6								16	211		
Do			63						195				
Liverpool Road		5								14	1,306		
Do			12						37				
Do				414						1,256			
Devonshire-street			96							291	291		
Parramatta Road			465							1,410	1,433		
Do		8							23				
Everton-street			130							393	393		
Moseley-street		44								134	134		
M'Gregor-street		46								139	139		
Thomas street		45								138	138		
Waimea-street		97								294	294		
Total for year		924	1,017	662						2,807 3,085 2,019	7,911	7,911	2,603
<b>CAMPBELLTOWN.</b>													
Canal				4						14	39		
Do				(7")	9				25				
Queen-street		24								69	510		
Do			149							441			
Railway-street		53								160	160		
Hurley-street		61								184	184		
Total for year		138	149	4	9					413 441 14 25	893	893	300
<b>CAMPBLEDOWN.</b>													
Stanley-street			69							209	209	209	69
<b>CANTERBURY.</b>													
Milton-street			118							350	350		
King-street			285							850	859		
Do		3							9				
Total for year		3	403							9 1,200	1,209	1,209	406



## MAINS LAID, 1889—continued.

District and Street.	No. and Size of Pipes.									Length of each size.	Length of main.	Total length for district.	Total No. of pipes for district.	
	3"	4"	6"	9"	12"	16"	18"	20"	24"					
<b>EAST ST. LEONARDS.</b>														
M'Dougal-street	...	111	...	...	...	...	...	...	...	yds.	yds.	yds.		
Brisbane-street	...	73	...	...	...	...	...	...	...	336	336			
Whaling Road	...	1	...	...	...	...	...	...	...	220	220			
Do	...	...	95	...	...	...	...	...	...	6	293			
Felton-street	...	48	...	...	...	...	...	...	...	287	147			
Falconer-street	...	57	...	...	...	...	...	...	...	147	171			
Little Arthur-street	...	99	...	...	...	...	...	...	...	171	299			
Arthur-street	...	...	85	...	...	...	...	...	...	299	256			
Milson-street	...	50	...	...	...	...	...	...	...	256	151			
Ben Boyd Road	...	37	...	...	...	...	...	...	...	151	113			
Do	...	...	414	...	...	...	...	...	...	113	1,259	1,914		
Do	...	...	...	178	...	...	...	...	...	542	341			
Alfred-street	...	...	113	...	...	...	...	...	...	341	207	341		
M'Laren-street	...	68	...	...	...	...	...	...	...	207	6	213		
Do	...	...	2	...	...	...	...	...	...	6	144			
Water-street	...	48	...	...	...	...	...	...	...	144	73	144		
Grantham-street	...	24	...	...	...	...	...	...	...	73	72	73		
Terrace-street	...	22	...	...	...	...	...	...	...	72	46	72		
Undercliff-street	...	15	...	...	...	...	...	...	...	46	205	46		
Willoughby-street	...	68	...	...	...	...	...	...	...	205		205		
Total for year	{	721	709	178	...	...	...	...	...	2,190	2,149	4,881	4,881	1,608
		...	...	...	...	...	...	...	...	542				
<b>ENFIELD.</b>														
Punchbowl Road	...	234	...	...	...	...	...	...	...	712	712			
King-street	...	50	...	...	...	...	...	...	...	152	152			
Total for year	...	284	...	...	...	...	...	...	...	864	864	864	284	
<b>FIVE DOCK.</b>														
Birkenhead Road	...	...	236	...	...	...	...	...	...	724	775			
Do	...	16	...	...	...	...	...	...	...	51	18			
Cambridge-street	...	3	...	...	...	...	...	...	...	18	770	804		
Do	...	...	252	...	...	...	...	...	...	770	15			
Do	...	...	...	4	...	...	...	...	...	15	189			
Lyons Road	...	61	...	...	...	...	...	...	...	189	182	371		
Do	...	...	58	...	...	...	...	...	...	182	449			
Collingwood-street	...	...	151	...	...	...	...	...	...	449	32	481		
Do	...	11	...	...	...	...	...	...	...	32	169			
Wolseley-street	...	58	...	...	...	...	...	...	...	169	149	318		
Do	...	...	48	...	...	...	...	...	...	149	520			
St. George's Crescent	...	165	...	...	...	...	...	...	...	520	182	520		
Havelock-street	...	60	...	...	...	...	...	...	...	182		182		
Total for year	{	374	745	4	...	...	...	...	...	1,162	2,274	3,451	3,451	1,123
		...	...	...	...	...	...	...	...	15				
<b>GLEBE.</b>														
Park Road	...	208	...	...	...	...	...	...	...	581	581			
Wentworth-street	...	76	...	...	...	...	...	...	...	235	161	235		
Water-street	...	53	...	...	...	...	...	...	...	161	65	161		
Cowper-street	...	21	...	...	...	...	...	...	...	65	79	65		
Mitchell-street	...	25	...	...	...	...	...	...	...	79	327	79		
Glebe Point Road	...	...	107	...	...	...	...	...	...	327	105	327		
Bell-street	...	33	...	...	...	...	...	...	...	105	152	105		
Marlborough-street	...	49	...	...	...	...	...	...	...	152	42	152		
Mansfield-street	...	12	...	...	...	...	...	...	...	42	242	42		
Derwent-street	...	78	...	...	...	...	...	...	...	242		242		
Total for year	{	555	107	...	...	...	...	...	...	1,662	327	1,989	1,989	662
		...	...	...	...	...	...	...	...					
<b>GRANVILLE.</b>														
Sydney Road	...	...	564	...	...	...	...	...	...	1,724	156	1,880		
"	...	50	...	...	...	...	...	...	...	156	181			
Kemp-street	...	59	...	...	...	...	...	...	...	181	186	181		
Good-street	...	61	...	...	...	...	...	...	...	186	92	186		
Railway Collonade	...	30	...	...	...	...	...	...	...	92	341	92		
Cowper-street	...	112	...	...	...	...	...	...	...	341	176	341		
East-street	...	58	...	...	...	...	...	...	...	176	153	176		
William-street	...	50	...	...	...	...	...	...	...	153	1,484	1,640		
"	...	...	502	...	...	...	...	...	...	1,484	3			
"	...	...	...	1	...	...	...	...	...	3	415			
South-street	...	136	...	...	...	...	...	...	...	415	330	415		
Railway Road	...	107	...	...	...	...	...	...	...	330	167	330		
Vulcan-street	...	56	...	...	...	...	...	...	...	167	266	167		
Carlton-street	...	87	...	...	...	...	...	...	...	266	267	266		
Lumley-street	...	87	...	...	...	...	...	...	...	267	563	267		
Railway-street	...	183	...	...	...	...	...	...	...	563		563		

## MAINS LAID, 1889—continued.

District and Street.	No. and Size of Pipes.									Length of each size.	Length of main.	Total length for district.	Total No. of pipes for district.
	3"	4"	6"	9"	12"	15"	18"	20"	24"				
<b>GRANVILLE—continued.</b>													
Hutchinson-street	...	92	...	...	...	...	...	...	...	yds. 282	yds. 282	yds.	
Jamieson-street	...	85	...	...	...	...	...	...	...	258	258		
Margaret-street	...	40	...	...	...	...	...	...	...	121	121		
Daniel-street	...	63	...	...	...	...	...	...	...	191	191		
Walter-street	...	100	...	...	...	...	...	...	...	303	303		
Hewlett-street	...	61	...	...	...	...	...	...	...	184	184		
Factory-street	...	...	150	...	...	...	...	...	...	456	456		
Total for year	{	1,517	...	1,216	...	1	...	...	...	4,632 3,664 3	8,299	8,299	2,734
<b>LEICHHARDT.</b>													
James-street	...	162	...	...	...	...	...	...	...	489	489		
William-street	...	20	...	...	...	...	...	...	...	58	58		
Charles-street	...	76	...	...	...	...	...	...	...	228	228		
Collins-street	...	...	43	...	...	...	...	...	...	130	130		
Short-street	...	...	2	...	...	...	...	...	...	9	9		
Wetherill-street	...	...	2	...	...	...	...	...	...	9	9		
Francis-street	...	...	76	...	...	...	...	...	...	230	230		
Booth-street	...	...	142	...	...	...	...	...	...	432	432		
Do	...	2	...	...	...	...	...	...	...	8	8	440	
Norton-street	...	...	341	...	...	...	...	...	...	1,057	1,057	1,060	
Do	...	...	...	1	...	...	...	...	...	3	3		
Johnston-street	...	...	...	407	...	...	...	...	...	1,239	1,239		
Do	...	...	18	...	...	...	...	...	...	48	48	1,291	
Do	...	2	...	...	...	...	...	...	...	4	4		
George-street	...	35	...	...	...	...	...	...	...	108	108		
Cromwell-street	...	149	...	...	...	...	...	...	...	455	455		
Commercial Road	...	76	...	...	...	...	...	...	...	222	222		
Church-street	...	54	...	...	...	...	...	...	...	160	160		
White-street	...	33	...	...	...	...	...	...	...	100	100		
Brennan-street	...	42	...	...	...	...	...	...	...	128	128		
Gladstone-street	...	44	...	...	...	...	...	...	...	134	134		
Percival-street	...	29	...	...	...	...	...	...	...	88	88		
William-street	...	...	42	...	...	...	...	...	...	132	132	137	
Do	...	1	...	...	...	...	...	...	...	5	5		
Hubert-street	...	146	...	...	...	...	...	...	...	441	441		
Total for year	{	871	...	666	...	408	...	...	...	2,628 2,047 1,242	5,917	5,917	1,945
<b>MACDONALD TOWN.</b>													
Bray-street	...	62	...	...	...	...	...	...	...	190	190		
M'Donald-street	...	169	...	...	...	...	...	...	...	513	513		
Bridge-street	...	26	...	...	...	...	...	...	...	83	83		
Lambert-street	...	25	...	...	...	...	...	...	...	78	78		
Total for year	...	282	...	...	...	...	...	...	...	864	864	864	282
<b>MARRICKVILLE.</b>													
Meeks Road	...	...	254	...	...	...	...	...	...	770	770	1,114	
Do	...	113	...	...	...	...	...	...	...	844	844		
Harriette-street	...	77	...	...	...	...	...	...	...	234	234		
Yule-street	...	142	...	...	...	...	...	...	...	429	429		
Marrickville Road	...	9	...	...	...	...	...	...	...	36	36		
Do	...	...	1181	...	...	...	...	...	...	3,545	3,545	5,379	
Do	...	...	...	6	...	...	...	...	...	19	19		
Do	...	...	...	...	11	...	...	...	...	49	49		
Do	...	...	...	...	...	454	...	...	...	1,730	1,730		
Way-street	...	89	...	...	...	...	...	...	...	270	270		
Toyer-street	...	38	...	...	...	...	...	...	...	115	115		
Bridge-street	...	61	...	...	...	...	...	...	...	181	181		
Thompson-street	...	63	...	...	...	...	...	...	...	195	195		
Albert-street	...	93	...	...	...	...	...	...	...	285	285		
Sydenham Road	...	2	...	...	...	...	...	...	...	9	9		
Do	...	...	153	...	...	...	...	...	...	465	465	477	
Do	...	...	...	1	...	...	...	...	...	3	3		
Silver-street	...	137	...	...	...	...	...	...	...	401	401		
Harrington-street	...	30	...	...	...	...	...	...	...	91	91		
Allan-street	...	55	...	...	...	...	...	...	...	172	172		
Railway Avenue	...	103	...	...	...	...	...	...	...	310	310		
Frazer-street	...	171	...	...	...	...	...	...	...	519	519		
Bishop-street	...	93	...	...	...	...	...	...	...	276	276		
Jones-street	...	4	...	...	...	...	...	...	...	12	12		
Do	...	...	88	...	...	...	...	...	...	267	267	279	
Illawarra Road	...	...	143	...	...	...	...	...	...	426	426		
Do	...	7	...	...	...	...	...	...	...	19	19	445	
Wardell Road	...	9	...	...	...	...	...	...	...	22	22		
Do	...	...	284	...	...	...	...	...	...	857	857	879	
Livingstone Road	...	...	12	...	...	...	...	...	...	45	45		
Do	...	23	...	...	...	...	...	...	...	65	65		
Do	...	...	...	293	...	...	...	...	...	859	859	1,959	
Do	...	...	...	...	262	...	...	...	...	960	960		

MAINS LAID, 1889—continued.

District and Street.	No. and Size of Pipes.									Length of each size.	Length of main.	Total length for district.	Total No. of pipes for district.
	3"	4"	6"	9"	12"	15"	18"	20"	24"				
<b>MARRICKVILLE—continued.</b>													
Gordon-street .....		113								yds. 344	yds. 344		
Robert-street .....		125								374	374		
Horton-street .....		105								320	320		
Maria-street .....		26								78	78		
Thomas-street .....		1								3	3		
Francis-street .....		74								227	227		
Petersham Road .....		44								135	135		
Total for year .....		1797	2115	300	11	716				5,466 6,375 911 49 2,690	15,491	15,491	4,939
<b>NEWTOWN.</b>													
Georgina-street .....		32								104	104		
London-street .....		47								145	145		
Holdsforth-street .....		56								173	173		
Wells-street .....		13								47	723		
Do .....			225							676			
Pine-street .....		60								183	183		
Leamington Avenue .....		57								171	171		
Charles-street .....		61								190	190		
Augustus-street .....		60								181	181		
Gladstone-street .....		52								163	163		
Sloano-street .....		48								153	153		
Margaret-street .....		44								138	138		
Kent-street .....		70								216	216		
Fullham-street .....		51								157	157		
Simmons-street .....		62								193	193		
Binning-street .....		18								56	56		
Ashmore-street .....		74								225	225		
Randal-street .....		31								94	94		
John-street .....			68							205	205		
Keig-street .....		49								153	153		
Total for year .....		885	293							2,742 881	3,623	3,623	1,178
<b>PADDINGTON.</b>													
Begg-street .....								18		75	75		
Liverpool-street .....								100		404	404		
Glenmore Road .....		1								6	1,517		
Do .....			8							26			
Do .....				21						71			
Do .....					13					29			
Do .....								52		203			
Do .....						327				1,182			
New South Head Road .....			3							6	574		
Do .....				9						30			
Do .....						149				538			
Leinster-street .....		126								381	381		
Oxford-street .....		2								8	873		
Do .....			281							865			
Total for year .....		129	292	30	13	476		152	18	395 897 101 29 1,720 607 75	3,824	3,824	1,110
<b>PETERSHAM.</b>													
Canterbury New Road .....			2							3	569		
Do .....				106						439			
Do .....					2					20			
Do .....						22				89			
Do .....								3		18			
Albert-street .....		58								178	178		
Morgan-street .....		3								10	10		
Railway Avenue .....			211							644	644		
Surry-street .....		32								97	97		
Warwick-street .....		47								142	142		
Rowley-street .....		63								191	191		
Durham-street .....		60								183	183		
Lincoln-street .....		97								294	294		
Temple-street .....		62								191	191		
Railway-street .....		10								32	203		
Do .....			56							171			
St. John's-street .....		72								221	221		
Toothill-street .....			142							429	429		
Canterbury Old Road .....			55							164	164		
Maddock-street .....		57								176	176		
Norwood-street .....		32								99	99		

MAINS LAID, 1889—continued.

District and Street.	No. and Size of Pipes.									Length of each size.	Length of Main.	Total length for district.	Total No. of pipes for district.
	3"	4"	6"	9"	12"	15"	18"	20"	24"				
<b>PETERSHAM—continued.</b>													
Railway Crescent		98								yds. 310			
Do			5							15	326		
Do				1						1			
Crystal-street							248	(21")		1,019	1,050		
Do								1		31			
Thomas street		78								239	239		
Sadlier's Crescent		80								247	247		
Total for year		849	471	1	106	2	270	4		2,610 1,426 1 439 20 1,108 49	5,653	5,653	1,703
<b>PROSPECT-SHERWOOD.</b>													
Sydney Road			118							356	358		
Do					1					2			
Total for year			118		1					356 2	358	358	119
<b>RANDWICK.</b>													
Beach-street			286							865	865		
Fish-street		63								183	183		
Fern-street		88								266	266		
Centennial Park			19							48			
Do				6						19	2,598		
Do					1					2			
Do						640				2,529			
Avoca-street		6								18	537		
Do			172							519			
Carrington Road			6							18	654		
Do				206						636			
Allison Road		1								1			
Do			1							3	337		
Do				104						314			
Do					4					19			
St. Mark's-street		68								210			
Do			1							4	872		
Do				1						3			
Do					166					655			
Oberon-street		138								393	393		
Judge-street		94								284	288		
Wilham-street		29								88	88		
Oswald-street		16								53	53		
Do													
Boundary-street		144								438	438		
Bourke-street			54							164	164		
Arden-street			89							273	356		
Do			27							83			
Total for year		676	628	317	171	640				2,021 1,894 972 676 2,529	8,092	8,092	2,432
<b>REDFERN.</b>													
Boronia-street		124								378	378		
Baptist-street		39								115	115		
Marriott-street		51								156	156		
Victoria-street		25								77	77		
Short-street		23								77	77		
Marriott-lane		35								169	169		
Edward-street		121								371	371		
Total for year		418								1,283	1,283	1,283	418
<b>ROCKDALE.</b>													
Arncliffe-street			50							152	152		
Rocky Point Road		20								63			
Do			24							65	5,148		
Do				335						1,014			
Do					987					4,006			
Total for year		20	74	335	987					63 217 1,014 4,006	5,300	5,300	1,416



## MAINS LAID, 1889—continued.

District and Street.	No. and Size of Pipes.									Length of each size.	Length of main.	Total length for district.	Total No. of pipes for district.	
	3"	4"	6"	9"	12"	15"	18"	20"	24"					
<b>STRATHFIELD—continued.</b>											yds.	yds.	yds.	
Bennett-street	...	...	41	...	...	...	...	...	...	123	123			
Kingsland-street	...	50	...	...	...	...	...	...	...	153	153			
Highgate-street	...	76	...	...	...	...	...	...	...	226	226			
Fairholm-street	...	156	...	...	...	...	...	...	...	466	466			
Bushy Hill-street	...	49	...	...	...	...	...	...	...	149	149			
Clarendon-street	...	98	...	...	...	...	...	...	...	303	305			
Do	...	...	1	...	...	...	...	...	2					
Alviston-street	...	53	...	...	...	...	...	...	...	158	158			
Total for year	{	890	...	...	...	...	...	...	...	2,685	4,304	4,304	1,426	
		...	536	...	...	...	...	...	...	1,619				
<b>VICTORIA.</b>														
Lighthouse-street	...	31	...	...	...	...	...	...	...	96	96			
Alma-street	...	40	...	...	...	...	...	...	...	120	120			
Flagstaff View-street	...	17	...	...	...	...	...	...	...	51	51			
William-street	...	...	1	...	...	...	...	...	...	3	405			
Do	...	...	...	133	...	...	...	...	...	402				
Thomas-street	...	87	...	...	...	...	...	...	...	262	262			
Elizabeth-street	...	30	...	...	...	...	...	...	...	92	92			
Bank-street	...	147	...	...	...	...	...	...	...	447	447			
Dumbarton-street	...	47	...	...	...	...	...	...	...	142	142			
Webb-street	...	32	...	...	...	...	...	...	...	96	96			
Chuter-street	...	69	...	...	...	...	...	...	...	207	207			
Bank-lane	...	14	...	...	...	...	...	...	...	43	43			
Euroku-street	...	120	...	...	...	...	...	...	...	367	367			
Mount-street	...	24	...	...	...	...	...	...	...	74	74			
Total for year	{	658	...	...	...	...	...	...	...	1,997	2,402	2,402	792	
		...	1	...	...	...	...	...	...	3				
		...	...	133	...	...	...	...	...	402				
<b>WATERLOO.</b>														
Bourke-street	...	...	236	...	...	...	...	...	...	710	710			
Lachlan-street	...	...	143	...	...	...	...	...	...	437	437			
Victoria-lane	...	29	...	...	...	...	...	...	...	90	90			
Kellick-street	...	71	...	...	...	...	...	...	...	205	205			
Gibson-street	...	31	...	...	...	...	...	...	...	90	90			
Bruce-street	...	23	...	...	...	...	...	...	...	70	70			
Amelia-street	...	46	...	...	...	...	...	...	...	140	140			
Murray-street	...	49	...	...	...	...	...	...	...	149	149			
Taylor-street	...	19	...	...	...	...	...	...	...	60	60			
Prince's Avenue	...	51	...	...	...	...	...	...	...	157	157			
Total for year	{	319	...	...	...	...	...	...	...	961	2,108	2,108	698	
		...	379	...	...	...	...	...	...	1,147				
<b>WAVERLEY.</b>														
Birrell-street	...	20	...	...	...	...	...	...	...	81	688			
Do	...	...	198	...	...	...	...	...	...	607				
Total for year	{	20	...	...	...	...	...	...	...	81	688	688	218	
		...	198	...	...	...	...	...	...	607				
<b>WOOLLAMRA.</b>														
Wolsley Road	...	95	...	...	...	...	...	...	...	287	916			
Do	...	...	208	...	...	...	...	...	...	629				
Stanley-street	...	50	...	...	...	...	...	...	...	153	153			
Saber-lane	...	35	...	...	...	...	...	...	...	108	108			
Reservoir	...	...	...	...	13	...	...	...	...	39	39			
Nelson-street	...	...	52	...	...	...	...	...	...	156	156			
Grafton-street	...	146	...	...	...	...	...	...	...	416	416			
Darling Point Road	...	4	...	...	...	...	...	...	...	16	1,467			
Do	...	...	477	...	...	...	...	...	...	1,451				
Total for year	{	330	...	...	...	...	...	...	...	980	3,255	3,255	1,080	
		...	737	...	...	...	...	...	...	2,236				
		...	...	...	13	...	...	...	...	39				

## List of Mains Cleaned during the year 1889.

District and Street.	Length of each Size.					Length of Main.	Total length for district.	
	3"	4"	6"	9"	12"			
CITY.							yds.	yds.
Washington-street .....	.....	196	.....	.....	.....	196		
James-street .....	51	.....	.....	.....	.....	51		
Victoria-place .....	90	.....	.....	.....	.....	90		
Victoria-lane .....	57	.....	.....	.....	.....	57		
Wilton-lane .....	37	.....	.....	.....	.....	37		
Jenkin-street .....	66	118	.....	.....	.....	184		
Gas-lane .....	40	.....	.....	.....	.....	40		
Darcy-street .....	68	.....	.....	.....	.....	68		
Fitzroy-street .....	.....	165	.....	.....	.....	165		
Shepherd-street .....	.....	144	.....	.....	.....	144		
Domain-street .....	255	.....	.....	.....	.....	255		
Rose-street .....	.....	152	137	.....	.....	289		
Nucleay-street .....	.....	.....	.....	57	.....	57		
Total for year .....	664	775	137	57	.....	1,633	1,633	
DARLINGTON.								
Cleveland-street .....	.....	17	140	.....	.....	157		
Newtown Road .....	.....	528	.....	.....	.....	528		
Darlington Road .....	.....	650	.....	.....	.....	650		
Codrington-street .....	.....	361	.....	.....	.....	361		
Raglan-street .....	142	130	.....	.....	.....	272		
Alma-street .....	.....	309	.....	.....	.....	309		
Ivy-street .....	.....	221	.....	.....	.....	221		
M'Donald-lane .....	112	.....	.....	.....	.....	112		
Rose-street .....	.....	749	.....	.....	.....	749		
Deane-street .....	123	.....	.....	.....	.....	123		
Shepherd-street .....	.....	406	.....	.....	.....	406		
Vine-street .....	.....	110	.....	.....	.....	110		
Total for year .....	377	3,481	140	.....	.....	3,998	3,998	
PADDINGTON.								
Oxford-street .....	.....	408	.....	.....	.....	408		
Total for year .....	.....	408	.....	.....	.....	408	408	
REDFERN.								
Bourke-street .....	.....	228	416	.....	.....	644		
Little Cleveland-street .....	189	.....	.....	.....	.....	189		
Hill-street .....	.....	111	.....	.....	.....	111		
Bellevue-street .....	.....	145	.....	.....	.....	145		
Cleveland-street .....	.....	1,029	.....	500	174	1,703		
Elizabeth-street .....	.....	802	385	.....	.....	1,187		
Stanley-lane .....	.....	32	.....	.....	.....	32		
Young-street .....	.....	648	.....	.....	.....	648		
Cooper-street .....	.....	293	.....	.....	.....	293		
James-street .....	262	38	.....	.....	.....	300		
Contre-street .....	.....	109	.....	.....	.....	109		
Redfern-street .....	.....	936	443	.....	.....	1,379		
Alderson-street .....	.....	172	.....	.....	.....	172		
Kettle-street .....	.....	58	.....	.....	.....	58		
Walker-street .....	.....	524	.....	.....	.....	524		
Phillip-street .....	.....	150	.....	.....	.....	150		
Moorehead-street .....	.....	646	.....	.....	.....	646		
Buckingham-street .....	.....	383	.....	.....	.....	383		
Castlereagh-street .....	.....	291	402	.....	.....	693		
Pitt-street .....	40	251	504	.....	.....	795		
Wells-street .....	.....	668	.....	.....	.....	668		
Burnett-street .....	.....	242	.....	.....	.....	242		
George-street .....	9	181	594	.....	.....	784		
Turner-street .....	231	15	.....	.....	.....	246		
Douglas-street .....	.....	272	.....	.....	.....	272		
Bullnaming-street .....	.....	389	400	.....	.....	789		
Albert-street .....	.....	140	.....	.....	.....	140		
Stirling-street .....	73	.....	.....	.....	.....	73		
Woodburn-street .....	.....	95	.....	.....	.....	95		
Holden-street .....	43	.....	.....	.....	.....	43		
Eveleigh-street .....	174	445	.....	.....	.....	619		
Caroline-street .....	156	.....	.....	.....	.....	156		
Botany-street .....	.....	346	.....	.....	.....	346		
Regent-street .....	.....	.....	364	.....	.....	364		
Marion-street .....	.....	108	154	.....	.....	262		
Roschill-street .....	.....	365	.....	.....	.....	365		
Hugo-street .....	182	.....	.....	.....	.....	182		
Lewis-street .....	66	.....	.....	.....	.....	66		
Olive-street .....	.....	154	.....	.....	.....	154		
Abercrombie-street .....	.....	415	.....	.....	.....	415		
Cornwallis-street .....	.....	228	.....	.....	.....	228		
Vine-street .....	.....	193	.....	.....	.....	193		
Edward-street .....	.....	198	.....	.....	.....	198		
Thomas-street .....	.....	125	.....	.....	.....	125		
Ivy-street .....	.....	229	.....	.....	.....	229		
Calder Road .....	.....	134	.....	.....	.....	134		
Codrington-street .....	.....	77	.....	.....	.....	77		
Wilson-street .....	.....	842	.....	.....	.....	842		
Total for year .....	1,425	12,707	3,662	500	174	18,468	18,468	

## List of Mains Cleaned during the year 1889—continued.

District and Street.	Length of each Size.					Length of Main.	Total length of district.
	3"	4"	6"	9"	12"		
<b>WATERLOO.</b>							
Pitt-street .....		334	..	.....	.....	yds. 334	yds.
Total for year.....		334	..	.....	.....	334	334
<b>WOOLLAHRA.</b>							
Darling Point Road .....		1,593	..	.....	.....	1,593	
Yarrunabbe Road .....		735	..	.....	.....	735	
Thornton-street .....		299	..	.....	.....	299	
New South Head Road.....		268	..	.....	.....	268	
Ocean-street .....		282	..	.....	.....	282	
Holt-street .....		177	..	.....	.....	177	
Henrietta-street .....		117	..	.....	.....	117	
Cooper-street .....		128	..	.....	.....	128	
Annandale-street .....		192	..	.....	.....	192	
Upper William-street .....		114	..	.....	.....	114	
Branch Road .....		231	..	.....	.....	231	
South-street .....		80	..	.....	.....	80	
Total for year .....	306	3,910	.....	.....	.....	4,216	4,216

## MAINS REMOVED, 1889.

District and Street.	No. of yards for each size removed.				
	3"	4"	6"	9"	12"
<b>CITY.</b>					
Elizabeth-street .....			yds. 1,217	yds.	yds.
Wylde-street.....			165	.....	.....
Macleay-street .....			.....	214	.....
Athlone-place .....			193	.....	.....
			1,575	214	.....
			1,789 yards.		
<b>MARRICKVILLE.</b>					
Livingstone-street .....					371

Grand Total for City and Suburbs, 2,160 yards (1 mile 400 yards).

## REPAIRS, 1889.

District.	No. in each district.	District.	No. in each district.
Alexandria .....	1	Paddington .....	8
Ashfield .....	3	Petersham .....	2
Balmain .....	1	Randwick .....	2
Burwood.....	1	Redfern .....	8
Camperdown .....	2	St. Leonards .....	6
City.....	48	St. Peters .....	4
Concord .....	1	Waterloo and Botany .....	7
Glebe .....	11	Waverley .....	3
Leichhardt .....	1	Woollahra .....	6
Macdonaldtown.....	1		
Marrickville .....	4		
Newtown .....	3	Total .....	123

## PRIVATE WORKS (inserting branches for large services, &amp;c), paid for by Consumers and others, 1889.

District.	No. in each district.	District.	No. in each district.
Ashfield .....	1	Paddington .....	12
Balmain .....	4	Petersham .....	1
Botany .....	1	Randwick .....	2
Camperdown .....	1	Redfern .....	3
Canterbury.....	1	St. Leonards .....	2
City.....	46	Waverley .....	2
Leichhardt .....	4	Woollahra .....	1
Newtown .....	3		
Macdonaldtown.....	1	Total for year.....	90
Marrickville .....	5		

District.	No. of Inspections.	Re-inspections of Premises where Notices had been served.		Total number of Inspections and Re-inspections.	Notices Served.										No. of Verdicts obtained for Non-payment of Fecs.	Amount of Fines.
		To pay Special Fecs.	To abate Waste.		For Pollution.			To pay Special Fecs.		To fix Meters.			To abate Waste.	Total Notices Served.		
					Baths.	Urinals.	Sinks.	Stock.	Gardens.	Bakeries.	Engines.	Sundries.				
<b>THE CITY.</b>																
Brisbane Ward .....	1,461	133	67	1,661	2	31	.....	70	1	1	18	1	49	173	2	£ s. d.
Bourke Ward .....	1,086	31	15	1,132	5	3	.....	22	1	.....	1	6	13	51	1	1 0 0
Cook Ward .....	5,410	546	139	6,095	.....	.....	.....	319	.....	2	.....	2	139	462	7	0 5 0
Denison Ward .....	3,547	312	60	3,919	.....	.....	.....	172	.....	2	1	1	53	229	.....	4 0 0
Fitzroy Ward .....	3,454	216	109	3,779	7	5	.....	176	10	.....	.....	.....	102	300	3	.....
Gipps Ward .....	1,699	73	96	1,868	.....	8	.....	48	4	.....	3	5	104	172	.....	0 15 0
Macquarie Ward.....	2,403	113	40	2,556	1	1	.....	87	2	4	9	1	39	144	13	.....
Phillip Ward .....	2,418	96	265	2,779	.....	.....	.....	71	20	2	1	1	241	336	3	5 2 6
<b>Total City .....</b>	<b>21,478</b>	<b>1,520</b>	<b>791</b>	<b>23,789</b>	<b>15</b>	<b>48</b>	<b>.....</b>	<b>965</b>	<b>38</b>	<b>11</b>	<b>33</b>	<b>17</b>	<b>740</b>	<b>1,867</b>	<b>29</b>	<b>12 12 6</b>
<b>THE SUBURBS.</b>																
Alexandria .....	1,421	261	89	1,771	.....	.....	12	115	.....	.....	.....	1	90	218	.....	.....
Ashfield .....	1,930	5	1	1,945	.....	.....	.....	12	.....	.....	.....	.....	1	13	.....	.....
Balmain .....	4,804	375	60	5,239	.....	.....	.....	263	19	5	1	1	58	347	7	5 11 0
Burwood .....	1,178	83	12	1,273	.....	.....	.....	44	.....	.....	.....	2	12	58	6	2 15 0
Camperdown .....	1,274	47	9	1,330	.....	.....	.....	116	.....	.....	2	1	14	133	.....	.....
Concord .....	231	.....	.....	231	.....	.....	.....	2	.....	.....	.....	.....	.....	2	.....	.....
Darlington .....	750	150	33	933	.....	.....	.....	75	.....	.....	.....	.....	33	108	1	0 10 0
Glebe .....	3,125	520	63	3,711	.....	.....	.....	284	4	3	.....	1	66	358	.....	.....
East St. Leonards .....	1,098	30	5	1,133	.....	.....	.....	13	.....	.....	.....	.....	5	18	1	0 10 0
Leichhardt .....	3,193	408	47	3,648	.....	.....	.....	298	1	5	3	.....	47	354	.....	.....
Macdonaldtown .....	1,175	154	9	1,338	.....	.....	2	83	.....	.....	.....	.....	9	94	.....	.....
Marrickville .....	2,428	209	26	2,663	.....	.....	.....	146	9	3	.....	1	25	184	8	5 1 0
Newtown .....	3,749	542	45	4,336	.....	.....	2	302	1	2	2	1	45	355	6	2 15 0
Paddington .....	3,512	415	82	4,000	.....	.....	.....	266	12	2	1	5	81	367	5	1 12 6
Petersham .....	1,526	41	15	1,582	.....	.....	.....	48	11	.....	.....	2	30	91	4	1 15 0
Randwick .....	634	110	8	802	.....	1	.....	49	5	.....	2	6	8	71	.....	.....
Redfern .....	3,642	573	71	4,286	.....	.....	.....	255	5	5	1	2	71	339	5	2 10 0
St. Peters .....	623	70	3	701	.....	.....	.....	52	2	.....	.....	.....	3	57	1	1 0 0
St. Leonards .....	1,017	9	1	1,027	.....	.....	.....	5	1	.....	.....	1	1	8	.....	.....
Strathfield .....	294	.....	.....	294	.....	.....	.....	7	.....	.....	.....	.....	4	11	.....	.....
Victoria .....	659	10	.....	669	.....	.....	.....	6	.....	.....	.....	.....	.....	6	.....	.....
Waterloo .....	1,819	314	76	2,209	.....	28	.....	176	2	2	1	.....	76	285	5	2 10 0
Waverley .....	1,495	156	11	1,662	.....	.....	.....	83	.....	4	.....	1	11	99	1	0 10 0
Woollahra .....	1,716	227	13	1,956	.....	.....	.....	152	34	.....	.....	4	13	203	6	4 17 0
<b>Total Suburbs.....</b>	<b>43,357</b>	<b>4,709</b>	<b>682</b>	<b>48,743</b>	<b>.....</b>	<b>1</b>	<b>44</b>	<b>2,852</b>	<b>106</b>	<b>31</b>	<b>13</b>	<b>29</b>	<b>703</b>	<b>3,779</b>	<b>56</b>	<b>31 16 6</b>
<b>Grand Total, City and Suburbs</b>	<b>64,835</b>	<b>6,229</b>	<b>1,473</b>	<b>72,537</b>	<b>15</b>	<b>49</b>	<b>44</b>	<b>3,317</b>	<b>144</b>	<b>42</b>	<b>46</b>	<b>46</b>	<b>1,443</b>	<b>5,646</b>	<b>85</b>	<b>41 9 0</b>

LEAKS and Defective Services shut off to prevent waste of water.

District.	Number of defective services and leaks.	District.	Number of defective services and leaks.
Alexandria .....	52	Paddington .....	94
Balmain .....	3	Petersham .....	3
Camperdown .....	29	Randwick .....	2
City .....	1,290	Redfern .....	276
Darlington .....	43	Victoria .....	6
East St. Leonards .....	24	Waterloo .....	69
Glebe .....	146	Waverley .....	14
Leichhardt .....	5	Woollahra .....	22
Newtown .....	8		
Marrickville .....	6	Total .....	2,090

METERS, 1889.

NEW Meters tested before connection, and Old Meters disconnected for adjustment.

Name of Manufacturer.	1"		2"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"		Totals.	
	New.	Old.	New.	Old.	New.	Old.	New.	Old.	New.	Old.	New.	Old.	New.	Old.	New.	Old.	New.	Old.	New.	Old.	New.	Old.
J. Tyler & Son .....	118	293	18	2	1	3	1	3	1	6	1	2	1	1	1	1	1	1	1	438	94	
Siemens & Halsh .....	10	234	6	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	244	13	
Guest & Ghirimes .....	2	142	27	2	4	3	3	3	1	2	2	2	2	2	2	2	2	2	2	188	73	
D. R. & Droop .....	4	106	18	3	3	1	1	1	1	5	3	4	4	4	4	4	4	4	4	144	41	
John Danks & Son .....	1	52	30	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	51	5	
Laidlaw & Son .....	5	23	4	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	36	7	
Davies & Shepherd .....	1	30	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	32	4	
Meinckie & Breslund .....	1	29	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	31	1	
Devrance & Co. .....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	
Total, New .....	142	909	72	8	6	3	11	6	7	14	3	14	3	1	1	1	1	1	1	1165	239	
"    Old .....	10	121	40	24	11	3	10	3	14	3	14	3	1	1	1	1	1	1	1	239	1	
Grand Total .....																					1404	

RETURN of Gas-engines and Water-troughs connected to the Water-mains in the City and Suburbs during the year ending 31st December, 1889.

District.	Gas-engines.	Water-troughs.	District.	Gas-engines.	Water-troughs.
Bourke Ward .....	5	.....	Darlington .....	.....	2
Brisbane Ward .....	18	.....	Five Dock .....	.....	1
Denison Ward .....	3	.....	Forest Lodge .....	.....	1
Gipps Ward .....	3	.....	Granville .....	.....	1*
Macquarie Ward .....	2	1	Leichhardt .....	.....	2
Phillip Ward .....	1	.....	Newtown .....	2	2
Total City .....	32	1	Petersham .....	1	2
Alexandria .....	.....	3	Randwick .....	.....	1
Ashfield .....	.....	2	St. Leonards .....	.....	5
Balmain .....	2	5	St. Peters .....	.....	1
Burwood .....	.....	1	Waterloo .....	.....	3
Camperdown .....	.....	4	Woollahra .....	.....	3
Concord .....	.....	1	Total Suburbs .....	5	40
			Total City and Suburbs..	37	41

NUMBER of Gully-shafts to which water was laid on during the year 1889.

Cook Ward .....	6	Phillip Ward .....	7
Denison Ward .....	16	Redfern .....	29
Fitzroy Ward .....	14		
Gipps Ward .....	3	Total .....	78
Macquarie Ward .....	3		

## RETURN of Main Drillings and Extensions in the City and Suburbs for the year ending 31st December, 1889.

District.	Drillings	Extensions.	District.	Drillings.	Extensions.
Bourke Ward .....	23	5	Garden Island .....	4	.....
Brisbane Ward .....	21	2	Guildford .....	5	.....
Cook Ward .....	116	15	Granville .....	19	1
Denison Ward .....	70	7	Leichhardt .....	308	57
Fitzroy Ward .....	108	12	Macdonaldtown .....	18	2
Gipps Ward .....	29	8	Marrckville .....	298	52
Macquarie Ward .....	37	5	Newtown .....	192	46
Phillip Ward .....	59	5	Paddington .....	104	30
Total City .....	463	59	Petersham .....	179	37
Ashfield .....	488	25	Randwick .....	82	24
Alexandria .....	57	3	Redfern .....	136	28
Balmain .....	266	45	Rockdale .....	13	.....
Burwood .....	177	20	St. Leonards .....	367	28
Camperdown .....	42	9	St. Peters .....	135	8
Concord .....	19	3	Strathfield .....	68	6
Campbelltown .....	36	1	Victoria .....	92	5
Darlington .....	14	6	Waterloo .....	65	6
Infield .....	9	.....	Waverley .....	158	40
Five Dock .....	5	.....	Woolahra .....	98	20
Glebe .....	73	23	Total Suburbs .....	3,527	525
			Total City and Suburbs .....	3,990	584

D. C. ROBERTSON,  
Inspector.

## RETURNS, Assessor's Branch, Water Supply and Sewerage Department, for the year ending 31st December, 1889.

No. of	Description.	Nos.
No. of	Rate Notices delivered .....	131,655
"	Entries of New Assessments made .....	4,273
"	Properties assessed by this Branch .....	3,783
"	New Assessment Notices delivered .....	1,566
"	Properties visited to ascertain if liable through New Mains .....	6,000
"	New Mains Notices delivered .....	4,089
"	Final Notices delivered for recovery of rates .....	13,700
"	Accounts for rates made out and delivered .....	4,860
"	Summonses issued .....	2,610
"	Accounts sent to Board's Solicitor for recovery .....	82
"	Horses for which fees were paid .....	4,709
"	Cows .....	379
"	Applications for gardens .....	419
"	Suburban Municipal Councils' Assessments which have been transcribed by this Branch .....	103,088

HERBERT J. BEAUMONT,  
Assessor.

1st February, 1890.

[One Diagram.]

1890.

NEW SOUTH WALES.

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PARLIAMENTARY STANDING COMMITTEE ON  
PUBLIC WORKS.

---

R E P O R T

TOGETHER WITH

MINUTES OF EVIDENCE, APPENDICES, AND PLANS,

RELATING TO THE

PROPOSED OFFICES

FOR

BOARD OF WATER SUPPLY AND  
SEWERAGE.

---

Presented to Parliament in accordance with the provisions of the Public Works Act,  
51 Vic. No. 37, section 8.

---

SYDNEY: CHARLES POTTER, GOVERNMENT PRINTER.

22—A

1890.

[1s. 9d.]



## MEMBERS OF THE COMMITTEE.

## LEGISLATIVE COUNCIL.

The Honorable JOHN LACKEY, Vice-Chairman.  
 The Honorable ANDREW GARRAN.  
 The Honorable FREDERICK THOMAS HUMPHERY.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 The Honorable GEORGE HENRY COX.

## LEGISLATIVE ASSEMBLY.

JOSEPH PALMER ABBOTT, Esquire, Chairman.  
 JACOB GARRARD, Esquire.  
 HENRY COPELAND, Esquire.  
 JAMES EBENEZER TONKIN, Esquire.  
 WILLIAM SPRINGTHORPE DOWEL, Esquire.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.  
 CHARLES ALFRED LEE, Esquire.

## GENERAL INDEX.

Report by the Committee.  
 Minutes of Evidence taken by the Committee.  
 Appendix.  
 Plans.

## LIST OF WITNESSES.

	PAGE.
Joseph Barling, Esq., Under Secretary for Public Works .....	7-8
Thomas Rowe, Esq., President of the Board of Water Supply and Sewerage .....	8-10
Reginald Bloxsome, Esq., Secretary, Board of Water Supply and Sewerage .....	11

## APPENDIX.

List of Properties resumed by the Government in the City of Sydney .....	A
List of Resumed Properties in the hands of the Government Collector .....	B

## PLANS.

- Plan I.—Proposed new offices of the Board of Water Supply and Sewerage, showing elevation to Pitt-street and Transverse Section.  
 Plan II.—Plan of Basement and Plan of Ground Floor.  
 Plan III.—Plan of First and Second Floors.  
 Plan IV.—Plan of Third and Fourth Floors.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

OFFICES FOR BOARD OF WATER SUPPLY AND SEWERAGE.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, appointed during the first Session of the present Parliament, under the Public Works Act of 1888, 51 Vic. No. 37, and the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, to whom was referred the duty of considering and reporting upon "the expediency of erecting Offices for the accommodation of the Board of Water Supply and Sewerage," have, after due inquiry, resolved that it is expedient the work should be carried out; and, in accordance with the provision of sub-section IV of clause 13 of the Public Works Act, report their resolution to the Legislative Assembly:—

1. It is proposed that the new offices shall be built on a piece of land, having a frontage of 70 or 75 feet, at the corner of Pitt-street and Wilmot-street, with a lane at the rear; and the cost of the building and the site is estimated at £50,000,—£30,000 for the building, £17,000 for the land, and £3,000 for incidental expenses and fittings. The plans, which will be found published with this report, show the style of the building it is proposed to erect, and the accommodation it is intended to provide. This accommodation, according to the evidence given before the Committee, will be ample for the carrying on of the office work of the Board; and the situation of the building, it is urged, will be central and convenient to the public.

Description of  
the proposed  
new offices.

2. At the time the Board of Water Supply and Sewerage commenced their duties under the Act which brought them into existence, premises were found for them in the offices at the end of the Circular Quay, previously occupied by the A.S.N. Co., and for some time they remained there. The position, however, was found to be exceedingly inconvenient to the public, and, as on the transfer of the Sewerage Works to the Board the accommodation was found insufficient, it became necessary that other and more suitable premises should be obtained. Representations were made to the Minister for Works on the subject, and an attempt was made by the Minister to rent other offices for the Board, but at that time no offices suitable for the purpose could be found, and it was eventually determined to invite Parliament to sanction the building of new offices. The preparation of the necessary plans was placed in the hands of the President of the Board, that course being regarded, apparently, as one more likely to result in the new building meeting requirements than if the work were in the ordinary way handed over to the Colonial Architect, and the Committee are informed that the plans, as prepared, provide for every necessity without being extravagant. In the meantime the Board, finding the inconvenience and unsuitableness of the offices at the Circular Quay becoming much greater as the operations of the Board increased, secured a lease for a year and a half of offices in Pitt-street, near the School of Arts, and it is proposed to remain there until the new offices shall have been built.

Reasons why  
new offices are  
considered  
necessary.

Questions that arise in connection with the proposal.

3. In the consideration of this matter some important questions arise, and to these the Committee have given attention. Admitting the inconvenience of the Board's carrying on its operations in offices at the Circular Quay, it does not at first sight appear that the most advantageous change to make is to build expensive new offices and remove into them. It does not, until after careful inquiry, seem unreasonable to think, in view of the large number of suites of offices to let in Sydney, that a more economical and at the same time satisfactory plan would be to rent some centrally-situated premises rather than to build. In a similar way it would appear that instead of spending £50,000 on large new offices it would be better if the offices first occupied by the Board, which are the property of the Government, were retained as the Board's headquarters; and to meet the convenience of the public a number of small branch offices, for the receipt of rates and other business carried on by the Board, were opened in central parts of the city and the suburbs. Another question necessary to consider is whether the Government or the Board is to pay the cost of the proposed new offices if they should be erected. Each of these matters is dealt with in the evidence.

Obligation on the Government to provide accommodation.

4. In the first place, by the 29th Clause of the Metropolitan Water and Sewerage Act of 1880, the obligation is imposed on the Government of providing accommodation for the Board, and, in pursuance of this, accommodation was found for the Board in the offices which had been occupied by the A. S. N. Co., and is now being sought in the proposed erection of new offices.

Interest on the cost of the new building not greater than the rent now paid.

5. For the use of the A. S. N. Co.'s offices the Board paid the Government rent at the rate of £1,500 a year, and to have obtained additional premises when the accommodation in the A. S. N. Co.'s offices became deficient would have increased the rental to £2,000, and, in addition to this, caused the staff to be divided, and the public to be put to further inconvenience. Other premises were eventually rented in Pitt-street, near Park-street; but, though the best that could be found, they are not, the President points out in his evidence, designed for the convenience of the Board, and, therefore, cannot be permanently suitable. These newly-acquired premises are costing in rent £2,000 a year, and for the same amount, representing the interest at 4 per cent. on £50,000, it is urged, a new building, suitable in every respect for the wants of the Board, may be obtained, and the transaction be commercially satisfactory, for the reason that the site on which the building would be erected must greatly increase in value.

Reasons against branch offices.

6. The idea of having a comparatively small central office and a number of branch offices does not find favour with the Board. According to the evidence of the President there would not be, with branch offices, any proper control of the funds collected, and on that ground he considers it necessary that large centrally-situated premises, where the whole of the business can be carried on with proper supervision, should be erected. If a system of branch receiving offices were adopted, it must, the President states, be done with the assistance of the banks, and though the Board have approached the banks on the subject no arrangement with them has been come to. It would be convenient for ratepayers to pay their rates to the Board through the Municipal Councils, but this plan is said not to be feasible, for the reason that the municipal bodies want so much per cent. for collecting the money, and will not guarantee the collection.

Cost of new offices to be paid by the Board.

7. The cost of the proposed new offices is to be paid by the Board. The Committee are informed in the evidence that it will be included in the total expenditure on the Water and Sewerage Works, and the Board are confident that they will be able to pay the interest on the total cost of the construction of the Water and Sewerage Works and on the cost of the proposed new building.

Conclusion arrived at by the Committee.

8. Under these circumstances, though it is not quite clear that a well-devised system of small branch offices could not be brought into operation with as much advantage to the Board and convenience to the general public, as is likely to result from the erection of the proposed expensive new offices, the Committee have come to the conclusion that the proposal before them should be sanctioned, and on Thursday, 30 January, they expressed this conclusion in the following resolution which was moved by Mr. Garrard, seconded by Mr. Cox, and passed unanimously:—

“That it is expedient the proposed offices for the Board of Water Supply and Sewerage, as referred to the Committee by the Legislative Assembly, be carried out.”

J. P. ABBOTT,  
Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Sydney, 11th February, 1890.

# PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## MINUTES OF EVIDENCE.

### OFFICES FOR BOARD OF WATER SUPPLY AND SEWERAGE.

TUESDAY, 14 JANUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq., (CHAIRMAN).

The Hon. JOHN LACKEY.  
The Hon. ANDREW GARRAN.  
The Hon. FREDERICK THOMAS HUMPHERY.  
The Hon. WILLIAM JOSEPH TRICKETT.  
The Hon. GEORGE HENRY COX.  
JACOB GARRARD, Esq.

HENRY COPELAND, Esq.  
JAMES EBENEZER TONKIN, Esq.  
WILLIAM SPRINGTHORPE DOWEL, Esq.  
EDWARD WILLIAM O'SULLIVAN, Esq.  
JOHN HURLEY, Esq.  
CHARLES ALFRED LEE, Esq.

The Committee proceeded to consider the proposed offices for Board of Water Supply and Sewerage.

Joseph Barling, Esq., Under Secretary for Public Works, sworn, and examined:—

1. *Chairman.*] Have you any statement to make in reference to this proposal? By the 29th clause of the Metropolitan Water and Sewerage Act of 1880, the obligation is placed on the Government of providing office accommodation for the Board of Water Supply and Sewerage, and in pursuance of that obligation the Government provided offices for the Board. Originally accommodation was found for them at the A.S.N. Company's old offices, but these were found extremely inconvenient. I dare say it is within the knowledge of every member of the Committee that very loud complaints were made in the papers of the extreme inconvenience of dragging people from the western suburbs and other parts to Circular Quay to pay their water rates. On the transfer of the Sewerage Works to the Board, which has now taken place, it was found that there was not sufficient accommodation at the A.S.N. Company's Offices. I must mention that the Government charged the Board £1,500 per year for the use of those offices. The Board made very strong representations to the Minister for Works as to the inconvenience of the offices, and it was attempted to rent other offices, but at that time no suitable offices could be found, and the Government eventually determined to ask Parliament to sanction the building of new offices. However, the inconvenience became so great that it was found necessary to obtain fresh accommodation, and temporary offices have been taken, and the Board have moved into new offices in Pitt-street near the School of Arts. I think they have got a lease of those offices for something like eighteen months at a rent of £2,000 per year. That will give time for the building of new offices which it is proposed to erect at the corner of Pitt-street and Wilmot-street, having a lane in the rear. I will hand in a description of the works. The estimated cost of the buildings, exclusive of fittings, at £26,500, and the land, of which 70 or 75 feet will be required, will cost about £17,000.
2. *Mr. Garrard.*] Has the land been secured? It has not. The Minister did not think he was justified in securing the land until the Committee had expressed their concurrence in the proposal.
3. *Mr. Trickett.*] Do the Board pay the Government rent at present? At first the Board paid the Government rent; now they pay it direct from their vote.
4. How is it that the Government have to build offices for them? It is an obligation imposed upon the Government by statute. This is because all the revenue derivable by the Board is paid into the Treasury.
5. *Mr. Hurley.*] The Government own a lot of land at the corner of Pitt and Bridge streets; could not this be utilised? The difficulty is that it would not be considered central enough.
6. *Mr. O'Sullivan.*] Are you aware that the Gas Company's offices are down at the end of the town? Yes.
7. And they have branch offices in the city; why cannot the Sewerage Board do the same? That might be desirable, but the President of the Board will be able to speak on that point. We are carrying out what we thought their reasonable request.
8. *Mr. Copeland.*] Can you inform the Committee what the Government are receiving from this water supply and sewerage scheme? I have not furnished myself with the particulars. I believe that something like £147,000 was paid into the Treasury last year.
9. Is it doing anything like paying interest on the outlay? I think it is.
10. Will the cost of these buildings be added to the cost of the water and sewerage works? Yes; it will be part of their capital charge.
11. So that the Government are merely advancing money for buildings the same as they have been doing for the Works? Yes.
12. The cost will be included in the total expenditure? Yes. I am sure the Minister would consider it most unjustifiable to put such a charge as this on the general ratepayers.

J. Barling,  
Esq.

14 Jan., 1890.

- J. Barling, Esq.  
14 Jan., 1890.
13. *Dr. Garran.*] Are you sure that that is so? I look upon it as so certain that the question has never arisen in my mind.
14. It is an important point, because otherwise the Government would be finding offices rent free for this Board? It is not to be thought of. Instead of rent being paid out of the revenue it is simply the payment of interest on a loan.
15. *Mr. Dowel.*] Can you inform the Committee what land the Government hold within a radius of a quarter of a mile of the proposed building? No; I could not answer that question.
16. *Mr. Copeland.*] Could you furnish us with information as to all the portions of land held by the Crown within the city? I think there would be no difficulty in obtaining the information, though I should have to go to other Departments to get it.
17. Will you furnish the Committee with a return on the subject? With pleasure.
18. *Mr. O'Sullivan.*] Do you know the name of the proprietor of this land? I do not.
19. *Mr. Lee.*] Has any attempt been made on the part of the Government to rent suitable offices for a long period? I know attempts have been made to rent offices for a long period, but attempts have been made to obtain suitable offices, and a good many premises have been offered.
20. Suppose these buildings were not erected would there be any difficulty in obtaining suitable offices? The present offices are answering all requirements at present, but how long they will do so I cannot say. There will be a large increase in the amount of the work.
21. Have you estimated what the annual interest on the outlay will be? We estimated the total cost at £47,000, the interest on which at 4 per cent. would be £1,880 per year. The Board are now paying £2,000 a year rent for premises which certainly are not so convenient for them as the proposed new building would be.
22. In addition to that £1,880 for interest will not the Board have to pay city taxes? I suppose they will.
23. *Dr. Garran.*] Is this proposal put forward at the instance of the Government or of the Board? The Board asked that new offices should be built, and the Government took the matter up.

Thomas Rowe, Esq., President of the Board of Water Supply and Sewerage, sworn, and examined:—

- T. Rowe, Esq.  
14 Jan., 1890.
24. *Mr. Copeland.*] You are President of the Water and Sewerage Board? I am.
25. You are aware that the Committee are considering a proposal to erect offices for the Board? Yes.
26. I understand that the plans have been prepared by you? Yes; under my superintendence.
27. Did the Board suggest the erection of these offices to the Government, or did the proposal emanate from the Government? It emanated from the Board.
28. What revenue is being derived from the water supply and sewerage system? There has been about £180,000 from the water supply. The sewerage system we have only just taken charge of. The revenue from it is about £50,000 at present, but it will greatly increase.
29. What is the total revenue? About £180,000.
30. Does it approximate, the amount of interest to be paid on the cost of the construction of the works? We think it will come to pretty near 4 per cent. upon the present outlay.
31. Will the cost of this building be added to the original cost of the water and sewerage works, and will you have to pay the interest on the cost of the buildings? Certainly. We are paying £2,000 a year in rent now. We were originally paying the Government £1,500 a year for premises at the northern end of the city—very inconvenient for the public, and when the sewerage was handed over to us we knew that we should have a larger number of clerks whom we should not be able to accommodate. To get other premises would have made our rental up to £2,000 a year, our staff would have been divided, and the public would have been caused a great deal of inconvenience. We were, therefore, led to consider the necessity of getting other premises to suit the convenience of the public, and to bring the whole staff together.
32. The new premises you are now renting are in Pitt-street? Near Park-street.
33. Are not those premises suitable for the carrying on of your business? They are not designed for the convenience of the Board, but they were the most convenient that we could find.
34. Do you consider the proposed buildings will be in a central and suitable position? We do. We think that they will be convenient for the citizens and for the suburban public.
35. Then the only question to consider is whether the Government can provide new buildings at a less annual cost than the rent which you are now paying—perhaps there may be some saving? I do not think there will be any saving at present but it would be a satisfactory commercial transaction. We reckon that the land and the building, furnished, would cost from £47,000 to £50,000. Suppose it is £50,000 at 4 per cent. that would be £2,000 a year and we should have a building suitable in every respect for our wants, as the site is one which must increase in value. In fifteen or twenty years time the building may be worth 30 or 40 per cent. more.
36. Do you not think that the actual cost will far exceed the estimate? I do not. I have been very particular, very guarded in designing it, and I think I have stated the extreme cost.
37. From what you know of the Board you feel confident that they will be able to pay the interest on the total cost of the construction of the water and sewerage works and on the cost of this building? I feel very confident on that point. Although we have a very large building we cannot fairly accommodate the clerks, of whom there are about a hundred altogether. We have thirty-five or forty men in a fairly well-lighted basement which may prove not to be the most desirable place to work in, but we are obliged to put them there.
38. If you found that the Board could not with the present rates meet their liabilities to the Government I suppose you could increase the water rates? We are always in a position to increase the water rates, but we do not wish to do that unless there is absolute necessity for it.
39. Are there any complaints now with reference to the rates you are charging? I have not heard any complaints of late. When we began to strike the rate a good deal of correspondence took place on the subject.
40. I suppose you are charging about the same rates that they charge in the other colonies? No, I think our rate is lower than the rate in any of the other colonies.
41. So that you could increase the rate if you found that your revenue was not sufficiently high to enable you

you to pay the Government? Certainly, but I do not think that the building of offices would lead to that necessity. There may be works now in existence which were not complete when the system was handed over to the Board, but I cannot form an opinion with regard to them until the whole of the works are handed over. T. Rowe, Esq.  
14 Jan., 1890.

42. I suppose you are aware that the Government have a piece of land in view? Of course I was a long time myself looking out for a site. A number of sites were offered, and the Board recommended the one which the Government now have in view as most suitable for their requirements. It is a site in Pitt-street below Bathurst-street. It is very central as regards the tramways, railways, and omnibuses, and it is near the Town Hall. No other position could be more suitable, and the price of the land is very much more reasonable than the land more this way.

43. Have you prepared these plans as an architect—that is, in your own professional capacity—or have you had them prepared as chairman of the Board? I have had them prepared as chairman of the Board; I got out sketches myself, then got the permission of the Board to employ a draftsman who worked in the Department under my superintendence preparing the plans.

44. I suppose you are satisfied that the building will be suitable? I thoroughly know the wants of the Board, and I could not suggest anything better.

45. *Dr. Garran.*] Will the accommodation in the new building be the same as or in excess of that which you have now? It will be in excess of it.

46. By how much? I could not tell how much, but the accommodation will be considerably greater. The basement of the present building is occupied by clerks, but the basement of the new building will be occupied with specimens of sanitary appliances for the instruction of the public and plumbers—baths, closets, and urinals, samples from the manufacturers, with illustrations of their working.

47. You will have more accommodation than you have now? A great deal more.

48. At practically the same rent? Yes.

49. *Mr. Tonkin.*] Have you a lease of the premises you now occupy? Yes, we have taken them for a year and a half, with the option of extension for six months longer.

50. Could you get a long lease of the premises? I dare say we could.

51. Would you not get them at a less rent if you took a long lease? Possibly, but I think it is an objectionable thing to employ thirty or forty clerks on the basement, where we have to use gas all day, which must be injurious to health. If we entered into a seven years' lease, at the end of that time we should be completely at the mercy of the landlord.

52. If you pay what is equal to a rent for the proposed new buildings, you think that in eight or ten years time the increased value will make the buildings cheaper than they would be if you were renting them? I think so.

53. *Mr. Dowd.*] What is the total cost of the works from which you say you derive a revenue of £180,000? I did not come prepared to answer that question. I thought I should have to give evidence solely with regard to the proposed building. We do not know the exact total cost yet, because some of the works are still in the hands of the Minister for Works.

54. I understood you to say that there was no probability of the Board not being able to pay interest on the cost of the works? Under any circumstances we must have offices.

55. *Mr. Cox.*] What staff have you now? We have 100. There are nine in the secretary's branch, fifteen in the accountant's branch, thirty-nine in the assessor's, twenty-two in the water engineer's, fifteen in the sewerage engineer's.

56. Have you taken into consideration the probability of the Board at some future time having receiving houses for rates in various parts of the city, such as the banks find it necessary to have? We have considered the matter, but I fail to see how we can have thorough control over the funds, if we are to collect money in a number of different places. I should be sorry to hold the position of President, and to be responsible, if we had not the control in the central depôt. Every penny received is checked by three persons. How we could check it if we were receiving money in different parts of the city, I cannot understand.

57. Is it not done by the banks? We have approached the banks, but have not come to any arrangement with them yet. They seem rather to avoid us.

58. It may be necessary to have these receiving houses, and that might lessen the cost of the central building? It could only be done through the banks. There are plumbers and drainers from twenty-five different districts, and the metropolis constantly coming and paying in fees; besides, the ratepayers of the city must have large offices.

59. Have you asked the Government whether they have any ground of their own which would form a suitable site? Yes. I pointed out a piece of ground in Elizabeth-street at the end of the High School building, and near Market-street, but the Government would not grant that site.

60. What would be the probable cost of the site which has been chosen? About £230 a foot. It is the intention of the Minister to resume the land at its market value.

61. You said that you could not give the total value of the works because they are not yet complete? Yes.

62. Consequently any rates that you charge can only be imposed with the belief that they will amount to so much? Yes. In considering our rate we got all the information we could possibly get from the Department, and struck our rate accordingly. The Board do not desire to strike a heavy rate; they would rather wait a year or two even if there is a little deficiency until the works are completed.

63. Do you know what per centage upon the outlay the revenue will be? We are trying to collect 4 per cent. on the outlay. We tried to form a sinking fund as well, but that has yet to be gone into. We are trying to conduct the whole thing upon commercial principles.

64. Until the whole thing is complete you can hardly form an opinion? We cannot form a correct opinion until the whole of the works are handed over.

65. *Mr. Humphery.*] Do you prefer collecting rates from ratepayers direct or through Municipal Councils. From the ratepayers direct.

66. Would it not be a great convenience to the ratepayers if they could pay the money to the Municipalities? Yes, no doubt, but the municipal bodies want so much per cent. for collecting the money, and they will not guarantee the collection. We are bound to collect this revenue, and as President I am responsible; therefore, how we could collect it through the boroughs, which are not responsible to us, seems a very great difficulty.

- T. Rowe, Esq.  
14 Jan., 1890.
67. Will it be compulsory to attend at your office to pay small amounts? We take cheques. We did at one time take postage stamps, but we found a difficulty about that; some said that they sent stamps, but the stamps never reached us.
68. *Mr. Garrard.*] Will you have sufficient land to enable you to extend your premises? No; we shall build on every inch of it.
69. If your work increases you will probably want room for a larger number of hands in a few years? I do not think that our staff will increase much more. Our principal work for years to come will be extending the water supply, the connecting of all the houses with the main sewers, ventilating, &c., but that will die out in the course of time.
70. The clerical staff will not materially increase? No.
71. *Mr. Trickett.*] What do you estimate the cost to be? The building £30,000, the land £17,000, incidental expenses and fittings £3,000, making a total of £50,000.
72. Do you think £30,000 the outside price for the building? I do.
73. What do you propose to construct the building of? Principally of brick with stone facings, using as little stone as possible to keep down the cost.
74. I suppose you will occupy the building throughout? Yes. There is another point—we have no caretaker's place in the present building; in the new building provision will be made for the caretaker, which will cause a saving of £50 a year.
- 75-6. *Mr. O'Sullivan.*] The Sewerage Board for some time occupied the offices of the A.S.N. Company, did they not? Yes.
77. Is not that a commodious structure? It is fairly commodious, but there is not room enough.
78. Do you think it necessary to put the country to the expense of a new building? The public have not been satisfied with the accommodation hitherto provided. They have been put to a considerable inconvenience.
79. Do not people go to the Gas Co.'s offices in Kent-street? The Gas Company has started a branch in Bathurst-street, near the intended site.
80. Could you not do that? If we did we could not then exercise a proper check on the books. That is a very serious matter indeed.
81. Do you think it so serious as the making of another department? We are paying £2,000 a year in rent, and if we can get better buildings at the same rate, the value of which will increase, that will be an advantage.
82. The old building is lying idle, is it not? Possibly the Government have some other use for it. I understood that the military were going to have it.
83. What rent do the Board propose to pay the Government for the new structure? We shall be able to pay 4 per cent. on the cost of construction in the shape of rent at £2,000 a year.
84. *Mr. Lee.*] Has any effort been made to obtain a long lease of premises in the city? We do not know of any premises suitable for the business of the Board without extensive alterations being made at great expense; then it would be only makeshift.
85. Are there no buildings at Circular Quay which might have been available? I do not know of any.
86. Would no portion of the additions to the Lands Office have been suitable? I never heard of any accommodation there. We applied for accommodation at the Town Hall, but they could not take us there. We must have the pay office on the ground floor, as so many people have business to transact there.
87. Have you advertised for suitable premises? Yes, and we have had twenty or twenty-five offers of premises.
88. There are many large flats of offices unoccupied in the City, are there not? I have studied the matter thoroughly, and visited a number of places, but I know of no place more suitable for the purposes of the Board than the one which we have taken.
89. Would it be possible to rent premises in the city? I do not think it is possible to rent premises in a convenient position, giving all the accommodation we require.
90. As a speculation, you think it would be better to build? I think so.
91. Inasmuch as the annual increment would, in the course of a few years, amount to a rental? Yes. The land of the proposed site, which is worth £230 a foot, will be worth possibly £500 a foot in twenty years time. A few hundred yards to the north of that site the land is that price now.
92. How many years have you been in Sydney? I have been in this city forty years.
93. And you are tolerably well acquainted with the large buildings? I have built a great many of them myself.
94. Consequently you are in a position to know what buildings are likely to be suitable? Yes.
95. That being so, you have no hesitation in recommending the erection of this building? I think the thing will speak for itself.
96. *Mr. Hurley.*] In your travels through the United Kingdom, has your attention been drawn to the class of buildings used by such bodies as that which you represent? I do not think there are many such bodies as the Water Supply and Sewerage Board.
97. Have you visited the Metropolitan Board of Works in London? I have not. Not many cities in the world have Boards managing the water supply and sewerage system.
98. Is it known that the building which you have vacated is likely to be utilised by the military? I have understood that it was.
99. Do you consider that it would be suitable for that purpose? It would make a very good brigade office. It adjoins the commissariat.
100. Have the Board taken into consideration the suitability of Government land in this street for such a building as you propose? It would be unwise for the Board to recommend the erection of a building anywhere about here, because it would not meet the convenience of the public.
101. The site you recommend is centrally situated, and will suit the general body of the population? Yes; it will be the most central point of the whole city for this purpose.
102. Do you know the price at which the land can be purchased? I think it has been offered at £230 a foot.

Reginald Bloxsome, Esq., Secretary, Board of Water Supply and Sewerage, sworn, and examined:—

103. *Mr. Lackey.*] You are connected with the Water and Sewerage Board? Yes, I am the secretary.
104. Have you been secretary ever since the establishment of that body? I have—since March, 1888.
105. Have the offices of the Board been in the same place as they are in now ever since the Board was established? No; they occupied temporary offices at Circular Quay, which they left about ten days ago.
106. It is proposed to build new offices in Pitt-street, near Wilmot-street? Yes.
107. Do you think that a suitable site? Very.
108. Is it regarded by the Board as a suitable site? Yes. It is in the centre of the city.
109. The Board are unanimous as to that being the most desirable site? Quite so.
110. Have you gone into the figures, or has it transpired what the probable cost will be? Yes; I have got it from professional men.
111. Do you think the cost will be within the amount estimated? That I cannot say. The professional men think so.
112. What do they estimate the cost to be? They estimate that the cost of the land will be a little over £17,000, and the cost of the building, exclusive of the fittings, about £26,500; you may say in round numbers that the building, fittings, and land will cost £50,000.
113. What rent are you paying at the present time? £2,000 a year.
114. You employ a considerable number of hands, clerical and professional? Yes; there are quite 100 in the building.
115. You have seen the plans? Yes.
116. And the Board have seen the plans? Yes.
117. Do they all agree as to the suitability of the proposed building? Yes, they highly approve of it.
118. Who are the members of the Board besides the President? Mr. Hickson, the Engineer-in-Chief for Sewerage, Mr. Darley, Engineer-in-Chief for Harbours and Rivers, Mr. Palmer and Mr. Young of the Municipal Council of Sydney, and Mr. Lander and Mr. Graham, representing the Suburban Municipal Councils.
119. They all agree as to the necessity for the work? Yes. The Board have been forced to go in for it by expressions of opinion from the ratepayers themselves.
120. It is a rule with your Board that the people must attend at the office to pay their rates—you do not send collectors round? No, but we take cheques or post office orders. We tried postage stamps but they were a failure.
121. As a rule people come and pay their rates across the counter? Yes.
122. Therefore it is essential that the offices should be in a convenient and central situation? About the centre of the city and as close to the Town Hall as possible.
123. Having in view the growth of the city and suburbs, is it your opinion that the proposed building will meet the requirements of the future? I do not think it will, but the building is to be constructed so that another floor can be put on it.
124. How many storeys are there to be? There are to be the basement, ground floor, and three storeys, and then the caretaker's place.
125. And it will be capable of being built still higher? Yes. The architect who drew out the plans told me that he would have been glad if he could have had a few feet more in the width as he would have made a great change in the building. No doubt if the Government buy that land it will be an exceedingly good speculation. Wherever the offices of the Board are they will bring traffic and that increases the value of property; therefore if we only rented a building we should be increasing the value of the property for somebody else, and when the lease expired the landlord would raise the rent. If the land is the property of the Board they will be raising the value of the property for themselves as trustees for the ratepayers of Sydney.
126. You think that the accommodation afforded would be sufficient for a considerable number of years? Yes, as long as they confine the Board to the water supply and sewerage works.
127. Have you made any estimate as to what it will cost to build? Yes; we shall pay the Government 4 per cent. Under the Country Towns Water and Sewerage Act, loans are paid back in sixty years, but there is nothing in the Act under which the Board is established, requiring them to pay back loans within sixty years. They have been debited with the money spent on the Nepean scheme, but they certainly could not be expected to pay that off in sixty years. The Board hope to pay back the capital and interest of the loans expended in reticulation in sixty years, and the capital and interest of the loans expended on the main works at a much longer period.
128. On the whole you think it is a desirable project, and that it ought to be carried out? Yes.
129. And you think that the property will increase in value as time goes on? Yes, it will increase enormously.

B. Bloxsome,  
Esq.  
14 Jan., 1890.

## PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## Offices for Board of Water Supply and Sewerage.

## APPENDIX.

## A.

## LIST OF PROPERTIES RESUMED BY THE GOVERNMENT IN THE CITY OF SYDNEY.

Where situated.	Area.	For what purpose resumed.	Date of resumption.	No. of buildings.
1. On the eastern side of Macquarie-street, commencing on the northern side of a lane nearly opposite Hunter-street, and extending along the building line of Macquarie-street in a northerly direction to the entrance of the Government Domain.	a. r. p. 1 0 7	Sydney Female School of Industry.	1870. Dec. 5	Nil.
2. Between Macquarie-street and Outer Domain, having a frontage to Macquarie-street of 174 feet.	1 1 30	Parliament Buildings ...	1879. Oct. 17	7 houses (occupied), 21 small tenements (occupied).
3. 355 feet frontage to Elizabeth-street, 150 feet to Market-street, and 363 feet to Castlereagh-street.	1 1 1	Public Library .....	1880. Nov. 24	High School, 14 shops and buildings (occupied).
4. At the corner formed by the western side of Phillip-street and the southern side of Hunter-street.	0 1 20	Purchased for buildings and offices in connection with the Department of Inspector-General of Police.	1886. April	"Star Hotel" (occupied), 4 houses (unoccupied), Offices of Inspector-General of Police.
5. Fronting Phillip, Bridge, and Young Streets.	0 1 22½	Buildings and offices in connection with the Department of Public Works.	1883. Nov. 27	4 houses (occupied).
6. At the corner formed by the eastern side of Elizabeth-street and the southern side of Hunter-street.	0 0 10½	Tramway purposes .....	1881. Dec. 2	Montague Chambers (occupied).
7. At the corner formed by the western side of Phillip-street and the northern side of Hunter-street.	0 0 11½	" .....	" 2	Orient Chambers (occupied).
8. Circular Quay, fronting Pitt, Queen, and George Streets.	0 2 19½	" .....	1882. May 5	Hotel (occupied).
9. 38 feet frontage to Regent-street, Redfern	0 0 11	Railway purposes.....	1883. Aug. 14	2 shops (occupied).
10. Murray-street, Pyrmont .....	.....	" .....	1881. June 14	10 houses (occupied).

## B.

## LIST OF RESUMED PROPERTIES IN THE HANDS OF THE GOVERNMENT COLLECTOR.

Pyrmont .....	Resumption situate in Murray-street, Pyrmont (Crawford Terrace).
Macquarie-street .....	" Macquarie-street and Domain.
Library .....	" Elizabeth, Market, and Castlereagh Streets.
Hunter-street .....	" at corner of Hunter and Phillip Streets.
Bridge-street .....	" Bridge and Phillip Streets.
Montague Chambers .....	" Hunter and Elizabeth Streets.
Hunter and Phillip Streets .....	" (ground rent).
Circular Quay .....	" in Pitt-street North.
Cook's River .....	" at Tempe.
Redfern Tunnel .....	" in Regent-street, near the Mercantile Bank.

[Four Plans.]

1890.

## NEW SOUTH WALES.

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 METROPOLITAN WATER AND SEWERAGE ACT.  
 (AMENDED BY-LAWS.)

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 Presented to Parliament, pursuant to Act 43 Vic, No. 32.
 

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 Department of Public Works,  
 Sydney, 17th March, 1890.

His Excellency the Governor, with the advice of the Executive Council, has been pleased to approve of the following "Amended Metropolitan Water By-laws" prepared by the Board of Water Supply and Sewerage in accordance with the provisions of the "Metropolitan Water and Sewerage Acts, 1880-1889," and in substitution of those published in the Gazette of 15th July, 1889.

BRUCE SMITH.

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 METROPOLITAN WATER BY-LAWS.

[13th December, 1889.]

WHEREAS, by the Metropolitan Water and Sewerage Acts, 1880-1889, the Board of Water Supply and Sewerage is authorized and empowered from time to time to make, alter, and repeal By-laws:

Now the Board of Water Supply and Sewerage, under and by virtue of the powers contained in the Metropolitan Water and Sewerage Acts, 1880-1889, do hereby make the By-laws following, that is to say:—

1. The following rates and charges are those which the owners and occupiers of lands and tenements shall pay in respect of water supplied by the Board, that is to say:—

*(For water supplied for domestic purposes otherwise than by measure.)*

- (I.) On every house, tenement, or land of twenty pounds assessed annual value and under, ten shillings per annum.
- (II.) On every house, tenement, or land above the assessed annual value of twenty pounds, a rate of sixpence for each pound sterling on the amount of the valuation up to three hundred pounds inclusive; fivepence for each pound on the amount of the valuation in excess of three hundred pounds up to seven hundred pounds; fourpence for each pound on the amount of the valuation in excess of seven hundred pounds up to one thousand pounds; threepence for each pound on the amount of the valuation in excess of one thousand pounds up to four thousand pounds; and twopence for each pound on the amount of the valuation in excess of four thousand pounds.
- (III.) Vacant lands of the assessed value of sixty pounds and over shall be subject to a rate of twopence for each pound sterling on the amount of the valuation.

- (IV.) The like rates as those above-mentioned shall be charged on all lands, tenements, and hereditaments not included in any valuation by the Municipal Council of the City of Sydney or Redfern, or of any Borough or Municipal District, and on all lands for the time being valued by the said Municipal Council of the City of Sydney or Redfern, or by such Borough or Municipal District, at a sum less than the true value thereof.

(For water supplied by measure.)

- (V.) The rates to be charged for water supplied from stand-pipes shall be one shilling and sixpence per 1,000 gallons.
- (VI.) The rates to be charged for water supplied from the mains by measure shall be one shilling and sixpence per 1,000 gallons.
- (VII.) Water-troughs will be charged for at the rate of twenty shillings per annum each.
- (VIII.) Gas-engines will be charged for at the rate of twenty shillings per annum each.
- (IX.) Water for steam boilers will be charged for by measure at the rate of one shilling and sixpence per 1,000 gallons.
- (X.) For water supplied to shipping, the charge will be one shilling and sixpence per 1,000 gallons. Her Majesty's Navy will be supplied free of charge.

Payment of rates.

2. Assessed rates must be paid half-yearly in advance whether a meter is used or not. In the case when a meter is used, the meter account will be rendered only when it is in excess of the assessment. Cheques and Post Office Orders will be received in payment of rates; but if the cheque tendered by any person as payment for rates due is dishonoured, the Board may cut off his service, and proceed for the recovery of the amount by Warrant for Distress. Cheques and Post Office Orders must be crossed in favour of the Board.

Minimum charge, by meter or otherwise, is the assessed rate.

3. The minimum charge for water, whether supplied through meter or otherwise, for domestic purposes and for purposes other than domestic, is the assessed annual rate. If the water is supplied by meter, and the meter account exceeds the assessment (calculated at the rate of one shilling and sixpence per 1,000 gallons), then such excess shall be charged in addition to the assessment.

Building charges, &c.

4. The Board may supply water for building purposes at the rate of five shillings per room or by meter at one shilling and sixpence per 1,000 gallons; and the minimum charge by meter shall be ten shillings and sixpence for each work, which charge must be paid in advance. The Board may supply water for the making and mixing of concrete for foundations of wooden blocks, stone cubes, or other form of permanent roadway or pavement, at the rate of £1 10s. per 1,000 square yards, by superficial measurement of road surface; and for all other concrete, brickwork or masonry, at the rate of threepence per cubic yard, as measured on the work.

Horses and cows

5. Any person who maintains horses or cows may be supplied with water, without meter, from the domestic service for the sum of 5s. per annum for each animal, in addition to the assessed annual rate of the premises on which such animal is maintained or supplied with water.

6. All lands or premises on which any one or more head of horses or cattle shall be kept or maintained, whether such lands or premises are actually supplied with water from any main water-pipe of the Board, or are otherwise ratable or not, shall be liable to an extra rate or charge (beyond and in addition to the assessed annual rate of the premises) of 5s. per head for each head of horses or cattle kept or maintained on such lands or premises.

Gardens.

7. The Board may supply water for gardens (and for such purpose may permit a hose and standpipe to be used) without meter, at the rate of 10s. per annum for every 750 square feet superficial area, or part thereof, in addition to the assessed annual rate of the premises to which such garden belongs or is attached.

Fountains and waterfalls.

8. The Board may permit a supply of water for water-fountains or waterfalls of a size, construction, and form, and in a position previously approved by the Board, without meter, from the domestic service, for the sum of 5s. per annum for each such fountain or waterfall, in addition to the assessed annual rate of the premises on which such fountain or waterfall is maintained.

Board may require any premises to take the whole supply of water through meter.

9. If the Board shall in any case be of opinion that the owner or occupier of any premises is wasting or misusing or otherwise illegally dealing with water, or that the whole supply of water to any premises should for any reason be by meter, they may give to the owner or occupier a notice directing him, within a time to be therein mentioned, to fix a meter to such premises, and to receive the whole supply of water to such premises through such meter; and after the expiration of such notice, whether a meter has been fixed in accordance therewith or not, the Board may cut off any supply of such premises which is otherwise than by meter.

Before affixing service-pipe, &c. license to be obtained from Board.

10. Before any person shall affix any service-pipe to any pipe of the Board, or alter, repair, or in any manner interfere with any pipe of the Board, or any service-pipe, cock, or fitting connected with any pipe of the Board, he shall obtain from the Board a license in that behalf to execute any such work; and any unlicensed person affixing, altering, repairing, or in any manner interfering with any such pipe, service-pipe, cock, or fitting as aforesaid, shall be liable to a penalty not exceeding ten pounds.

Licensed plumber.

11. Before any such license shall be granted by the Board, the person applying for the same shall satisfy the Board that he is a competent plumber. His competency must be certified to by three master plumbers.

12. Any person, whether licensed as aforesaid or not, who shall offend by opening any ground so as to uncover any pipe or pipes, the property of the Board, without giving two days' notice to the Board of his intention so to do, or who shall in any way tamper, interfere with, or alter any pipe, the property of the Board, without the printed permit of the Board being first obtained, or who shall wilfully or negligently break, injure, or open any lock, cock, valve, pipe, work, or engine, the property of the Board, shall be liable for each such offence to a penalty not exceeding twenty pounds.

Before pipes can be uncovered two days' notice to Board must be given.

13. The Board only, or a plumber duly licensed by the Board, under the superintendence and according to the directions of the officer appointed by the Board for that purpose, is empowered to tap the main in the streets or elsewhere and attach service-pipes thereto, or extend the same generally as the case may be. Any person infringing this clause shall be liable to a penalty not exceeding twenty pounds.

Board or licensed plumber only empowered to tap mains, &c.

14. Any person, whether licensed as aforesaid or not, who shall lay any pipe to communicate with the pipe or pipes of the Board without giving two days' notice of the day and hour when such pipe is intended to be made to communicate with the pipe or pipes of the Board, and without having obtained the official printed permit, or who shall make such communication, except under the superintendence and according to the directions of some officer of the Board, or who shall lay any leaden or other pipe to communicate with a pipe of the Board of a strength and material not sanctioned by the Board, shall be liable for each such offence to a penalty not exceeding five pounds; and, in the event of continuing the offence, to a further penalty of two pounds for each day after the notice of the offence from the Board.

Penalty for communicating with pipes of the Board without notice.

15. Every application for water must be accompanied by the payment of a fee of three shillings for the tapping of any main.

Fee for tapping main.

16. Every owner or occupier of any house, tenement, or lands, shall, for the purpose of obtaining a supply of water to such house, tenement, or lands (after receiving from the Board the prescribed notice so to do), construct such connections and fittings from and in connection with such house, tenement, or lands to communicate with the water-main of the Board as are prescribed by the By-laws and Regulations of the said Board.

Board may compel owner to connect premises with the water-mains.

17. Any person who, being an owner or occupier of lands or premises supplied with water under the said cited Act, for the purpose of taking, in a manner not authorized by such Act, any such water, uses in or places on, or affixes or attaches to, such land or premises, or to any prescribed fitting, or wilfully permits to be used in or placed on, or affixed or attached to, such lands or premises, or to any prescribed fitting, any fitting, instrument, or thing not authorized in that behalf by the Board, or who alters, misuses, injures, or removes any prescribed fitting, except for the purpose of necessary repair, shall, upon conviction thereof, forfeit and pay to the Board a sum not greater than ten pounds, without prejudice to the right of the Board to recover from him damages in respect to any injury by such owner or occupier done, or wilfully permitted to be done, to the Board's property, and without prejudice to the Board's right to recover from him the value of any water wasted, misused, or unduly consumed.

Penalty for using unauthorized fittings.

18. The owner or occupier must, at his own expense, lay down and maintain all the pipes and apparatus upon his premises. All pipes must be of galvanized wrought-iron, where possible, and where lead pipes are used they must be of equal thickness throughout, and of at least the respective weights following, viz.:-

Owner to lay and maintain services.

$\frac{3}{8}$ -in. ....	5 lb. per yard	Weight of lead pipes.
$\frac{1}{2}$ -in. ....	6 lb. "	
$\frac{5}{8}$ -in. ....	9 lb. "	
1-in. ....	12 lb. "	
$1\frac{1}{4}$ -in. ....	16 lb. "	
$1\frac{1}{2}$ -in. ....	20 lb. "	

Where wrought-iron pipes are used, they must be of the kind known as galvanized wrought-iron lap-welded steam tubes, unless otherwise permitted by the Board.

19. Any consumer's pipe, cock, cistern, or other fitting laid, fixed, or used otherwise than in accordance with these Regulations and with the provisions of the Act, or which shall in the opinion of the Board, be or become of bad or defective quality, or shall conduce to the waste, misuse, or contamination of the water, shall, upon the Board giving notice in writing, be discontinued and disused; and the Board may require the same to be removed, replaced, or repaired, and may stop the supply of water to the said consumer until such pipe, cock, cistern, or other fitting shall have been removed, replaced, or repaired to the satisfaction of the Board.

Defective fittings to be removed.

20. No person shall use, in connection with the water of the Board, any iron pipe, tee, thimble, bend, reducing coupling, plug, &c., unless it be of the best manufacture, true in section, straight, and of equal thickness, properly and truly cut with Whitworth's standard gas thread, and perfectly sound and new, and free from all defects. Every such tee, bend, tube, &c., shall be capable of withstanding a hydrostatic pressure equal to a column of water 400 feet in height.

Quality of fittings for iron pipes.

21. Every person shall make all joints between tees, bends, thimbles, couplings, elbows, and cocks, &c., with white or red lead and flax. All joints on lead pipes, and lead pipes with brass unions, shall be of the kind known as "wiped joints."

Joints.

22. No person shall lay any service-pipe on private property, below the ground surface, at a less depth than ten inches.

Depth of pipe.

- Pipes through drains to be properly protected.
23. No person shall lay any pipe or other apparatus through any sewer, drain, ashpit, cistern, or manure tank, or through, in, or into any place where, in the event of the pipe becoming unsound, the water of the Board conveyed through such pipe would be liable to be fouled, or to escape without observation—unless such pipe or apparatus be laid through an exterior cast-iron pipe or box of sufficient length and strength to afford due protection to the same, and to bring any leakage or waste within easy detection.
- Approved fittings.
24. No person shall use any tap, stop-cock, bib-cock, ball-cock, valve, closet cistern, service-box, waste-not regulator, bath tap or valve, or other fitting in connection with a supply of water of the Board which is not of the best quality, and approved by the Board.
- Cocks.
25. No person shall use any stop or bib-cock which is not loose-valve, screw-down, high-pressure cocks, made of hard brass or gun-metal, and in every respect of best quality and workmanship.
- Cisterns.
26. No person shall use any cistern or tank that is not provided with an equilibrium ball-valve, and the overflow-pipe laid and fixed in a suitable manner, open to inspection, and in a position approved by the Board.
- Service not to communicate with rain-water receptacles or underground tanks.
27. No person shall fix or use any service-pipe which communicates with any cistern, tank, or vessel intended or used for the reception of rain-water below the surface of the ground, except with the express permission of the Board.
- Water-closets.
28. No person shall construct or use any water-closet fitting not approved by the Board, or supplied from the service pertaining to the tenement through a proper closet-cistern, or service-box, fitted with approved waste-preventing apparatus. No person shall fix or use any service-pipe which communicates directly or indirectly with the basin or trap, or otherwise than with the cistern of a water-closet.
- Baths.
29. The Board will not supply any water to any bath, the outlet of which is not distinct from and unconnected with the inlet or inlets; and the inlet or inlets shall be placed above the highest water-level of the bath. The outlet of such bath shall be provided with a perfectly water-tight plug, valve, or cock. No such bath shall have any overflow waste-pipe that is not laid and fixed in a suitable manner, open to inspection, and in a position approved by the Board. No bath shall exceed in dimensions 6 ft. 6 in. long by 2 ft. 6 in. wide by 2 ft. deep unless supplied by meter. The Board will not supply water to any bath unless the same shall be so constructed as to prevent a waste of water.
- Service connection.
30. Except by the permission of the Board, every tenement shall have an independent service-pipe connected with the water-main, and such service shall be stop-cocked; and no person shall connect more than one tenement with the main of the Board from one service, except by permission of the Board.
- Urinals.
31. No person shall fix or have fixed a service-pipe so as to communicate directly with any urinal, and every urinal shall be supplied only through a cistern or service-box, fitted with waste-preventing apparatus approved by the Board.
- Water for other than domestic purposes.
32. No person shall use water supplied by the Board for other than domestic purposes, except the supply is by meter, or excepted in the manner hereinbefore provided.
- Dial of meters to be capable of registering 1,000,000 gallons. Meters registering incorrectly.
33. No person, except with special consent of the Board, shall affix a meter, the dial of which is not capable of registering (1,000,000) one million gallons.
34. If any meter shall not correctly indicate the water passing through it, the Board may charge for the supply according to the average daily consumption for any month preceding the date upon which such meter shall have been examined and found to be in order; or at the request of the consumer, or by direction of the Board, the said meter shall be tested and the charge for water supplied regulated accordingly.
- Meters not to be interfered with.
35. No person not duly authorized by the Board shall disconnect any meter or other apparatus from the service-pipes, or in any way interfere with the same.
- Steam boiler to have self-acting valve.
36. If any person shall connect any service-pipe, or branch service-pipe, with any steam boiler for the purpose of feeding or supplying the same with water, without first affixing a self-acting valve for preventing the pressure of the steam reversing or affecting the dial of the meter, he shall be liable to a penalty not exceeding five pounds; and a further penalty of two pounds for each day after notice of the offence from the Board to each offender.
- No hose to be attached to any pipe for watering garden, &c., without meter.
37. Except as hereinbefore provided, no person shall use a hose attached to any tap or pipe (used for the purpose of supplying the water of the Board for domestic purposes to any house or premises) for watering any garden, laying dust, or for any other purpose whatsoever, unless where a water-meter is fixed and the water supplied by measure; and any person offending against this By-law shall be liable to a penalty not exceeding five pounds.
- No tap to be in garden without meter.
38. Except as hereinbefore provided, no person shall place any tap in any garden or screwed tap in any yard or to or outside of any dwelling or premises supplied with the water of the Board to which a hose could be attached unless a water-meter is fixed and the water supplied by measure; and any person offending against this By-law shall be liable to a penalty not exceeding five pounds.
- Pipes, &c., to be kept in proper repair.
39. Any person using water supplied by the Board shall keep all pipes and other appliances in connection with the supply of water to such person in a proper state of repair.

40. All work at any time done or to be done on private lands or premises in connection with the water supply, whether such work consist in the laying and fixing of new services, or in the extension or alteration of existing services and fittings, shall be inspected by the proper officer of the Board, and no such work shall be commenced until after the expiration of two days' notice thereof first given to the Board, and the necessary printed permit obtained. In no case shall the water be turned on to any lands or premises where any such work shall have been executed until the said work shall have been inspected by the said officer, and certified by him, on the prescribed form. No under-ground or enclosed work shall on any account be covered up or concealed from view until the same shall have been duly inspected and passed by the inspector; and any person offending against this By-law shall be liable to a penalty not exceeding five pounds. Inspection of work.

41. The supply and use of water, whether for domestic purposes or under special agreement, shall be open to inspection and admeasurement whenever required; and such information must from time to time be afforded as will be sufficient to enable the Board to obtain a satisfactory account of the quantity of water actually consumed, and of the pipes, taps, cisterns, and other apparatus and conveniences for receiving and delivering such water. Any officer of the Board may at all reasonable times in the day-time enter on the premises of any person using water supplied by the Board, for the purpose of inspecting the service pipes or other appliances on such premises. Supply and use of water open to inspection.

42. If the service pipes or other appliances of any such person shall on any inspection be found to be out of repair, the Board may forthwith, without notice, repair the same in such manner as may be deemed necessary, and the cost of any such repairs may be recovered by the Board from the owner or occupier of such premises. Board may repair.

43. The water supply to the public parks and gardens shall be by meter, and shall be exclusively under the control and direction of the Board; and any person turning on the water, or otherwise interfering with such water supply, shall be liable to a penalty not exceeding five pounds. Board have control of water supplied to public parks, &c.

44. All notices and applications required by these By-laws are to be made upon printed forms, to be obtained at the Board's office. Notices sent by post must be prepaid. Any sums paid by the Board on account of notices sent by post and not prepaid will be charged against and recovered from the sender. Notices and applications to be made upon printed forms.

45. The Board shall be at liberty to discontinue and cut off the supply of water immediately on the discovery of any breach of these Regulations. Board may discontinue supply.

46. In the construction of these By-laws, the word "person" shall be deemed to extend to and include a corporation, or any body or number of persons, and the masculine shall include the feminine gender. Interpretation of terms.

47. Any person committing a breach of any By-law to which no specific penalty is attached, or who shall refuse or neglect to obey any injunction in any such By-law, shall, upon conviction, be liable to pay a penalty not exceeding twenty pounds, and, in case of a continuing offence, a further penalty not exceeding five pounds for each day after notice of such offence shall have been given by the Board to such offender.

48. The following shall be the form of notice to connect to water mains, prescribed under Section 16, Metropolitan Water and Sewerage Act Amendment Act of 1889:—

#### NOTICE TO CONNECT TO WATER MAINS.

To the Owner or Occupier.

Board of Water Supply and Sewerage,  
Sydney, 18 .

NOTICE IS HEREBY GIVEN that a water main has been laid in (as the case may be), and is ready to distribute water. The Board of Water Supply and Sewerage hereby demand and require that the owner or occupier of the house, tenement, or lands at or on which this notice is left or exhibited, shall construct such connections or fittings from or in connection with such house, tenement, or lands, to communicate with such main as are prescribed by the by-laws and regulations of the said Board.

For the Board of Water Supply and Sewerage,

REGINALD BLOXSONE,  
Secretary.

THOMAS ROWE,  
Secretary.  
President.

#### NOTE.—Attention is directed to the following Rules:—

The Board will pay a reward of not less than ten shillings to any person who will give such information as shall lead to the conviction of any person or persons who shall wrongfully attach (temporarily or otherwise) any pipe to any of the mains or services of the Board, or to any pipe, cistern, or apparatus connected therewith, or to or into which the water of the Board shall flow, or who shall wrongfully draw off, use or take the water of the Board, or who shall knowingly permit the said water to be wrongfully drawn off, used, or taken. Reward for information as to fittings.

The Board will also adequately reward any person (not being the person in fault) who shall communicate timely information to the Board of any leakages or waste of water, whether the same be accidental, negligently or wilfully occasioned or suffered, or who shall give such information as shall lead to the conviction of any person or persons who shall steal or cause to be stolen, or improperly appropriated, the water of the Board.—*Vide* section 73 of Act 43 Vic. No. 32. Reward for information as to waste.

- Sample fittings.** A set of standard fittings, such as are at present approved, is exhibited in the Board Engineer's office; but the Board will give due consideration to the claims of any other fitting which may be presented for approval, and if considered satisfactory the same will be purchased and placed among and become one of the standard approved fittings.
- No gratuities allowed.** The Board do not permit their officers, workmen, or agents to solicit or receive any fee or gratuity whatever, and desires to be informed of any infraction of this Regulation, and also of any act of incivility or neglect of attention on the part of such officers, workmen, and agents, or any of them.
- Attention is also directed to the following clauses of the Metropolitan Water and Sewerage Act, 43 Vic. No. 32:—*
- Meter to be supplied and maintained by consumer.** 55. Every person who shall have agreed with the Board for a supply of water by measure, shall at his own expense, unless he hire a meter from the Board, provide a meter and keep and maintain the same in good working condition to the satisfaction of such officer as may be appointed by the Board, and in the event of any repairs being required notice in writing shall be immediately given by such person to the Board and a registration of the quantity used shall be taken before such repairs are effected.
- Notice of removal, &c., of meter.** 56. Every person requiring to remove or alter the position of any meter shall give six days' notice in writing to that effect to the Board, and a registration of the quantity of water used shall be taken before such removal or alteration is made.
- Penalty for neglecting to provide meter.** 57. If any person who under the provisions hereinbefore contained ought to provide any meter, neglect or refuse, after having been required by the Board so to do, to provide such meter, he shall for every day during which such neglect or refusal continues forfeit a sum not exceeding two pounds.
- Penalty for neglecting to give notice of repairs of meters.** 58. If any person who has provided any meter as aforesaid, fail to give the notice hereinbefore required of any repairs required for such meter he shall forfeit a sum not exceeding ten pounds.
- Water may be cut off if meter not in order.** 59. If any person refuse or delay to have such meter properly repaired and put in correct working order after having been required by any officer of the Board so to do, the Board may shut off the supply of water from the premises of such person either by cutting the service-pipe or otherwise, until such meter shall have been properly repaired and certified by some officer of the Board as being in proper working order.
- Penalty for fixing uncertified meter.** 60. If any plumber or other person fix or refix any meter upon any premises supplied with water by the Board, without having first obtained a certificate from the Board that the said meter has been examined and found in correct working order, he shall forfeit a sum not exceeding ten pounds.
- For removing or altering meter without notice.** 61. If any person remove or alter the position of or in any way interfere with any meter without giving such notice as aforesaid, he shall for each such offence forfeit a sum not exceeding twenty pounds over and above the damage which he may be found liable to pay in any action at law at the suit of the Board.
- Power to officers of Board to inspect meters.** 62. The officers of the Board may enter any house, building, or lands, to, through, or into which water is supplied by the Board by measure, in order to inspect the meters, instruments, pipes, and apparatus for the measuring, conveyance, reception, or storage of water, or for the purpose of ascertaining the quantity of water supplied or consumed, and may from time to time enter any house, building, or lands, for the purpose of removing any meter, instrument, pipe, or apparatus, the property of the Board; and if any person hinders any such officer from entering or making such inspection, or effecting such removal, he shall, for each such offence, be liable to a penalty not exceeding five pounds; but, except with the consent of a Justice, this power of entry shall be exercised only between the hours of ten in the forenoon and four in the afternoon.
- Notice to lay service pipes.** 63. After pipes have been laid under the authority of this Act, for the supply of water to any street or part thereof, the Board shall cause a notice, in the form contained in the Third Schedule hereto, or to the like effect, to be published in four consecutive numbers of the *Gazette*, and in one or more newspapers circulating in the locality; and the owner or occupier of every tenement referred to in such notice shall, within three weeks from the date of the last publication of such notice in the *Gazette*, cause a proper pipe and stop-cocks to be laid, so as to convey a supply of water to such tenement. And after fourteen days from such last publication the owner or occupier of such tenement shall, unless the Board refuse to supply him with water, be liable to pay the rates and charges for such supply, although no such pipes and stop-cocks be laid, or no such water be used in such tenement.
- Pipes laid by owners or occupiers. Power to inhabitants to lay service pipes.** 64. Any owner or occupier of any dwelling-house, or part of a dwelling-house, within a Water District, who shall wish to have water from the waterworks of the Board brought into his premises, and who shall have paid or tendered to the Board the portion of water rate in respect of such premises, by this Act directed to be paid in advance, may open the ground between the pipes of the Board and his premises, having first obtained the consent of the owners and occupiers of such ground, and lay any pipes from such premises to communicate with the pipes of the Board.
- Notice to Board of laying pipes.** 65. Such pipes shall be of a strength and material approved of by some officer of the Board, and every such owner or occupier shall, before he begins to lay any such pipe, give to the Board two days' notice of his intention to do so.

70. Before any pipe is made to communicate with the pipes of the Board, the person intending to lay such pipes shall give two days' notice to the Board of the day and hour when such pipe is intended to be made to communicate with the pipes of the Board, and every such pipe shall be so made to communicate under the superintendence and according to the directions of the surveyor, or other officer appointed for that purpose by the Board. And the bore of any such pipe shall not exceed three-quarters of an inch, except with the consent of the Board.

Communication with pipes of Board to be made under superintendence of surveyor.

Bore of service pipes.

71. Any person who shall have laid down any pipe, or other works, or who shall have become the proprietor thereof, may remove the same after having first given six days' notice in writing to the Board of his intention so to do, and of the time of such proposed removal, and every such person shall make compensation to the Board for any injury or damage to their pipes or works which may be caused by such removal.

Service pipes may be removed after giving notice.

72. Any such owner or occupier may open or break up so much of the pavement, if any, as shall be between the pipe of the Board and his house, building, or premises, and any sewer or drain therein for any such purpose as aforesaid (doing as little damage as may be, and making compensation for any damage done in the execution of any such work). Provided always that every such owner or occupier desiring to break up the pavement of any street, or any sewer or drain therein, shall be subject to the same necessity of giving previous notice, and shall be subject to the same control, restrictions, and obligations in, and during the time of breaking up the same, and also reinstating the same, and to the same penalties for any delay in regard thereto as the Board are subject to under the provisions of this Part.

Power to break pavements.

73. If any person supplied with water by the Board wrongfully does, or causes or permits to be done, anything in contravention of any of the provisions of this Part, or wrongfully fails to do anything which under any of those provisions ought to be done for the prevention of the waste, misuse, undue consumption, or contamination of the water of the Board, the Board may (without prejudice to any remedy against him in respect thereof) cut off any of the pipes by or through which water is supplied to him or for his use, and may cease to supply him with water so long as the cause of injury remains or is not remedied.

PROTECTION OF THE WATER.

In case of any breach of this Part of this Act water may be cut off.

74. If any person, supplied with water by the Board, wilfully or negligently causes or suffers any pipe, valve, cock, cistern, bath, soil-pan, water-closet, or other apparatus or receptacle to be out of repair, or to be so used or contrived that the water supplied to him by the Board is or is likely to be wasted, misused, unduly consumed, or contaminated, or so as to occasion or allow the return of foul air or other noisome or impure matter into any pipe belonging to or connected with the pipes of the Board, he shall, for every such offence, be liable to a penalty not exceeding five pounds.

Penalty for waste of water.

75. If any person—

- (1.) Not having from the Board a supply of water for other than domestic purposes, uses for other than domestic purposes any water supplied to him by the Board;
- or
- (2.) Having from the Board a supply of water for any purpose other than domestic, uses such water for any purpose other than those for which he is entitled to use the same;—

Penalty for misapplication of water.

he shall for every such offence be liable to a penalty not exceeding forty shillings without prejudice to the right of the Board to recover from him the value of the water misused.

76. It shall not be lawful for the owner or occupier of any premises supplied with water by the Board, or any consumer of the water of the Board, or any other person, to affix, or cause or permit to be affixed, any pipe or apparatus to a pipe belonging to or used by such owner, occupier, consumer, or any other person, or to make any alteration in any such communication or service-pipe, or in any apparatus connected therewith, without the consent, in every such case, of the Board. And if any person acts in any respect in contravention of the provisions of the present section, he shall, for every such offence, be liable to a penalty not exceeding five pounds, without prejudice to the right of the Board to recover damages from him in respect of any injury done to its property, and without prejudice to their right to recover from him the value of any water wasted, misused, or unduly consumed.

No pipe to be fixed to consumer's pipe without permission of Board.

77. If any person, not being supplied with water by the Board, wrongfully takes or uses any water from any reservoir, watercourse, conduit, or pipe belonging to the Board, or from any pipe leading to or from any such reservoir, watercourse, conduit, or pipe, or from any cistern or other like place containing water belonging to the Board or supplied by them for the use of any consumer of the water of the Board, he shall for every such offence be liable to a penalty not exceeding five pounds.

Penalty for unlawfully taking water.

78. The surveyor or other person appointed for that purpose by the Board may, between the hours of nine o'clock in the forenoon and four o'clock in the afternoon, enter into any house or premises supplied with water by the Board in order to examine if there be any waste or misuse of such water; and if any such surveyor or other person at any such time be refused admittance into such dwelling-house or premises for the purpose aforesaid, or be prevented from making such examination as aforesaid, the Board may turn off the water supplied by them from such house or other premises.

Inspection of water.

79. If any person bathes in any stream, reservoir, aqueduct or other waterworks belonging to the Board, or wash, throw, or cause to enter therein any dog or other animal he shall for every such offence forfeit a sum not exceeding five pounds.

Polluting the water. Penalty for bathing in water of the Board.

Penalty for throwing dirt therein.

80. If any person throw or convey or cause or permit to be thrown or conveyed any rubbish, dirt, filth, or other noisome thing into any such stream, reservoir, aqueduct, or other waterworks as aforesaid, or wash or cleanse therein any cloth, wool, leather, or skin of any animal, or any clothes or other thing he shall for each such offence forfeit a sum not exceeding five pounds.

Penalty for letting foul water flow thereinto.

81. If any person cause the water of any sink, sewer, or drain, steam-engine, boiler, or other filthy water belonging to him or under his control, to run or be brought into any stream, reservoir, aqueduct, or other waterworks belonging to the Board, or shall do any other act whereby the water of the Board shall be fouled, he shall for each such offence forfeit a sum not exceeding five pounds, and a further sum of twenty shillings for each day (if more than one) that such offence continues.

Penalty for nuisance in watershed area.

82. Where any owner or occupier of any land within the watershed to be proclaimed as hereinbefore provided, or any reservoir or source of supply transferred to, or vested in the Board, does, or permits to be done on his land any act, or permits to remain thereon any matter or thing, which in the opinion of the Board is likely to injure the water supply, if notice to discontinue or remove the same be given to him in writing by the Board, and if he neglect or refuse to discontinue such act, or to remove such matter or thing, he shall for each such offence forfeit a sum not exceeding five pounds, and a further sum of twenty shillings for each day (if more than one) that such offence continues.

Provisions as to connection of closet and other pipes with mains, and as to cisterns, &c.

86. The following provisions shall take effect for the purpose of protecting the water in the mains or other pipes of the Board from all impurities from closets and other receptacles of faecal matter or urine—

No closet pipes hereafter to connect directly with the main.

(I.) It shall not be lawful for any person to connect with the main any pipe delivering the water directly into the closet-pan or other receptacle for faecal matter or urine without the intervention of a cistern or cisterns into which the water from the main shall first be received, and any person so offending shall forfeit and pay a penalty not exceeding fifty pounds.

Board may disconnect pipes in certain cases.

(II.) The Board may employ any artificers or workmen to cut off or otherwise disconnect from the main any pipe directly discharging the water into a closet without the intervention of a cistern [hereinafter termed "directly connected"], and which in the opinion of the Board may endanger the purity of the water by the absorption of noxious gases, or suction of faecal matter or urine into such pipe, or into the main, or otherwise: For the purpose of effecting such disconnection the Board's artificers and workmen may enter into and upon the premises of any person or corporation whatsoever to do, or cause to be done, anything in his opinion requisite or necessary in relation thereto.

The expense incurred by any disconnection to be paid by tenant and deducted from his rent.

(III.) Whenever the Board shall have caused any pipe to be cut off, or disconnected, or other work to be done in relation thereto, they shall forthwith serve the owner or occupier of the premises with a notice in writing, requiring him to pay the actual cost or expense incurred. And such owner or occupier shall pay the amount to the Board, and if the amount be paid by an occupier only he may deduct the same from the rent then due or accruing. Upon such owner or occupier making default in any such payment after the delivery of such notice as aforesaid the Board may sue for and recover the same with full costs of suit.

Owners of premises shall fix closet-cisterns or be liable to a penalty.

(IV.) The owner of every dwelling-house or premises which shall have therein or thereon any closet with a pipe or branch-pipe directly connected with the main, shall be required to fix and erect a cistern or cisterns for the reception of the water intended to be used for the closet, and every cistern shall be made of such materials and dimensions, and of such model or plan of construction, and with such ball-cocks, stop-cocks, waste-pipes, and other appliances as shall be deemed requisite and have been approved by the Board for securing the water from pollution through any noxious gases or matter evolved or derived from such closets or otherwise. Every owner neglecting to comply with the provisions of this section shall forfeit and pay a penalty not exceeding five pounds.

Upon neglect of owner, the tenant after fourteen days notice, to fix cistern and deduct the expense from rent.

(V.) Whenever any owner shall have neglected to fix and erect a cistern, with its appliances, as is in the last preceding sub-section provided for, the tenant or occupier of the premises is hereby authorized and required, after receiving a written notice thereof from the Board in that behalf, to fix and erect such cistern, with its appliances before mentioned, within fourteen days after the receipt of such notice, and the said tenant or occupier shall, upon payment by him of the charges and expense of such fixing and erection, be entitled either to deduct the amount so paid from the rent then due or accruing, or, at his option, to sue for and recover the same, with full costs of suit, from the owner as for money paid to his use.

Any person re-establishing any connection with the main unless authorized, or wilfully injuring any pipe, &c., liable to a penalty.

(VI.) Any person who shall, without the authority of the Board, re-establish any such connection which may have been cut off, removed, or severed by him, or who shall in any manner wilfully injure or tamper with any connection-pipe, cistern, ball-cock, stop-cock, or waste-pipe which may have been approved by the Board, so as to destroy, diminish, or endanger its efficiency, may be summoned for such offence before two Justices, and on conviction thereof shall be adjudged to pay the amount of the charges and expenses which the Board may have incurred (and which they are hereby authorized to incur) in repairing or restoring the same to a state of efficiency. Every such offender shall also forfeit and pay a penalty not exceeding ten pounds, and the amount of charges and expenses and penalty respectively shall, when recovered, be paid over to the Board.

87. Where several houses or parts of houses, in the separate occupation of several persons, are supplied by one common pipe, or where water is supplied to courts, alleys, and right-of-way by stand pipes, the several owners or occupiers of such houses, or parts of houses, or of the several houses, or parts of houses, in every such court, alley, or right-of-way, shall be liable to the payment of the same rates for the supply of water as they would have been liable to if each of such several houses, or parts of houses, had been supplied with water from the works of the Board by a separate pipe.

88. The rates and charges for water, and all sums due to the Board under this Part, shall be paid by and be recoverable from the owner of the premises or the occupier or person requiring, receiving, or using the supply of water; and all rates shall be paid in advance by equal payments on the first day of January and the first day of July in each year, and the first payment shall be made at the time when the owner or occupier of any tenement shall become liable to pay such rates and charges, and all such rates and charges may be enforced and recovered in respect of any premises in the said City of Sydney, or in any such Municipality as aforesaid, situate within one hundred and fifty feet from the alignment of any street or public highway along which a main water pipe belonging to the Board is laid, although such premises are not actually supplied with water from such main.

89. If any such person refuse or neglect to pay on demand to the Board any rate, charge, or sum due to the Board under this Part, the Board may recover the same with costs, or may order a warrant under the hand of their President or Vice-president, in the form contained in the Fourth Schedule hereto, to be from time to time issued to some constable or other person named therein to levy such rate, charge, or sum by distress and sale of goods and chattels of the person occupying the premises in respect of which such rate, charge, or sum is due at the time when the warrant of distress is executed, and in case no sufficient goods and chattels of such occupier be found on the premises to satisfy such distress, the owner of the premises, or if he be absent from the Colony, his agent shall be liable for such rate, charge, or sum, and the same may be recovered from him.



1890.

NEW SOUTH WALES.

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PARLIAMENTARY STANDING COMMITTEE ON  
PUBLIC WORKS.

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REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

AND

PLAN

RELATING TO THE

PROPOSED EXTENSION OF SYDNEY WATER SUPPLY

TO

SOUTHERN SUBURBS—HURSTVILLE AND ROCKDALE.

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Presented to Parliament in accordance with the provisions of the Public Works Act,  
51 Vic. No. 37, section 8.

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SYDNEY : CHARLES POTTER, GOVERNMENT PRINTER.



## MEMBERS OF THE COMMITTEE.

## LEGISLATIVE COUNCIL.

The Honorable JOHN LACKEY, Vice-Chairman.  
 The Honorable ANDREW GARRAN.  
 The Honorable FREDERICK THOMAS HUMPHERY.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 The Honorable GEORGE HENRY COX.

## LEGISLATIVE ASSEMBLY.

JOSEPH PALMER ABBOTT, Esquire, Chairman.  
 JACOB GARRARD, Esquire.  
 HENRY COPELAND, Esquire.  
 JAMES EBENEZER TONKIN, Esquire.  
 WILLIAM SPRINGTHORPE DOWEL, Esquire.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.  
 CHARLES ALFRED LEE, Esquire.

## GENERAL INDEX.

Report by the Committee.  
 Minutes of Evidence taken by the Committee.  
 Plan.

## LIST OF WITNESSES.

	PAGE.
Joseph Barling, Esq., Under Secretary for Public Works .....	7-8
Cecil West Darley, Esq., Engineer-in-Chief for Harbours and Rivers .....	8-9
Mr. Hugh Patrick, Mayor of Hurstville .....	9-10
Mr. Henry E. Godfrey, Mayor of Rockdale .....	10
Mr. J. B. Carroll, Mayor of Kogarah .....	11

## PLAN.

Sketch Plan—Southern Suburbs Water Supply.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

EXTENSION OF SYDNEY WATER SUPPLY TO SOUTHERN SUBURBS—  
HURSTVILLE AND ROCKDALE.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, appointed during the first Session of the present Parliament, under the Public Works Act of 1888, 51 Vic. No. 37, and the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, to whom was referred the duty of considering and reporting upon "the expediency of extending the Sydney Water Supply to Southern Suburbs—Hurstville, Rockdale," have, after due inquiry, resolved that it is not expedient the works should be carried out; and in accordance with the provision of subsection IV, of clause 13, of the Public Works Act, report their resolution to the Legislative Assembly:—

1. In considering this matter, which was submitted to them on the 1st October, 1889, the Committee took evidence from Mr. Joseph Barling, Under Secretary for Public Works; Mr. C. W. Darley, Engineer-in-Chief for Harbours and Rivers; and Messrs. Hugh Patrick, H. E. Godfrey, and J. B. Carroll, the Mayors of Hurstville, Rockdale, and Kogarah, respectively—the municipalities directly interested in this question. The matter appears, according to the evidence of Mr. Barling, to have originated in a public meeting which was held in the Council Chambers, Kogarah, in March, 1887, at which a resolution was passed on the subject, asking Parliament to devise some scheme for the better supply of water to that and other municipalities. The Hon. J. H. Carruthers, Minister of Public Instruction, one of the Members for the district, wrote to the Minister for Works, pointing out that there had already been a scarcity of water in the southern suburbs, and urging the necessity for provision to be made for a permanent supply. After the receipt of that letter surveys were made, and a scheme was proposed for connecting the places referred to with the main water supply from the Nepean, at a cost, as originally estimated, of £75,000, but afterwards reduced to £66,000, and the matter was then referred to the Committee. Since then, however, a supply of water for the district has been provided by means of temporary arrangements, which are explained in a minute by Mr. Darley. This minute states that since the original scheme was submitted, the Water Board has extended a 15-inch and a 12-inch trunk main from Petersham to beyond Kogarah, and already most of the low-lying populated portion of the district has been reticulated, and the water laid on. A temporary scheme has also been submitted by the Board's Engineer, to pump from the end of this trunk main to an elevated tank over Hurstville, which will supply all the elevated districts for some time to come, at a cost of about £3,200. This temporary scheme will, it is considered, answer all purposes until the district is more densely populated, and the money laid out on it will not necessarily be lost when the permanent scheme shall be carried out, as the reticulation pipes will be laid to suit the permanent scheme, and the land required for the temporary tank will suit for the permanent reservoir. In his evidence Mr. Darley stated that he thought it was advisable to postpone the permanent scheme for, say, five years, by which course five

years' interest on the large estimated outlay for that work would be saved. The water for the temporary scheme will be drawn from the Petersham Reservoir, where there is an abundance of water, as the pipe is not used to two-thirds of its capacity. The permanent scheme would be supplied from Potts' Hill. The Mayors of Hurstville, Rockdale, and Kogarah are agreed that if the districts concerned get a sufficient supply of water, the cheaper and quicker they get it the better.

Conclusion  
arrived at  
by the  
Committee.

2. Taking into consideration the statements in the evidence, and bearing in mind the present sparseness of the population of the districts in question, the Committee are of opinion that the temporary arrangement proposed will, for some years to come, fully meet the wants of the inhabitants, and they have the less hesitation in recommending its adoption, as they find that the works in connection with it can be afterwards utilized to a large extent in carrying out the permanent scheme. The Committee, therefore, on the 21st January, passed unanimously the following resolution, which was moved by Mr. Trickett, and seconded by Mr. Cox :—

“That it is not expedient to carry out the extension of the Sydney Water  
“Supply to the Southern Suburbs, Hurstville and Rockdale, according to  
“the proposal submitted to the Committee.”

J. P. ABBOTT,

Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Sydney, 11th February, 1890.

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7

# PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## MINUTES OF EVIDENCE.

### EXTENSION OF SYDNEY WATER SUPPLY TO SOUTHERN SUBURBS, HURSTVILLE AND ROCKDALE.

TUESDAY, 14 JANUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq., (CHAIRMAN).

<p>The Hon. JOHN LACKEY. The Hon. ANDREW GARLAN. The Hon. FREDERICK THOMAS HUMPHERY. The Hon. WILLIAM JOSEPH TRICKETT. The Hon. GEORGE HENRY COX. JACOB GARRARD, Esq.</p>		<p>HENRY COPELAND, Esq. JAMES EBENEZER TONKIN, Esq. WILLIAM SPRINGTHORPE DOWEL, Esq. EDWARD WILLIAM O'SULLIVAN, Esq. JOHN HURLBY, Esq. CHARLES ALFRED LEE, Esq.</p>
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The Committee proceeded to consider the proposed Extension of the Sydney Water Supply to Southern Suburbs:—Hurstville and Rockdale.

Joseph Barling, Esq., Under Secretary for Public Works, sworn, and examined:—

1. *Chairman.*] What are you? Under Secretary for Public Works.
2. Will you tell us what you have to say in reference to the extension of the Sydney Water Supply to the Southern Suburbs? I have to ask that this proposal be withdrawn from the consideration of the Committee because since the proposal was made temporary arrangements have been made for the supply of water to Kogarah and other districts on the Illawarra line which will answer requirements for some time to come.
3. The Department cannot withdraw it; all we can do is for the Committee to report to Parliament recommending that the proposal be not carried out; Parliament sent the proposal to us, and we shall have to give reasons to Parliament why it should not be carried out. You may as well tell us why the proposal was sent to Parliament, and why it is now proposed to withdraw it? It was sent to Parliament as the result of a public meeting at which a resolution was passed on the subject. That meeting was held in the Council Chambers at Kogarah in March, 1887, and the Minister was approached and asked to devise some scheme for the better supply of water to that and other municipalities. Subsequently Mr. Carruthers, one of the members for the district, wrote the following letter on the subject:—

J. Barling,  
Esq.  
14 Jan., 1890.

Sydney, 25th February, 1887.

The Hon. Minister for Works, Sydney.

Sir,—I have the honor, on behalf of the residents of Arncliffe, Rockdale, Kogarah, Hurstville, Canterbury, Peakhurst, Kingsgrove, and Tempe, to request that you will be pleased to take the necessary steps to obtain from the officers of your Department a report on the expediency of connecting these places with the main water supply from the Nepean. Already in these localities there has been a scarcity of water in the late periods of drought, and a recurrence of such periods in future, with the increased population, will cause a water famine there. The requirements of the immediate future, in my opinion, necessitate steps being now taken to provide for a supply from a permanent source.

After the receipt of this letter surveys were made, and a scheme was proposed for connecting the places referred to with the Nepean water supply, and eventually Parliament was asked to refer the question to this Committee. Since then, however, temporary arrangements have been made by which the supply of the district has been provided for. The Engineer-in-Chief has written the following minute:—

Water supply to Hurstville and southern suburbs; original estimate £75,000, submitted to Public Works Committee.

SINCE this scheme was submitted originally the Water Board have extended a 15-inch and a 12-inch trunk main from Petersham reservoir to beyond Kogarah, and already most of the low-lying populated portion of the district has been reticulated, and the water laid on.

The Board's Engineer for water supply has since submitted a temporary scheme for pumping from the end of this trunk main to an elevated tank over Hurstville, which will supply all the elevated districts for some time to come, at a cost of about £3,200.

The district is very sparsely populated, and the Board's assessor estimates that at the outside the probable revenue, assuming water to be laid on, would not exceed £250 per annum. Under the circumstances I am of opinion that it will be premature to carry out the large permanent scheme from Potts' Hill for some few years to come.

The temporary scheme proposed will answer all purposes until the district is more densely populated.

Had the 12-inch trunk main not been laid beyond Cook's River, then perhaps it would have been best to have carried out the large scheme; but since the work has been done I think a postponement for a few, say five, years desirable.

The present time is not the most favourable, in any case, for placing extensive orders for pipes and machinery, seeing that iron has risen so abnormally high.

The money laid out on the temporary pumping scheme will not necessarily be lost when the permanent scheme is carried out, as the reticulation pipes will be laid to suit the permanent scheme, and the land required for the temporary tank will suit for the permanent reservoir. Under the circumstances I recommend that the scheme be now withdrawn from the Public Works Committee.

C. DARLEY.

The

J. Barling, Esq. The Minister for Works has considered this matter, and he is of opinion that good reasons have been shown for asking the Committee to be so good as not to proceed with the examination of the scheme for the present.

14 Jan., 1890.

4. What is the estimated cost of the proposed work? I have a detailed estimate of £66,000; but I see that it has been put down at £75,000. That was a rough estimate.
5. At the time it was approved by the Minister the estimated cost was £66,000? Yes.
6. And since that was submitted you say that the Board of Water Supply have laid pipes to Kogarah which will enable that district to be supplied with water? Yes.
7. The cost of that, instead of being charged to loan votes, will come out of the revenue from the water supply? I imagine that it will still be charged to the loan votes, although I cannot answer that question definitely at present. A vote has been taken for the Water Supply Department, and I should imagine that any new work will be paid for out of loans, because it will be revenue-producing.

Cecil West Darley, Esq., Engineer-in-Chief for Harbours and Rivers, sworn, and examined:—

C. W. Darley, Esq.

14 Jan., 1890.

8. Mr. Garrard.] You are Engineer-in-Chief for Harbours and Rivers? Yes.
9. And a member of the Sewerage and Water Board? Yes.
10. You propose not to go on with the scheme for the extension of the Sydney water supply to Hurstville and Rockdale at an estimated cost of £66,000? I think it is advisable to postpone it.
11. What means have been taken to supply Kogarah and Hurstville with water? The Board have extended a 15-inch main part of the way, and then a 12-inch main as far as Kogarah from the Petersham reservoir.
12. How far does the 15-inch main go—down through Marrickville to Cook's River? Not quite; but to the Marrickville Road; then from there there is a 12-inch main.
13. In what direction? It comes down through St. Peters along the Cook's River Road, through Arncliffe and Rockdale to Kogarah.
14. I want to know where it is taken—along the lower level to Kogarah or the higher level? It is taken along the lower level.
15. How far out does it go—into Kogarah? They are laying the pipes there now.
16. How far does the 12-inch main go? I think a 9-inch main goes into Kogarah.
17. What do you propose to do with regard to the higher levels of Kogarah and Hurstville? When the scheme was brought forward it was proposed to erect a pumping station, and to have a high-level tank, near Hurstville.
18. Do you look upon that as a temporary measure which will have to be followed by a fuller scheme sooner or later? I think so. It depends upon how the district grows.
19. What is the estimated cost of this temporary scheme? About £3,500. The reticulation will have to be laid down in any case, and it will form part of the permanent work.
20. From what reservoir do you get the supply for Rockdale? Petersham.
21. What is the difference between the height where the proposed branch takes place and Pott's Hill? 12 feet.
22. Then you will lose 12 feet of head by going down to Petersham? Yes.
23. And all the water going to Hurstville will have to be pumped 12 feet higher? It is only a few hours pumping, and a very small pump will do it.
24. You think this expenditure of over £3,000 will meet the requirements of those districts for some years to come? The work was originally estimated to cost £75,000; but on going carefully into it I found that we could do it for £66,000. Four per cent. on that would be nearly £3,000 for one year's interest. We can carry out the temporary scheme, and if the larger scheme is postponed for five years we save five years' interest. Nearly all the work will be permanently useful, and the cost of maintaining a small station will be very much less than that of maintaining a large one.
25. In drawing your supplies from Petersham reservoir, will not that leave less water for suburbs which you contemplated would get their supplies from there? There is abundance of water. We are not using two-thirds of the capacity of the pipe. The pipe down to Petersham will carry 1,700,000 gallons a day, and the whole quantity which we are sending out hardly amounts to 10,000,000 gallons a day.
26. Then those districts which are drawing their supplies from Petersham will not be impoverished by this scheme? Not at all. The district is sparsely populated, and the quantity of water required will be comparatively small for some time to come.
27. Has the attention of the Department been directed to the prospect of getting a supply for the southern suburbs from the Woniora River? No.
28. Has any scheme with that object been put before the Department by outside people? It has been mooted. I think we did look into a proposal to obtain a supply from the Woniora River in connection with the site of noxious trades on the south side of Botany.
29. Not with a view of supplying Hurstville and Kogarah? No.
30. You are not in a position to say what would be the probable cost of supplying Kogarah and Hurstville from the Woniora River? No.
31. Do you know whether the people of Hurstville and Kogarah are satisfied with your temporary proposal as against the more complete one? If they get all they want I think they ought to be satisfied.
32. Are you aware of a petition having been sent in to go on with a permanent supply as against your temporary one? No, and I do not see why people should be listened to in dictating a higher expenditure than is necessary, if they get what they want. I might mention that the Board's assessor was sent out to the district, and he assessed all the high level district for which water would have to be pumped, and it only came to about £250 a year; therefore, if we carried out the complete scheme we should incur an expenditure of more than £60,000 to get a revenue of £250. Had not the pipes been run out of such large size a different course might have been taken. I am averse to bringing water into the city, and sending it out so far. The laying of the 12-inch pipe was authorized when I was in England, and as it has been taken out that far it is better to postpone the complete scheme for a few years. At the same time I do not regard it as permanent system at all satisfactory. We must go back to Potts' Hill.
33. You are satisfied that it is a feasible and right thing to carry out this temporary scheme for the present? Yes.

34. *Mr. O'Sullivan.*] Do you say that this temporary work will afterwards form a portion of the complete scheme? All the pipes which are laid will.
35. So that this work will have to be done in the future if it is not done now? When the population of the district increases it will have to be done.
36. *Mr. Dowel.*] Is this proposal not to proceed with the permanent work a departmental proposal, or is it a proposal of the Water and Sewerage Board? The proposal not to proceed with it is my own.

C. W. Darley,  
Esq.  
14 Jan., 1890.

TUESDAY, 21 JANUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).

The Hon. JOHN LACKEY.	JACOB GARRARD, Esq.
The Hon. ANDREW GARRAN.	HENRY COPELAND, Esq.
The Hon. FREDERICK THOMAS HUMPHERY.	JAMES EBENEZER TONKIN, Esq.
The Hon. WILLIAM JOSEPH TRICKETT.	EDWARD WILLIAM O'SULLIVAN, Esq.
The Hon. GEORGE HENRY COX.	JOHN HURLEY, Esq.

CHARLES ALFRED LEE, Esq.

The Committee further considered the proposed extension of the Sydney Water Supply to Southern suburbs—Hurstville and Rockdale.

Mr. Hugh Patrick, Mayor of Hurstville, sworn, and examined:—

37. *Mr. Garrard.*] What are you? I am Mayor of Hurstville.
38. Do you know the details of the proposal before the Committee in reference to the water supply? I cannot say that I do.
39. Are you aware that it has been proposed to bring the supply of water from Potts' Hill to a new reservoir at Laycock's Road, Hurstville? I am not aware of that. I understood that the supply was to come from Petersham.
40. Are you aware that that is the work remitted to this Committee for consideration? Yes.
41. That is the project which your Council think would serve them well? Them and the surrounding district.
42. Is the present Sydney water supply taken to Hurstville? Not yet.
43. What is the nearest point to which it is taken? Rockdale.
44. Are you aware that the mains are being extended into Rockdale and that the Water and Sewerage Board are preparing to pump the water from there to the same reservoir at Laycock's Road? I am not aware of that.
45. If you get a supply, whether it is by gravitation from Potts' Hill, or from Laycock's Road by pumping, is it immaterial to you? Yes.
46. The quicker you get it the better? No doubt; but we are a great deal higher. Hurstville is higher than Petersham; there is a difference of 214 feet. That is the reason why we think we ought to have a reservoir somewhere at Hurstville; we do not say where.
47. You think that the proposed reservoir at Laycock's Road would suit admirably? Yes.
48. It is immaterial to you whether the supply is pumped up or comes by gravitation from Potts' Hill? Yes; I have had some experience in the city, years ago, and I know that in the summer months the lower levels exhausted the pipes, and that is likely to happen when the water supply is extended to Hurstville.
49. If you are sure of a supply of water from a reservoir at Laycock's Road that is all you want, is it not? Yes.
50. Are you an engineer by profession? I am not.
51. Would you set up your engineering knowledge against that of Mr. Darley? I should be sorry to do so.
52. Then, if we are assured by Mr. Darley and others that a supply of water can be obtained from Laycock's Road by pumping, cheaper than from Potts' Hill, would that suit better? I could not say that it would suit better. If we had it we should be able to supply the district from the heights of Hurstville.
53. I understand you to say that you consider the point at Laycock's Road an admirable and proper site? Yes.
54. If it is proposed to provide a supply of water to Laycock's Road that is all you want, and the cheaper and quicker it is done the better? Yes. May I ask whether the Public Works Committee intend to recommend that a reservoir be made at Laycock's Road? If it has been decided to do that I am not needed here.
- 55-6. I want to know whether a reservoir at Laycock's Road would be sufficient for your requirements? A reservoir would be.
57. Are you under the impression that if pipes were laid from Potts' Point Hill to Laycock's Road the water would go by gravitation? No.
58. You know it would have to be pumped? Yes.
59. So far as the people you represent are concerned a reservoir at Laycock's Road is all they require? I believe that that is the site which has been recommended. We have not chosen any site. We leave it to the Department.
60. When your Council wrote a letter to the Committee were they aware that the Water and Sewerage Board were making arrangements for pumping the water to Laycock's Road? No.
61. They were under the impression that the only thing before them was to get the water from Potts' Hill the possibility of that supply not being gone on with, and your being left without water? Yes; of course we knew from the Department that they would be able to supply water by gravitation to the lower parts of Hurstville and West Kogarah.
62. They can do that now from Petersham? Yes.
63. *Chairman.*] What are the rates likely to be for the water supply? The municipal rates for 1889, at 1s. in the £, amounted to £2,750. We expect an increase this year. We were incorporated in 1887 when the revenue amounted to about £2,200. In 1888 the amount was about £2,500. The houses

Mr.  
H. Patrick.  
21 Jan., 1890.

- Mr. H. Patrick.  
21 Jan., 1890.
- in the district are increasing in number. In 1887 there were 467 houses, and a population of 2,163; in 1888 there were 530 houses, and an estimated population of 2,415, showing an increase of 63 houses, and 252 persons; in 1889, there were 550 houses, and an estimated population of 2,500, showing an increase of 20 houses, and 100 people. During the period that the district has been incorporated times have been dull.
64. Do you think you could raise £3,000 a year to pay interest on the expenditure in carrying out this work. You are aware, I suppose, that the municipalities will have to pay for it? We are only one; I suppose the others would have to pay too.
65. I am speaking of Hurstville and Rockdale? No doubt we should be able to pay our portion.
66. It must be an onerous tax for 2,400 people to pay £1,500? That would not be the amount; there are three municipalities, of which Rockdale is the largest.
67. *Dr. Garran.*] How many municipalities will this water supply serve? Rockdale, Kogarah, and Hurstville. I do not know about Canterbury.
68. Is the revenue of those other municipalities as large as yours? The revenue of the Rockdale municipality should be larger, seeing that it has been many years incorporated, and is nearer the city. The suburbs nearest the city are the most thickly populated.
69. I should gather that a 7d. water rate at Hurstville would yield £1,500 a year. Do you think the other municipalities would give so much? I should think so.
70. If they did you have an income of £4,500 a year. Have you calculated whether that would pay the interest on the expenditure? I do not know what the expenditure would be.
71. *Mr. Garrard.*] Has your Council ever had under consideration a project for supplying water from across the George's River, as against the Nepean supply? I recollect a person, named Murphy some time ago suggesting some such scheme, but it did not come before the Council.
72. No consideration was given to it? No.
73. The Council believe in having the water from the Nepean supply? Yes. Murphy mentioned that if they could get a Bill passed they were prepared to bring water across the river to supply the district.

Mr. Henry E. Godfrey, Mayor of Rockdale, sworn, and examined:—

- Mr. H. E. Godfrey.  
21 Jan., 1890.
- 73½. *Mr. Garrard.*] Are you Mayor of Rockdale? I am.
74. How long have you held that position? About eight months.
75. Were you an alderman before that? Yes, for sixteen years.
76. Of Rockdale? Yes.
77. You know the project which has been remitted to the Committee, to take a line of pipes from Potts' Hill to Laycock's Road, to supply the southern suburbs with water? Yes.
78. Would that serve your district as well as those of Hurstville and Kogarah? I believe it would; that is the very highest point.
79. At present the lower parts are supplied from Petersham? Yes.
80. How far does the water supply extend? As far as Arrow Road, on the Rocky Point Road.
81. Is there any project to extend it further? I do not know of any.
82. Is your Council in favour of the proposed reservoir at Laycock's Road? No particular point has been decided on. Only the highest point would suit our higher levels.
83. Do you think that if there was a reservoir at Laycock's Road that would be the best source to get your water from? I am positive of that.
84. And if a water supply by that means can be obtained at a cost of £4,000, as against an expenditure of £66,000, would it not be to the interest of the district to be supplied at the lower cost? Yes; if the supply at the lower cost will meet the requirements of the district.
85. Are you an engineer? No.
86. Would you put your opinion against that of the Engineer-in-Chief and Mr. Trevor Jones? I would not.
87. If we have it in evidence from Mr. Darley that the scheme I have mentioned would give an ample supply of water for years to come, you would be prepared to take his word? I should have no alternative. I have had no information from any surveyor.
88. If it can be done at a smaller cost it will be more to your interest than to have the more expensive scheme from Potts' Hill? We should not have to bear the cost as a municipality.
89. As one of the municipalities you would have to bear the cost. If the least expensive system is adopted the cost to you will, of course, be diminished? If that system will meet the wants of the people I say by all means let us have the less costly one. As I am not an engineer I do not pretend to know.
90. If it has been stated here by the Engineer-in-Chief that at a cost of something under £4,000 the water can be pumped up to the same level where it is proposed to bring the Potts' Hill water to supply your district, will it not be better to take that than the more expensive scheme which has been proposed? Yes. We have some very high points about Arncliffe. If that scheme would give us an equal pressure it would do.
91. As long as you get the same head of water it does not matter where you get it from, if you get it cheaper and quicker than by the more expensive scheme? It will not affect the ratepayers of Rockdale.
92. If we have been assured by a competent officer that all your requirements can be provided at a less cost than that of carrying out the more expensive scheme, will not your municipality be more than satisfied? Yes; we should be in favour of the less cost.
93. Has there been before you a project to supply the district from the Woinora? It was never brought before the Council. It was suggested by outside people.
94. Have you ever considered that proposal as against the Nepean supply? I have not. I talked the matter over with a man named Dallon, who, I think, was a surveyor, but I never went into it.
95. The people are in favour of getting their supply from the Nepean source, as cheaply and quickly as possible? Yes.

Mr.

Mr. J. B. Carroll, Mayor of Kogarah, sworn, and examined:—

96. *Mr. Garrard.*] Are you Mayor of Kogarah? I am.
97. How long have you held that position? This is the second time.
98. How long were you an alderman? Two or three years.
99. Are you aware that a project has been remitted to the Committee for the supply of the Southern suburbs with water from Potts' Hill, and the formation of a reservoir at Laycock's Road? No, I cannot say that I am aware of that.
100. Has the matter of water supply ever occupied the attention of your Council? It has.
101. Have they taken any steps to urge that it be carried out? We did, and the pipes are being laid in our municipality now.
102. By the Water and Sewerage Board? Yes.
103. From Petersham? Yes.
104. That will be for the lower levels? Yes.
105. But it is necessary that the higher levels should be supplied too? Yes.
106. If it has been stated confidently by the Engineer-in-Chief for Harbours and Rivers that he can provide a supply for the district from this proposed reservoir commanding the heights, at a cost of less than £4,000 as against the proposed expenditure of £66,000 on a supply from Potts' Hill direct, do you think that that would not be preferable to the more expensive scheme? I do. The cheaper we can get it the better. We are anxious to get the water as soon as possible.
107. Do you know the proposed site? I do not.
108. Do you know Laycock's Road? Yes.
109. That is the highest point in the district? Yes.
110. Do you think that a suitable place for a reservoir? I do not know of a better site.
111. It is the best place to command the whole district? Yes.
112. And if the municipality can be supplied with water more quickly and cheaply from there than from anywhere else that would be satisfactory to the people? Yes. Only one small portion of our district has that elevation, and that is the part near Hurstville Railway Station. Kogarah is only about 80 feet above the level of the sea.
113. Would you be perfectly satisfied if a supply of water were obtained the cheapest and quickest way? Yes; we are anxious to get a supply as soon as possible.
114. *Dr. Garran.*] You do not want any pumping in your municipality if it is only 80 feet above the sea level? That is one portion of the district. The portion next Hurstville has the same elevation as Hurstville.
115. Is that a fourth part of your area? No. The municipality contains 3,500 acres. The elevated portion will be about 100 acres.
116. The bulk would be supplied without any pumping? Yes.
117. A very small portion of the municipality is interested in the pumping at all? Yes, that near Hurstville.

Mr.  
J. B. Carroll.  
21 Jan., 1890.

[One plan.]



1890.

## NEW SOUTH WALES.

METROPOLITAN WATER AND SEWERAGE ACT AMEND-  
MENT ACT OF 1889.

(PROCLAIMING BOUNDARIES OF LIVERPOOL DISTRICT.)

Presented to Parliament, pursuant to Act 53 Vic. No. 16.

NEW SOUTH WALES, } Proclamation by His Excellency The Right Honourable CHARLES ROBERT, BARON  
to wit. } CARRINGTON, a Member of Her Majesty's Most Honourable Privy Council,  
(L.S.) } Knight Grand Cross of the Most Distinguished Order of Saint Michael and  
By Deputation from } Saint George, Governor and Commander-in-Chief of the Colony of New South  
His Excellency : } ALFRED STEPHEN,  
ALFRED STEPHEN, } Lieutenant-Governor. Wales and its Dependencies.

IN pursuance of the provisions of "The Metropolitan Water and Sewerage Act Amendment Act of 1889," I, CHARLES ROBERT, BARON CARRINGTON, Governor aforesaid, do hereby proclaim that the following shall be the defined boundaries of the Liverpool Water District, for the purpose of carrying out the authorized scheme of Water Supply for the town of Liverpool:—

Commencing on the right bank of Prospect Creek, at Kenyon's Bridge, at the crossing of the road from Smithfield to Parramatta; and bounded on the east by that creek downwards to the George's River; and by that river upwards to a point due east from the south-east corner of Richard Guise's portion of 300 acres, parish of St. Luke; thence on the south by a line due west, forming part of the southern boundary of that portion, to its intersection with the Bringelly Road; and thence by that road south-westerly, westerly, and south-westerly to the Nepean Canal; bounded thence on the west by that canal northerly, north-easterly, and northerly to the boundary dividing the parish of Prospect from the parishes of Melville and St. Luke; thence on the north by that boundary easterly to Prospect Creek; and by Prospect Creek downwards, to the point of commencement.

The above area includes the whole of the parish of St. Luke and parts of the parishes of Cabramatta and Melville, in the county of Cumberland, and contains about 58 square miles. *Vide* Office Map of the county of Cumberland.

Given under my Hand and Seal, at Government House, Sydney, this third day of February, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

METROPOLITAN WATER AND SEWERAGE ACT  
AMENDMENT ACT OF 1889.

(PROCLAIMING BOUNDARIES OF CAMPBELLTOWN DISTRICT.)

Presented to Parliament, pursuant to Act 53, Vic. No. 16.

NEW SOUTH WALES, } Proclamation by His Excellency The Right Honourable CHARLES ROBERT, BARON  
to wit. } CARRINGTON, a Member of Her Majesty's Most Honourable Privy Council,  
(L.S.) } Knight Grand Cross of the Most Distinguished Order of Saint Michael and  
*By Deputation from* } Saint George, Governor and Commander-in-Chief of the Colony of New South  
*His Excellency:* }  
ALFRED STEPHEN, }  
*Lieutenant-Governor.* } Wales and its Dependencies.

In pursuance of the provisions of "The Metropolitan Water and Sewerage Act Amendment Act of 1889," I, CHARLES ROBERT, BARON CARRINGTON, Governor aforesaid, do hereby proclaim that the following shall be the defined boundaries of the Campbelltown Water District, for the purpose of carrying out the authorized scheme of Water Supply for the Town of Campbelltown:—

Commencing at the intersection of the north-eastern boundary line of the parish of Narellan with the Nepean Canal; and bounded on the north-east by that boundary line south-easterly to its intersection with the northern boundary line of the parish of St. Peter; thence by that boundary line easterly to George's River; thence on the east by George's River southerly to its intersection with the southern boundary line of the parish of St. Peter; thence on the south by the southern boundary line of the parish of St. Peter westerly to its intersection with the eastern boundary line of the parish of Narellan; thence on the west by part of the eastern boundary line of the parish of Narellan northerly to its intersection with the Nepean Canal; thence by that canal northerly, to the point of commencement.

The above-described boundaries include the whole of the parish of St. Peter and a portion of the parish of Narellan, in the county of Cumberland, the area being about 25 (twenty-five) square miles.

Given under my Hand and Seal, at Government House, Sydney, this third day of February, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## METROPOLITAN WATER AND SEWERAGE ACT AMENDMENT ACT OF 1889.

(PROCLAIMING BOUNDARIES OF METROPOLITAN DISTRICT.)

Presented to Parliament, pursuant to Act 53 Vic. No. 16.

NEW SOUTH WALES, } Proclamation by His Excellency The Right Honourable CHARLES ROBERT,  
to wit. } BARON CARRINGTON, a Member of Her Majesty's Most Honourable Privy  
(L.S.) } Council, Knight Grand Cross of the Most Distinguished Order of St. Michael and  
By Deputation from } His Excellency: St. George, Governor and Commander-in-Chief of the Colony of New South  
ALFRED STEPHEN, }  
Lieutenant-Governor. } Wales and its Dependencies.

IN pursuance of the provisions of "The Metropolitan Water and Sewerage Act Amendment Act of 1889," I, CHARLES ROBERT, BARON CARRINGTON, Governor aforesaid, do hereby proclaim that the following shall be the defined boundaries of the Metropolitan Water District, for the purpose of carrying out the authorized scheme of Water Supply for the City of Sydney and its Suburbs:—

County of Cumberland, parishes of Alexandria, Botany, Bankstown, Concord, Hunter's Hill, Liberty Plains, Petersham, St. Andrew, St. George, St. James, St. Lawrence, St. Philip, St. John, Willoughby, and Field of Mars, area about 136,000 acres: Commencing on the shore of the Pacific Ocean, at the Inner South Head of Port Jackson; and bounded thence by that shore southerly to the North Head of Botany Bay; thence by the northern and western shores of that bay westerly and southerly to the northern shore of George's River; thence by that shore westerly and upwards to the confluence of Prospect Creek; thence by the left bank of that creek upwards to Konyon Bridge, at the crossing of the road from Sherwood to Parramatta; thence by the western boundary of the parish of St. John, being lines forming the western boundaries of Benjamin Herbert's 60 acres, W. Herbert's 60 acres, P. Farrell's 50 acres, Thomas Parkes' 50 acres, Samuel Hennell's 30 acres, and John Young's 30 acres, northerly to the northern side of the Old Prospect Road; by that side of that road easterly to the Great Western Road at the crossing of a branch of Toongabbie Creek, which forms an eastern boundary of D'Arcy Wentworth's 2,750 acres; by an eastern and a northern boundary of that land northerly and west to the south-west corner of J. J. Bohringer's 22½ acres, and by the western boundary of that land north to Toongabbie Creek; thence by that creek downwards to the confluence of the Quarry branch of that creek; and by that branch upwards to the southern boundary of William Goodin's 40 acres; thence by that boundary easterly to the Windsor Road; and by a line east, crossing that road, to the western boundary of Mr. Alderson's 100 acres; thence by part of the western and by the north-western boundary of that land northerly and north-easterly to the western boundary of Wm. Charles Wentworth's 260 acres; thence by part of the western and by the northern boundary of that land northerly and easterly to the south-west corner of John Pickup's 86 acres; thence by the southern boundaries of that land and a line easterly to the south-west corner of John Turner's 72 acres; thence by a line partly forming the south-eastern boundaries of that land, William Wright's 30 acres, Edward Quinn's 50 acres, William Sutton's 140 acres, Andrew Murray's 280 acres, and part of the south-eastern boundary of Andrew Murray's 135 acres 2 roods north-easterly to a southern branch of Devlin's Creek; thence by that branch downwards to Devlin's Creek; and by that creek downwards to the Great Northern Railway Line near Carlingford Platform; thence by a line along the northern side of Somerset-street, and the northern side of a road forming the southern boundaries of portions 418 to 421, parish of Field of Mars, easterly to Terry's Creek; thence by that creek downwards to the Lane Cove River; and by that river downwards to the confluence of Blue Gum Creek; thence by that creek upwards to the north-western boundary of Isaac Nichol's 200 acres, parish of Willoughby; thence by part of that boundary north-easterly to the southernmost corner of Thomas Boulton's 60 acres; thence by the south-western boundary of that land north-westerly to its westernmost corner; thence by a line partly forming the north-western boundary of that land and the northern side of Albert-street and its prolongation north-easterly to the southern shore of Middle Harbour; thence by that shore generally easterly to Middle Head; and thence by a line south-easterly, to the point of commencement.

All references to counties and parishes made in the above description are in connection with the maps of the same in the Department of Lands.

Given under my Hand and Seal, at Government House, Sydney, this thirtieth day of January, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!

)

1890.

## NEW SOUTH WALES.

# METROPOLITAN WATER AND SEWERAGE ACT.

(BY-LAWS.)

Presented to Parliament, pursuant to Act, 43 Vic. No. 32.

Department of Public Works,  
Sydney, 24th December, 1889.

HIS Excellency the Governor, with the advice of the Executive Council, has been pleased to approve of the following By-laws in connection with the Metropolitan Sewerage System which have been prepared in accordance with the provisions of the Acts 43 Vic. No. 32 and 53 Vic. No. 16.

BRUCE SMITH.

## BOARD OF WATER SUPPLY AND SEWERAGE.

### METROPOLITAN SEWERAGE BY-LAWS.

WHEREAS by the Metropolitan Water and Sewerage Act of 1880, 43 Vic. No. 32, and the Metropolitan Water and Sewerage Act Amendment Act of 1889, 53 Vic. No. 16, the Board of Water Supply and Sewerage is authorized and empowered from time to time to make, alter, and repeal By-laws.

Now, the Board of Water Supply and Sewerage, under and by virtue of the powers contained in the Metropolitan Water and Sewerage Acts, 1880-1889, do hereby make the By-laws following, that is to say:—

1. The following rates and charges are those which the owners and occupiers of lands and tenements shall pay in respect of sewerage, that is to say:—

- (1.) On every house, tenement, or land of seventeen pounds assessed annual value and under, ten shillings per annum.
- (2.) On every house, tenement, or land above the assessed annual value of seventeen pounds, a rate of seven pence for each pound sterling on the amount of the valuation.
- (3.) Vacant lands of the assessed annual value of £40 and over shall be subject to a rate of three pence for each pound sterling on the amount of the valuation.

Notice to be given before removal or alteration of drains, &c.

2. No person shall remove or make any alteration in any drain, trap, soil-pipe, water-closet, urinal, sinks, or other fitting communicating with any sewer of the Board, unless he shall have previously given to the Board six (6) days' notice in writing of his intention to do so.

Authorized plumbers or other workmen only to be employed.

3. No builder, plumber, drainer, or other workman shall do or be allowed to do any work in connection with the drainage of any premises, unless he shall have been duly admitted by the Board as a "licensed drainer," and shall have engaged to conform to and comply with the By-laws and Regulations.

Material, &c., for drains.

4. Every person who shall erect a new building, or make additions to any existing building, or connect existing premises to any sewer of the Board, shall in the construction of every drain of such building, additions, or premises, use good sound pipes formed of glazed stoneware or of other equally suitable material.

Size of drains, drains to be laid in concrete, where necessary to have proper fall and suitable joints.

(a.) He shall cause every such drain to be of adequate size, and if constructed or adapted to be used for conveying sewage to have an internal diameter not less than four inches, and to be laid in a bed of good concrete when necessary, with a proper fall and with watertight socketed or other suitable joints.

Drains beneath buildings.

(b.) He shall not construct any such drain so as to pass under any building, except in any case where any other mode of construction is impracticable, and in that case he shall cause such drain to be so laid in the ground that there shall be a distance equal at least to the full diameter thereof between the top of such drain at its highest point and the surface of the ground under such building.

To be embedded in concrete.

(c.) He shall also cause every such drain to be laid in a direct line for the whole distance beneath such building, and to be completely embedded in and covered with good and solid concrete at least six inches thick all round.

Drains to be ventilated.

(d.) He shall likewise cause adequate means of ventilation to be provided in connection with such drain, at each end of such portion thereof as is beneath such building.

Inlets to be trapped.

(e.) He shall cause every inlet to any drain (not being an inlet provided in pursuance of the By-law in that behalf as an opening for the ventilation of such drain), to be properly trapped.

## House-drains to be trapped from sewer.

5. Every house-drain shall be provided with a suitable disconnector trap at a point as distant as may be practicable from such building and as near as may be practicable to the point at which such drain may be connected with the public sewer or other means of drainage, but if possible within the boundaries of the property.

## Work to be executed according to the Regulations.

6. All work connected in any way with the drainage of any premises shall be inspected by an officer appointed by the Board for that purpose, and every facility shall be afforded for such inspection. No underground or enclosed work shall on any account be covered up or concealed from view until the same shall have been duly inspected and passed by the Inspector.

## Position of water-closets.

7. Every person who shall construct a water-closet in a building shall construct such water-closet in such a position that one of its sides at the least shall be an external wall.

## Every water-closet to have external windows.

8. Every person who shall construct a water-closet in connection with a building, whether the situation of such water-closet be or be not within such building, shall construct in one of the walls of such water-closet a window of not less dimensions than two feet by one foot exclusive of the frame, and opening directly into the external air.

## Water-closet to have additional and permanent ventilation.

(a.) He shall, in addition to such window, cause such water-closet to be provided with adequate means of constant ventilation by at least one air-brick built in an external wall of such water-closet, or by an air-shaft, or by some other effectual method or appliance.

## Construction of cistern to water-closet.

9. Every water-closet hereafter erected, altered, or repaired shall be supplied with a proper supply cistern, fitted immediately over the closet. The down pipe from same shall in no case be less than 1½ inch internal diameter, and shall be fitted as straight as possible; the bottom of such cistern shall be at least five feet clear above the closet seat. Every cistern shall be made of such materials and dimensions and of such plan of construction, and with such ball-cocks, stop-cocks, down and waste pipes, and other appliances as shall be deemed requisite by the Board to prevent waste of water. In connection with every cistern there shall be provided a service box or compartment, which will discharge not less than two (2) gallons at each flush.

(a.) Every house, tenement, factory, institution or place, public or private, shall hereafter be provided with means of storing water for flushing and cleansing the pipes, drains, traps, and apparatus of water-closets and urinals connected therewith, in the event of a temporary stoppage of water supply or otherwise, and such tanks or cisterns shall be of such capacity, dimensions, and arrangement as to contain, in the aggregate, a quantity of water equal to two days' supply of two gallons per head per diem according to the possible requirements of such house, tenement, factory, institution or place. Every owner neglecting to comply with the provisions of this section will be liable to a penalty not exceeding five pounds.

## Water-closet to have flushing apparatus.

10. Every person who shall construct a water-closet in connection with a building shall furnish such water-closet with a suitable apparatus for the effectual application of water to any pan, basin, or other receptacle, with which such apparatus may be connected and used, and for the effectual flushing and cleansing of such pan, basin, or other receptacle, and for the prompt and effectual removal therefrom of any solid or liquid filth which may from time to time be deposited therein. (No person shall erect or use any cistern which is not made of such materials and dimensions, and of such model or plan of construction, and with such ball-cocks, stop-cocks, waste-pipes, and other appliances, as shall be deemed requisite, and have been approved by the Board).

## Water-closet to have proper basin.

(a.) He shall furnish such water-closet with a pan, basin, or other suitable receptacle of non-absorbent material, and of such shape, of such capacity, and of such mode of construction as to receive and contain a sufficient quantity of water, and to allow all filth which may from time to time be deposited in such pan, basin, or receptacle to fall free of the sides thereof, and directly into the water received and contained in such pan, basin, or receptacle.

## Ventilation of house-drains.

11. Every owner of existing buildings, and every person who shall erect a new building, and every person who shall connect any existing building to any sewer or drain under the control

of the Board, shall, for the purpose of securing efficient ventilation of the drains of such building, comply with the following requirements:—

(i.) He shall provide at least two untrapped openings to the drains, and in the provision of such openings, he shall adopt such of the two arrangements hereinafter specified as the circumstances of the case may render the more suitable and effectual, that is to say—

(a.) One opening, being at or near the level of the surface of the ground adjoining such opening, shall communicate with the drains by means of a suitable pipe, shaft, or disconnecting chamber, and shall be situated as near as may be practicable to the trap which, in pursuance of the By-law in that behalf, shall be provided between the main drain or other drain of the building and the sewer or other means of drainage with which such drain may lawfully communicate. Such opening shall also in every case be situated on that side of the trap which is the nearer to the building. The second opening shall be obtained by carrying up from a point in the drains, as far distant as may be practicable from the point at which the first-mentioned opening shall be situated, a pipe or shaft, vertically, to such a height and in such a manner as effectually to prevent any escape of foul air from such pipe or shaft into any building in the vicinity thereof.

(b.) In every case where the foregoing arrangement of the openings to the drains may be impracticable, there shall be substituted the arrangement hereinafter prescribed. One opening shall be obtained by carrying up from a point, as near as may be practicable to the trap, which in pursuance of the By-law in that behalf, shall be provided between the main drain or other drain of the building and the sewer or other means of drainage with which such drain may lawfully communicate, a pipe or shaft, vertically, to such a height and in such a manner as effectually to prevent any escape of foul air from such pipe or shaft into any building in the vicinity thereof. Such opening shall also in every case be situated on that side of the trap which is the nearer to the building. The second opening, being at a point in the drains as far distant as may be practicable from the point at which such last-mentioned pipe or shaft shall be carried up, shall be at or near the level of the surface of the ground adjoining such opening, and shall communicate with the drains by means of a suitable pipe or shaft.

(ii.) He shall cause every opening provided in accordance with either of the arrangements hereinbefore specified to be furnished with a suitable grating or other suitable cover for the purpose of preventing any obstruction in or injury to any pipe or drain by the introduction of any substance through any such opening. He shall, in every case, cause such grating or cover to be so constructed and fitted as to secure the free passage of air through such grating or cover by means of a sufficient number of apertures, of which the aggregate extent shall be not less than the sectional area of the pipe or drain to which such grating or cover may be fitted.

(iii.) Every pipe or shaft which may be used in connection with either of the arrangements hereinbefore specified shall be of a sectional area not less than that of the drain with which such pipe or shaft may communicate, and not less in any case than the sectional area of a pipe or shaft of the diameter of four inches.

(iv.) No bend or angle shall (except by the special authority and permission of the Board) be formed in any pipe or shaft used in connection with either of the arrangements hereinbefore specified.

(v.) Provided always, that for the purpose of either of the arrangements hereinbefore specified the soil-pipe of any water-closet, in every case where the situation, sectional area, height, and mode of construction of such soil-pipe shall be in accordance with the requirements applicable to the pipe or shaft to be carried up from the drains, may be deemed to provide the necessary opening for ventilation which would otherwise be obtained by means of such last-mentioned pipe or shaft.

## No inlet to drains within buildings.

12. Any person who shall erect a new building, shall not construct any drain of such building in such a manner as to allow any inlet to such drain (except such inlet as may be necessary from the apparatus of any water-closet) to be made within such building.

## Size, situation, and ventilation of soil-pipe.

(a.) He shall cause the soil-pipe from every water-closet in such building to be at least four inches in diameter, and to be fixed outside such building, and to be continued upwards without diminution of its diameter and, except where unavoidable, without any bend or angle being formed in such soil-pipe to such a height and in such a position as to afford, by means of the open end of the soil-pipe, a safe outlet for sewer air.

Soil-pipe not to be trapped at foot.

(b.) He shall so construct such soil-pipe that there shall not be any trap between such soil-pipe and the drains or any trap (other than such as may necessarily form part of the apparatus of any water-closet) in any part of such soil-pipe.

Waste-pipes to discharge into the open air.

(c.) He shall also cause the waste-pipe from every bath-sink (not being a slop-sink constructed or adapted to be used for receiving any solid or liquid filth) or lavatory, the over-flow pipe from any cistern and from any safe under any bath or water-closet, and every pipe in such building for carrying off waste water to be taken through an external wall of such building and to discharge in the open air over a channel leading to a trapped gully grating, at least eighteen inches distant.

Slop sinks to be as water-closets.

(d.) He shall as regards the mode of construction of the waste-pipe from any slop-sink constructed or adapted to be used for receiving within such building any solid or liquid filth, comply in all respects with such of the provisions of this By-law as are applicable to the soil-pipe from a water-closet.

Openings for ventilation.

13. All openings for ventilation made in accordance with these By-laws shall at all times be kept open and perfectly free from obstruction. Every occupier shall at all times see that all openings to the drains upon his premises, whether for ventilation or otherwise, and that all traps and other fittings are at all times in good order, clean, and free from obstruction.

Officer of Board may enter premises.

14. Any officer of the Board acting under their authority may enter between sunrise and sunset any house or premises connected with the sewers, in order to examine whether the drains and other fittings in such house or premises are in proper order. Any person refusing such admission, or in any way hindering such officer in the execution of his duty, shall be liable to a penalty as hereinafter mentioned.

Notice and plan of intended new building or rebuilding.

15. Every person who shall intend to erect a building or rebuild, or make any addition or alterations to any building shall give to the Board seven days' notice of such intention, which notice shall be accompanied by plans and section of such intended buildings, or addition, or alteration, drawn to a scale of one inch to every eight feet, showing the intended lines of drainage of such building, and the details of the arrangement proposed to be adopted for the ventilation of the drains.

Drainage of subsoil.

16. Every person who shall erect a new building shall cause the subsoil of the site of such building to be effectually drained by means of suitable stoneware pipes properly laid to a suitable outfall, wherever the dampness of the site renders such precaution necessary. He shall not lay any such pipe in such a manner or in such a position as to communicate directly with any sewer or cesspool or with any drain constructed or adapted to be used for conveying sewage, but shall provide a suitable trap with a ventilator opening, at a point in the line of the subsoil drain as near as may be practicable to such trap.

Lowest story to be at level above sewer.

17. Every person who shall erect a new building shall construct the lowest story of such building at such level as will allow of the construction of a drain sufficient for the effectual drainage of such building, and of the provision of the requisite communication with any sewer into which such drain may lawfully empty, at a point in the upper half diameter of such sewer, or with any other means of drainage with which such drain may lawfully communicate. The Board may in any case in which they think proper, exempt any person from the provisions of this By-law.

Deposit of solid matters in cesspits and house drains.

18. No person shall permit any solid matter, animal, or any other matter to be deposited in closet-traps, yard-sinks, or house-drains so as to endanger the efficiency of same.

Deposit of refuse in sewer.

19. No person shall deposit ashes, house refuse, or any other solid matter in any sewer or drain; suitable provision must be made to intercept and prevent same passing into such sewers or drains.

Discharges from Hospitals, &c.

20. It shall not be lawful for any person to empty into any sewer or drain under the control of the Board, from any hospital, institution, or other private or public building, any solid or liquid discharges from patients suffering from typhoid fever or any other infectious or contagious disease, without first thoroughly disinfecting the same.

Refuse from gas or chemical works not to be discharged into sewers.

21. It shall not be lawful for any person to discharge into any sewer or drain any gaseous liquid or solid of an explosive nature.

Street gullies not to be connected to sewers without permission.

22. No person shall connect any gullies or pits for the disposal of road drainage into any sewer or drain under the control of the Board, without first obtaining the consent of the Board to such connection or connections being made.

Notices to be prepaid.

23. All notices and applications required by these By-laws are to be made upon printed forms to be obtained at the office of the Board. Notices sent by post must be prepaid. All sums paid by the Board on account of notices sent by post and not prepaid will be charged against and recovered from the sender.

"Person" includes corporation, &c.

24. In the construction of these By-laws the word "person" shall be deemed to extend to and include a corporation, or any body or number of persons, and the masculine shall include the feminine gender.

Penalties.

25. Any person committing a breach of any By-law to which no specific penalty is attached, or who shall refuse or neglect to obey any injunction in any such By-law, shall upon conviction be liable to pay a penalty not exceeding £20. And in case of a continuing offence, a further penalty not exceeding £5 for each day after notice of such offence shall have been given by the Board to such offender.

26. The following shall be the form of notice to connect to sewers prescribed under section 5, "Metropolitan Water and Sewerage Act, 1889":—

*Notice to connect to Sewer under the control of the Board of Water Supply and Sewerage.*

Board of Water Supply and Sewerage,  
Sydney, 18 .

To the Owner or Occupier.

Notice is hereby given that a sewer has been laid in (as the case may be), and is ready for receiving sewage. The Board of Water Supply and Sewerage hereby demand and require that the owner or occupier of the house, tenement, or lands at or on which this notice is left or exhibited shall construct the drains, cisterns, and fittings from and in connection with such house, tenement, or lands, to communicate with such sewer, as are prescribed by the By-laws and Regulations of the said Board.

For the Board of Water Supply and Sewerage,

Secretary.

The following shall be the form of demand prescribed under Sub-section II to Section VI of "Metropolitan Water and Sewerage Act Amendment Act of 1889":—

*Demand for Payment of Expenses of Drainage and Ventilation of Premises.*

Board of Water Supply and Sewerage,  
Sydney, 18 .

To the owner or occupier.

You are hereby required within twenty-one (21) days from the date of this notice to pay to the Board of Water Supply and Sewerage the sum of £ (as the case may be), being the full amount of (as the case may be)

to premises No. street, (as the case may be). And take notice that unless the abovementioned sum of £ be paid by you within the time abovementioned proceedings for the recovery of such sum will be taken against you without further notice.

For the Board of Water Supply and Sewerage,

Secretary.



1890.

## NEW SOUTH WALES.

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**METROPOLITAN WATER AND SEWERAGE ACT.**  
 (BY-LAWS FOR COUNTRY DISTRICTS, COUNTY OF CUMBERLAND.)

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 Presented to Parliament, pursuant to Acts 43 Vic. No. 32, 51 Vic. No. 28, and  
 53 Vic. No. 16.
 

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 Department of Public Works,  
 Sydney, 20th June, 1890.

**METROPOLITAN WATER BY-LAWS.—FOR COUNTRY DISTRICTS IN  
 COUNTY OF CUMBERLAND.**

HIS Excellency the Governor, with the advice of the Executive Council, has been pleased to approve of the following "Metropolitan Water By-laws, Country Districts, County of Cumberland," prepared by the Board of Water Supply and Sewerage, in accordance with the provisions of the "Metropolitan Water and Sewerage Acts, 1880-1889."

BRUCE SMITH.

WHEREAS by the Metropolitan Water and Sewerage Acts, 1880-1889, the Board of Water Supply and Sewerage is authorized and empowered from time to time to make, alter, and repeal By-laws:

Now the Board of Water Supply and Sewerage, under and by virtue of the powers contained in the Metropolitan Water and Sewerage Acts, 1880-1889, do hereby make the By-laws following, that is to say:—

1. The following rates and charges are those which the owners and occupiers of lands and tenements shall pay in respect of water supplied by the Board, that is to say:—

*(For water supplied for domestic purposes otherwise than by measure.)*

- (I.) On every house, tenement, or land of £10 assessed annual value and under, 10s. per annum.
- (II.) On every house, tenement, or land above the assessed annual value of £10, a rate of 1s. for each pound sterling on the amount of the valuation.
- (III.) Vacant lands of the assessed value of £30 and over shall be subject to a rate of 4d. for each pound sterling on the amount of the valuation.
- (IV.) The like rates as those above mentioned shall be charged on all lands, tenements, and hereditaments not included in any valuation by any Borough or Municipal District, and on all lands for the time being valued by any such Borough or Municipal District at a sum less than the true value thereof.

*(For water supplied by measure.)*

- (v.) The rates to be charged for water supplied from stand-pipes shall be 1s. 6d. per 1,000 gallons.
- (vi.) The rates to be charged for water supplied from the mains by measure shall be 1s. 6d. per 1,000 gallons.
- (vii.) Water-troughs will be charged for at the rate of 20s. per annum each.
- (viii.) Gas-engines will be charged for at the rate of 20s. per annum each.
- (ix.) Water for steam boilers will be charged for by measure at the rate of 1s. 6d. per 1,000 gallons.

Payment of rates.

2. Assessed rates must be paid half-yearly in advance whether a meter is used or not. In the case when a meter is used the meter account will be rendered only when it is in excess of the assessment. Cheques and Post Office Orders will be received in payment of rates; but if the cheque tendered by any person as payment for rates due is dishonoured, the Board may cut off his service, and proceed for the recovery of the amount by warrant of distress. Cheques and Post Office Orders must be crossed in favour of the Board.

Minimum charge, by meter or otherwise, is the assessed rate.

3. The minimum charge for water, whether supplied through meter or otherwise, for domestic purposes and for purposes other than domestic, is the assessed annual rate. If the water is supplied by meter, and the meter account exceeds the assessment (calculated at the rate of 1s. 6d. per 1,000 gallons), then such excess shall be charged in addition to the assessment.

Building charges, &c.

4. The Board may supply water for building purposes at the rate of 5s. per room or by meter at 1s. 6d. per 1,000 gallons. And the minimum charge by meter shall be 10s. 6d. for each work, which charge shall be paid in advance. The Board, may supply water for the making and mixing of concrete for foundations of wooden blocks, stone cubes, or other form of permanent roadway or pavement, at the rate of £1 10s. per 1,000 square yards, by superficial measurement of road surface; and for all other concrete, brickwork, or masonry, at the rate of 3d. per cubic yard, as measured on the work.

Horse and cow

5. Any person who maintains horses or cows may be supplied with water, without meter, from the domestic service for the sum of 5s. per annum for each animal, in addition to the assessed annual rate of the premises on which such animal is maintained or supplied with water.

6. All lands or premises on which any one or more head of horses or cattle shall be kept or maintained, whether such lands or premises are actually supplied with water from any main water-pipe of the Board, or are otherwise ratable or not, shall be liable to an extra rate or charge (beyond and in addition to the assessed annual rate of the premises), of 5s. per head for each head of horses or cattle kept or maintained on such land or premises.

Gardens.

7. The Board may supply water for gardens (and for such purpose may permit a hose and standpipe to be used) without meter, at the rate of 10s. per annum for every 750 sq. ft. superficial area, or part thereof, in addition to the assessed annual rate of the premises to which such garden belongs or is attached.

8. The Board may permit a supply of water for water fountains or waterfalls of a size, construction, and form, and in a position previously approved by the Board, without meter, from the domestic service, for the sum of 5s. per annum for each such fountain or waterfall, in addition to the assessed annual rate of the premises on which such fountain or waterfall is maintained.

9. If the Board shall in any case be of opinion that the owner or occupier of any premises is wasting or misusing or otherwise illegally dealing with water, or that the whole supply of water to any premises should for any reason be by meter, they may give to the owner or occupier a notice directing him within a time to be therein mentioned, to fix a meter to such premises, and to receive the whole supply of water to such premises through such meter, and after the expiration of such notice, whether a meter has been fixed in accordance therewith or not, the Board may cut off any supply of such premises which is otherwise than by meter.

Before affixing service-pipe, &c., license to be obtained from Board.

10. Before any person shall affix any service-pipe to any pipe of the Board, or alter, repair, or in any manner interfere with any pipe of the Board, or any service-pipe, cock, or fitting connected with any pipe of the Board, he shall obtain from the Board a license in that behalf to execute any such work; and any unlicensed person affixing, altering, repairing, or in any manner interfering with any such pipe, service-pipe, cock, or fitting as aforesaid shall be liable to a penalty not exceeding £10.

Licensed Plumber.

11. Before any such license shall be granted by the Board the person applying for the same shall satisfy the Board that he is a competent plumber. His competency must be certified to by three master plumbers.

Before pipes can be uncovered two days' notice to Board must be given.

12. Any person, whether licensed as aforesaid or not, who shall offend by opening any ground so as to uncover any pipe or pipes, the property of the Board, without giving two days' notice to the Board of his intention so to do, or who shall in any way tamper, interfere with, or alter any pipe, the property of the Board, without the permission in writing of the Board being first obtained, or who shall wilfully or negligently break, injure, or open any lock, cock, valve, pipe, work, or engine, the property of the Board, shall be liable for each such offence to a penalty not exceeding twenty pounds.

13. The Board only, or a plumber duly licensed by the Board, under the superintendence and according to the directions of the officer appointed by the Board for that purpose, is empowered to tap the main in the streets or elsewhere and attach service-pipes thereto, or extend the same generally as the case may be. Any person infringing this clause shall be liable to a penalty not exceeding £20.

Board or licensed plumber only empowered to tap mains, &c.

14. Any person, whether licensed as aforesaid or not, who shall lay any pipe to communicate with the pipe or pipes of the Board without giving two days' notice of the day and hour when such pipe is intended to be made to communicate with the pipe or pipes of the Board, and without having obtained the official printed permit, or who shall make such communication, except under the superintendence and according to the directions of some officer of the Board, or who shall lay any leaden or other pipe to communicate with a pipe of the Board of a strength and material not sanctioned by the Board, shall be liable for each such offence to a penalty not exceeding £5; and, in the event of continuing the offence, to a further penalty of £2 for each day after the notice of the offence from the Board.

Penalty for communicating with pipes of the Board without notice.

15. Every application for water must be accompanied by the payment of a fee of 3s. for the tapping of any main.

Fee for tapping main.

16. Every owner or occupier of any house, tenement, or lands, shall for the purpose of obtaining a supply of water to such house, tenement, or lands (after receiving from the Board the prescribed notice so to do), construct such connections and fittings from and in connection with such house, tenement, or lands, to communicate with the water-main of the Board, as are prescribed by the By-laws and Regulations of the said Board.

17. Any person who, being an owner or occupier of lands or premises supplied with water under the said cited Act, for the purpose of taking, in a manner not authorized by such Act, any such water, uses in or places on, or affixes or attaches to, such land or premises, or to any prescribed fitting, or wilfully permits to be used in or placed on, or affixed or attached to, such lands or premises, or to any prescribed fitting, any fitting, instrument, or thing not authorized in that behalf by the Board, or who alters, misuses, injures, or removes any prescribed fitting, except for the purpose of necessary repair, shall upon conviction thereof forfeit and pay to the Board a sum not greater than £10, without prejudice to the right of the Board to recover from him damages in respect to any injury by such owner or occupier done, or wilfully permitted to be done, to the Board's property, and without prejudice to the Board's right to recover from him the value of any water wasted, misused, or unduly consumed.

Penalty for using unauthorized fittings.

18. The owner or occupier must, at his own expense, lay down and maintain all the pipes and apparatus upon his premises. All pipes must be of galvanized wrought iron, where possible, and where lead pipes are used they must be of equal thickness throughout, any of at least the respective weights following, viz. :—

Owner to lay and maintain service.

	Weight of lead pipes.
$\frac{3}{8}$ -in. ....	5 lb. per yard
$\frac{1}{2}$ -in. ....	6 lb. "
$\frac{3}{4}$ -in. ....	9 lb. "
1-in. ....	12 lb. "
1 $\frac{1}{4}$ -in. ....	16 lb. "
1 $\frac{1}{2}$ -in. ....	20 lb. "

Where wrought-iron pipes are used they must be of the kind known as galvanized wrought-iron lap-welded steam tubes, unless otherwise permitted by the Board.

19. Any consumer's pipe, cock, cistern, or other fitting laid, fixed, or used otherwise than in accordance with these Regulations and with the provisions of the Act, or which shall in the opinion of the Board be or become of bad or defective quality, or shall conduce to the waste, misuse, or contamination of the water, shall, upon the Board giving notice in writing, be discontinued and disused; and the Board may require the same to be removed, replaced, or repaired, and may stop the supply of water to the said consumer until such pipe, cock, cistern, or other fitting shall have been removed, replaced, or repaired to the satisfaction of the Board.

Defective fittings to be removed.

20. No person shall use, in connection with the water of the Board, any iron pipe, tee, thimble, bend, reducing coupling, plug, &c., unless it be of the best manufacture, true in section, straight, and of equal thickness, properly and truly cut with Whitworth's standard gas thread, and perfectly sound and new, and free from all defects. Every such tee, bend, tube, &c., shall be capable of withstanding a hydrostatic pressure equal to a column of water 400 feet in height.

Quality of fittings for iron pipes.

21. Every person shall make all joints between tees, bends, thimbles, couplings, elbows, and cocks, &c., with white or red lead and flax. All joints on lead pipes, and lead pipes with brass unions, shall be of the kind known as "wiped joints."

Joints.

22. No person shall lay any service-pipe on private property, below the ground surface, at a less depth than 10 inches.

Depth of pipe.

23. No person shall lay any pipe or other apparatus through any sewer, drain, ashpit, cistern, or manure tank, or through, in, or into any place where, in the event of the pipe becoming unsound, the water of the Board conveyed through such pipe would be liable to be fouled, or to escape without observation—unless such pipe or apparatus be laid through an exterior cast-iron pipe or box of sufficient length and strength to afford due protection to the same, and to bring any leakage or waste within easy detection.

Pipes through drains to be properly protected.

- Approved fittings. 24. No person shall use any tap, top-cock, bib-cock, ball-cock, valve, closet cistern, service-box, waste-not, regulator, bath tap or valve, or other fitting in connection with a supply of water of the Board which is not of the best quality, and approved by the Board.
- Cocks. 25. No person shall use any stop or bib-cock which is not loose-valve, screw-down, high-pressure cocks, made of hard brass or gun-metal, and in every respect of best quality and workmanship.
- Cistern. 26. No person shall use any cistern or tank that is not provided with an equilibrium ball-valve, and the overflow-pipe laid and fixed in a suitable manner, open to inspection, and in a position approved by the Board.
- Service not to communicate with rain-water receptacles or underground tanks. 27. No person shall fix or use any service-pipe which communicates with any cistern, tank, or vessel intended or used for the reception of rain-water below the surface of the ground, except with the express permission of the Board.
- Water-closets. 28. No person shall construct or use any water-closet fitting not approved by the Board, or supplied from the service pertaining to the tenement through a proper closet-cistern, or service-box, fitted with approved waste-preventing apparatus. No person shall fix or use any service-pipe which communicates directly or indirectly with the basin or trap, or otherwise than with the cistern of a water-closet.
- Baths. 29. The Board will not supply any water to any bath, the outlet of which is not distinct from and unconnected with the inlet or inlets; and the inlet or inlets shall be placed above the highest water-level of the bath. The outlet of such bath shall be provided with a perfectly water-tight plug, valve, or cock. No such bath shall have any overflow waste-pipe that is not laid and fixed in a suitable manner, open to inspection, and in a position approved by the Board. No bath shall exceed in dimensions 6 ft. 6 in. long by 2 ft. 6 in. wide by 2 ft. deep unless supplied by meter. The Board will not supply water to any bath unless the same shall be so constructed as to prevent a waste of water.
- Service connections. 30. Except by the permission of the Board, every tenement shall have an independent service-pipe connected with the water-main and such service shall be stop-cocked, and no person shall connect more than one tenement with the main of the Board from one service, except by permission of the Board.
- Urinals. 31. No person shall fix, or have fixed, a service-pipe so as to communicate directly with any urinal, and every urinal shall be supplied only through a cistern or service-box, fitted with waste-preventing apparatus approved by the Board.
- Water for other than domestic purposes. 32. No person shall use water supplied by the Board for other than domestic purposes, except the supply is by meter, or excepted in the manner hereinbefore provided.
33. No person, except with special consent of the Board, shall affix a meter, the dial of which is not capable of registering (1,000,000) one million gallons.
- Meters registering incorrectly. 34. If any meter shall not correctly indicate the water passing through it, the Board may charge for the supply according to the average daily consumption for any month preceding the date upon which such meter shall have been examined and found to be in order; or at the request of the consumer, or by direction of the Board, the said meter shall be tested and the charge for water supplied regulated accordingly.
- Meters not to be interfered with. 35. No person not duly authorized by the Board shall disconnect any meter or other apparatus from the service-pipes, or in any way interfere with the same.
- Steam boiler to have self-acting valve. 36. If any person shall connect any service-pipe, or branch service-pipe, with any steam boiler for the purpose of feeding or supplying the same with water, without first affixing a self-acting valve for preventing the pressure of the steam reversing or affecting the dial of the meter, he shall be liable to a penalty not exceeding £5; and a further penalty of £2 for each day after notice of the offence from the Board to each offender.
- No hose to be attached to any pipe for watering garden, &c., without meter. 37. Except as hereinbefore provided, no person shall use a hose attached to any tap or pipe (used for the purpose of supplying the water of the Board for domestic purposes to any house or premises) for watering any garden, laying dust, or for any other purpose whatsoever, unless where a water-meter is fixed and the water supplied by measure; and any person offending against this By-law shall be liable to a penalty not exceeding £5.
- No tap to be in garden without meter. 38. Except as hereinbefore provided, no person shall place any tap in any garden or screwed tap in any yard, or to or outside of any dwelling or premises supplied with the water of the Board to which a hose could be attached unless a water-meter is fixed and the water supplied by measure; and any person offending against this By-law shall be liable to a penalty not exceeding £5.
39. Any person using water supplied by the Board shall keep all pipes and other appliances in connection with the supply of water to such person in a proper state of repair.
- Inspection of work. 40. All work at any time done or to be done on private lands or premises in connection with the water supply, whether such work consist in the laying and fixing of new services, or in the extension or alteration of existing services and fittings, shall be inspected by the proper officer of the Board, and no such work shall be commenced until after the expiration of two days' notice thereof first given to the Board and the necessary printed permit obtained. In no case shall the water be turned on to any lands or pre-

mises where any such work shall have been executed until the said work shall have been inspected by the said officer, and certified by him on the prescribed form. No underground or enclosed work shall on any account be covered up or concealed from view until the same shall have been duly inspected and passed by the inspector; and any person offending against this By-law shall be liable to a penalty not exceeding £5.

41. The supply and use of water, whether for domestic purposes or under special agreement, shall be open to inspection and admeasurement whenever required; and such information must from time to time be afforded as will be sufficient to enable the Board to obtain a satisfactory account of the quantity of water actually consumed, and of the pipes, taps, cisterns, and other apparatus and conveniences for receiving and delivering such water. Any officer of the Board may at all reasonable times in the day-time enter on the premises of any person using water supplied by the Board for the purpose of inspecting the service pipes or other appliances of such premises.

Supply and use of water open to inspection.

42. If the service pipes or other appliances of any such person shall on any inspection be found to be out of repair, the Board may forthwith, without notice, repair the same in such manner as may be deemed necessary, and the cost of any such repairs may be recovered by the Board from the owner or occupier of such premises.

Board may repair.

43. The water supply to the public parks and gardens shall be exclusively under the control and direction of the Board; and any person turning on the water, or otherwise interfering with such water supply, shall be liable to a penalty not exceeding £5.

Board have control of water supplied to public parks, &c.

44. All notices and applications required by these By-laws are to be made upon printed forms, to be obtained at the Board's office. Notices sent by post must be prepaid. Any sums paid by the Board on account of notices sent by post and not prepaid will be charged against and recovered from the sender.

Notices and applications to be made upon printed forms.

45. The Board shall be at liberty to discontinue the supply of water immediately on the discovery of any breach of these Regulations.

Board may discontinue supply.

46. In the construction of these By-laws the word "person" shall be deemed to extend to and include a corporation or any body or number of persons, and the masculine shall include the feminine gender.

Interpretation of terms.

47. Any person committing a breach of any By-law to which no specific penalty is attached, or who shall refuse or neglect to obey any injunction in any such By-law, shall, upon conviction, be liable to pay a penalty not exceeding £20, and, in case of a continuing offence, a further penalty not exceeding £5 for each day after notice of such offence shall have been given by the Board to such offender.

48. The following shall be the form of notice to connect to water mains prescribed under section 16, Metropolitan Water and Sewerage Act Amendment Act of 1889:—

*Notice to connect to Water-mains.*

Board of Water Supply and Sewerage,  
Sydney, 18 .

To the owner or occupier.  
NOTICE is hereby given that a water-main has been laid in (*as the case may be*), and is ready to distribute water.

The Board of Water Supply and Sewerage hereby demand and require that the owner or occupier of the house, tenement, or lands at or on which this notice is left or exhibited shall construct such connections or fittings from or in connection with such house, tenement, or lands to communicate with such main as are prescribed by the By-laws and Regulations of the said Board.

For the Board of Water Supply and Sewerage,  
Secretary.

*NOTE.—Attention is directed to the following Rules:—*

The Board will pay a reward of not less than 10s. to any person who will give such information as shall lead to the conviction of any person or persons who shall wrongfully attach (temporarily or otherwise) any pipe to any of the mains or services of the Board, or to any pipe, cistern, or apparatus connected therewith, or to or into which the water of the Board shall flow, or who shall wrongfully draw off, use, or take the water of the Board, or who shall knowingly permit the said water to be wrongfully drawn off, used, or taken.

Reward for information as to fittings.

The Board will also adequately reward any person (not being the person in fault) who shall communicate timely information to the Board of any leakages or waste of water, whether the same be accidental, negligently, or wilfully occasioned or suffered, or who shall give such information as shall lead to the conviction of any person or persons who shall steal or cause to be stolen, or improperly appropriated, the water of the Board. (*Vide* section 73 of Act 43 Vic. No. 32.)

Reward for information as to waste.

A set of standard fittings, such as are at present approved, is exhibited in the Board Engineer's office; but the Board will give due consideration to the claims of any other fittings which may be presented for approval, and, if considered satisfactory, the same will be purchased and placed among and become one of the standard approved fittings.

Sample fittings.

The Board do not permit their officers, workmen, or agents to solicit or receive any fee or gratuity whatever, and desires to be informed of any infraction of this Regulation, and also of any act of incivility or neglect of attention on the part of such officers, workmen, and agents, or any of them.

No gratuities allowed.

Attention is also directed to the following clauses of the *Metropolitan Water and Sewerage Act, 43 Vic. No. 32* :—

- Meter to be supplied and maintained by consumer.
55. Every person who shall have agreed with the Board for a supply of water by measure shall, at his own expense, unless he hire a meter from the Board, provide a meter and keep and maintain the same in good working condition to the satisfaction of such officer as may be appointed by the Board, and in the event of any repairs being required notice in writing shall be immediately given by such person to the Board, and a registration of the quantity used shall be taken before such repairs are effected.
- Notice of removal, &c., of meter.
56. Every person requiring to remove or alter the position of any meter shall give six days' notice in writing to that effect to the Board, and a registration of the quantity of water used shall be taken before such removal or alteration is made.
- Penalty for neglecting to provide meter.
57. If any person who under the provisions hereinbefore contained ought to provide any meter neglect or refuse, after having been required by the Board so to do, to provide such meter, he shall for every day during which such neglect or refusal continues forfeit a sum not exceeding two pounds.
- Penalty for neglecting to give notice of repairs of meters
58. If any person who has provided any meter as aforesaid fail to give the notice hereinbefore required of any repairs required for such meter he shall forfeit a sum not exceeding ten pounds.
- Water may be cut off if meter not in order.
59. If any person refuse or delay to have such meter properly repaired and put in correct working order, after having been required by any officer of the Board so to do, the Board may shut off the supply of water from the premises of such person either by cutting the service-pipe or otherwise, until such meter shall have been properly repaired and certified by some officer of the Board as being in proper working order.
- Penalty for fixing uncertified meter.
60. If any plumber or other person fix or refix any meter upon any premises supplied with water by the Board, without having first obtained a certificate from the Board that the said meter has been examined and found in correct working order, he shall forfeit a sum not exceeding ten pounds.
- For removing or altering meter without notice.
61. If any person remove or alter the position of or in any way interfere with any meter without giving such notice as aforesaid, he shall for each such offence forfeit a sum not exceeding twenty pounds over and above the damage which he may be found liable to pay in any action at law at the suit of the Board.
- Power to officers of Board to inspect meters.
62. The officers of the Board may enter any house, building, or lands, to, through, or into which water is supplied by the Board by measure, in order to inspect the meters, instruments, pipes, and apparatus for the measuring, conveyance, reception, or storage of water, or for the purpose of ascertaining the quantity of water supplied or consumed, and may from time to time enter any house, building, or lands for the purpose of removing any meter, instrument, pipe, or apparatus, the property of the Board, and if any person hinders any such officer from entering or making such inspection, or effecting such removal, he shall, for each such offence, be liable to a penalty not exceeding five pounds, but, except with the consent of a Justice, this power of entry shall be exercised only between the hours of ten in the forenoon and four in the afternoon.
- Notice to lay service pipes.
67. After pipes have been laid, under the authority of this Act, for the supply of water to any street or part thereof, the Board shall cause a notice, in the form contained in the Third Schedule hereto, or to the like effect, to be published in four consecutive numbers of the *Gazette*, and in one or more newspapers circulating in the locality; and the owner or occupier of every tenement referred to in such notice shall, within three weeks from the date of the last publication of such notice in the *Gazette*, cause a proper pipe and stop-cocks to be laid, so as to convey a supply of water to such tenement. And after fourteen days from such last publication the owner or occupier of such tenement shall, unless the Board refuse to supply him with water, be liable to pay the rates and charges for such supply, although no such pipes and stop-cocks be laid, or no such water be used in such tenement.
- Pipes laid by owners or occupiers. Power to inhabitants to lay service pipes.
68. Any owner or occupier of any dwelling-house, or part of a dwelling-house, within a Water District, who shall wish to have water from the waterworks of the Board brought into his premises, and who shall have paid or tendered to the Board the portion of water rate in respect of such premises, by this Act directed to be paid in advance, may open the ground between the pipes of the Board and his premises, having first obtained the consent of the owners and occupiers of such ground, and lay any pipes from such premises to communicate with the pipes of the Board.
- Notice to Board of laying pipes.
69. Such pipes shall be of a strength and material approved of by some officer of the Board, and every such owner or occupier shall, before he begins to lay any such pipe, give to the Board two days' notice of his intention to do so.
- Communication with pipes of Board to be made under superintendence of surveyor.
70. Before any pipe is made to communicate with the pipes of the Board, the person intending to lay such pipes shall give two days' notice to the Board of the day and hour when such pipe is intended to be made to communicate with the pipes of the Board, and every such pipe shall be so made to communicate under the superintendence and according to the directions of the surveyor, or other officer appointed for that purpose by the Board. And the bore of any such pipe shall not exceed three-quarters of an inch, except with the consent of the Board.
- Bore of service pipes.
71. Any person who shall have laid down any pipe, or other works, or who shall have become the proprietor thereof, may remove the same after having first given six days' notice in writing to the Board of his intention so to do, and of the time of such proposed removal, and every such person shall make compensation to the Board for any injury or damage to their pipes or works which may be caused by such removal.
- Service pipes may be removed after giving notice.

72. Any such owner or occupier may open or break up so much of the pavement, if any, as shall be between the pipe of the Board and his house, building, or premises, and any sewer or drain therein for any such purpose as aforesaid (doing as little damage as may be, and making compensation for any damage done in the execution of any such work): Provided always that every such owner or occupier desiring to break up the pavement of any street, or any sewer or drain therein, shall be subject to the same necessity of giving previous notice, and shall be subject to the same control, restrictions, and obligations in, and during the time of breaking up the same, and also reinstating the same, and to the same penalties for any delay in regard thereto as the Board are subject to under the provisions of this Part.

Power to break pavements.

73. If any person supplied with water by the Board wrongfully does, or causes or permits to be done, anything in contravention of any of the provisions of this Part, or wrongfully fails to do anything which under any of those provisions ought to be done for the prevention of the waste, misuse, undue consumption, or contamination of the water of the Board, the Board may (without prejudice to any remedy against him in respect thereof) cut off any of the pipes by or through which water is supplied to him or for his use, and may cease to supply him with water so long as the cause of injury remains or is not remedied.

PROTECTION OF THE WATER.

In case of any breach of this Part of this Act water may be cut off.

74. If any person, supplied with water by the Board, wilfully or negligently causes, or suffers any pipe, valve, cock, cistern, bath, soil-pan, water-closet, or other apparatus or receptacle to be out of repair, or to be so used or contrived that the water supplied to him by the Board is or is likely to be wasted, misused, unduly consumed, or contaminated, or so as to occasion or allow the return of foul air or other noisome or impure matter into any pipe belonging to or connected with the pipes of the Board, he shall, for every such offence, be liable to a penalty not exceeding five pounds.

Penalty for waste of water.

75. If any person—

- (1.) Not having from the Board a supply of water for other than domestic purposes, uses for other than domestic purposes any water supplied to him by the Board; or
- (2.) Having from the Board a supply of water for any purpose other than domestic, uses such water for any purpose other than those for which he is entitled to use the same,

Penalty for misapplication of water.

he shall for every such offence be liable to a penalty not exceeding forty shillings without prejudice to the right of the Board to recover from him the value of the water misused.

76. It shall not be lawful for the owner or occupier of any premises supplied with water by the Board, or any consumer of the water of the Board, or any other person, to affix, or cause or permit to be affixed, any pipe or apparatus to a pipe belonging to or used by such owner, occupier, consumer, or any other person, or to make any alteration in any such communication or service-pipe, or in any apparatus connected therewith, without the consent, in every such case, of the Board. And if any person acts in any respect in contravention of the provisions of the present section, he shall for every such offence be liable to a penalty not exceeding five pounds, without prejudice to the right of the Board to recover damages from him in respect of any injury done to its property, and without prejudice to their right to recover from him the value of any water wasted, misused, or unduly consumed.

No pipe to be fixed to consumer's pipe without permission of Board.

77. If any person, not being supplied with water by the Board, wrongfully takes, or uses any water from any reservoir, watercourse, conduit, or pipe belonging to the Board, or from any pipe leading to or from any such reservoir, watercourse, conduit, or pipe, or from any cistern or other like place containing water belonging to the Board, or supplied by them for the use of any consumer of the water of the Board, he shall for every such offence be liable to a penalty not exceeding five pounds.

Penalty for unlawfully taking water.

78. The surveyor or other person appointed for that purpose by the Board may, between the hours of nine o'clock in the forenoon and four o'clock in the afternoon, enter into any house or premises supplied with water by the Board in order to examine if there be any waste or misuse of such water; and if any such surveyor or other person at any such time be refused admittance into such dwelling-house or premises for the purpose aforesaid, or be prevented from making such examination as aforesaid, the Board may turn off the water supplied by them from such house or other premises.

Inspection of water.

79. If any person bathe in any stream, reservoir, aqueduct, or other waterworks belonging to the Board, or wash, throw, or cause to enter therein any dog or other animal he shall for every such offence forfeit a sum not exceeding five pounds.

Polluting the water. Penalty for bathing in water of the Board.

80. If any person throw or convey or cause or permit to be thrown or conveyed any rubbish, dirt, filth, or other noisome thing into any such stream, reservoir, aqueduct, or other waterworks as aforesaid, or wash or cleanse therein any cloth, wool, leather, or skin of any animal, or any clothes or other thing, he shall for each such offence forfeit a sum not exceeding five pounds.

Penalty for throwing dirt therein.

81. If any person cause the water of any sink, sewer, or drain, steam-engine, boiler, or other filthy water belonging to him or under his control, to run or be brought into any stream, reservoir, aqueduct, or other waterworks belonging to the Board, or shall do any other act whereby the water of the Board shall be fouled, he shall for each such offence forfeit a sum not exceeding five pounds, and a further sum of twenty shillings for each day (if more than one) that such offence continues.

Penalty for letting foul water flow thereinto

Penalty for nuisance in watershed area.

82. Where any owner or occupier of any land within the watershed to be proclaimed as hereinbefore provided, or any reservoir or source of supply transferred to, or vested in the Board, does, or permits to be done on his land any act, or permits to remain thereon any matter or thing, which in the opinion of the Board is likely to injure the water supply, if notice to discontinue or remove the same be given to him in writing by the Board, and if he neglect or refuse to discontinue such act, or to remove such matter or thing, he shall for each such offence forfeit a sum not exceeding five pounds, and a further sum of twenty shillings for each day (if more than one) that such offence continues.

Provisions as to connection of closet and other pipes with mains, and as to cisterns, &c.

83. The following provisions shall take effect for the purpose of protecting the water in the mains or other pipes of the Board from all impurities from closets and other receptacles of faecal matter or urine—

No closet pipes hereafter to connect directly with the main.

(I.) It shall not be lawful for any person to connect with the main any pipe delivering the water directly into the closet-pan or other receptacle for faecal matter or urine without the intervention of a cistern or cisterns into which the water from the main shall first be received, and any person so offending shall forfeit and pay a penalty not exceeding fifty pounds.

Board may disconnect pipes in certain cases.

(II.) The Board may employ any artificers or workmen to cut off or otherwise disconnect from the main any pipe directly discharging the water into a closet without the intervention of a cistern [hereinafter termed "directly connected"], and which in the opinion of the Board may endanger the purity of the water by the absorption of noxious gases, or suction of faecal matter or urine into such pipe, or into the main, or otherwise: For the purpose of effecting such disconnection the Board's artificers and workmen may enter into and upon the premises of any person or corporation whatsoever to do, or cause to be done, anything in his opinion requisite or necessary in relation thereto.

The expense incurred by any disconnection to be paid by tenant and deducted from his rent.

(III.) Whenever the Board shall have caused any pipe to be cut off, or disconnected, or other work to be done in relation thereto, they shall forthwith serve the owner or occupier of the premises with a notice in writing, requiring him to pay the actual cost or expense incurred. And such owner or occupier shall pay the amount to the Board, and if the amount be paid by an occupier only he may deduct the same from the rent then due or accruing. Upon such owner or occupier making default in any such payment after the delivery of such notice as aforesaid the Board may sue for and recover the same with full costs of suit.

Owners of premises shall fix closet-cisterns or be liable to a penalty.

(IV.) The owner of every dwelling-house or premises which shall have therein or thereon any closet with a pipe or branch-pipe directly connected with the main, shall be required to fix and erect a cistern or cisterns for the reception of the water intended to be used for the closet, and every cistern shall be made of such materials and dimensions, and of such model or plan of construction, and with such ball-cocks, stop-cocks, waste-pipes, and other appliances as shall be deemed requisite and have been approved by the Board for securing the water from pollution through any noxious gases or matter evolved or derived from such closets or otherwise. Every owner neglecting to comply with the provisions of this section shall forfeit and pay a penalty not exceeding five pounds.

Upon neglect of owner the tenant after fourteen days notice to fix cistern and deduct the expense from rent.

(V.) Whenever any owner shall have neglected to fix and erect a cistern, with its appliances, as is in the last preceding sub-section provided for, the tenant or occupier of the premises is hereby authorized and required, after receiving a written notice thereof from the Board in that behalf, to fix and erect such cistern, with its appliances before mentioned, within fourteen days after the receipt of such notice, and the said tenant or occupier shall, upon payment by him of the charges and expense of such fixing and erection, be entitled either to deduct the amount so paid from the rent then due or accruing, or, at his option, to sue for and recover the same, with full costs of suit, from the owner as for money paid to his use.

Any person re-establishing any connection with the main unless authorized, or wilfully injuring any pipe, &c., liable to a penalty.

(VI.) Any person who shall, without the authority of the Board, re-establish any such connection which may have been cut off, removed, or severed by him, or who shall in any manner wilfully injure or tamper with any connection-pipe, cistern, ball-cock, stop-cock, or waste-pipe which may have been approved by the Board, so as to destroy, diminish, or endanger its efficiency, may be summoned for such offence before two Justices, and on conviction thereof shall be adjudged to pay the amount of the charges and expenses which the Board may have incurred (and which they are hereby authorized to incur) in repairing or restoring the same to a state of efficiency. Every such offender shall also forfeit and pay a penalty not exceeding ten pounds, and the amount of charges and expenses and penalty respectively shall, when recovered, be paid over to the Board.

Where several houses supplied by one pipe each to pay.

84. Where several houses or parts of houses, in the separate occupation of several persons, are supplied by one common pipe, or where water is supplied to courts, alleys, and right-of-way by stand pipes, the several owners or occupiers of such houses, or parts of houses, or of the several houses, or parts of houses, in every such court, alley, or right-of-way, shall be liable to the payment of the same rates for the supply of water as they would have been liable to if each of such several houses, or parts of houses, had been supplied with water from the works of the Board by a separate pipe.

85. The rates and charges for water, and all sums due to the Board under this Part, shall be paid by and be recoverable from the owner of the premises or the occupier or person requiring, receiving, or using the supply of water; and all rates shall be paid in advance by equal payments on the first day of January and the first day of July in each year, and the first payment shall be made at the time when the owner or occupier of any tenement shall become liable to pay such rates and charges, and all such rates and charges may be enforced and recovered in respect of any premises in the said City of Sydney, or in any such Municipality as aforesaid, situate within one hundred and fifty feet from the alignment of any street or public highway along which a main water pipe belonging to the Board is laid, although such premises are not actually supplied with water from such main.

**WATER RATES.**

Rates to be recoverable from either landlord or tenant.

Rates to be paid half-yearly in advance.

86. If any such person refuse or neglect to pay on demand to the Board any rate, charge, or sum due to the Board under this Part, the Board may recover the same with costs, or may order a warrant under the hand of their President or Vice-president in the form contained in the Fourth Schedule hereto, to be from time to time issued to some constable or other person named therein to levy such rate, charge, or sum by distress and sale of goods and chattels of the person occupying the premises in respect of which such rate, charge, or sum is due at the time when the warrant of distress is executed, and in case no sufficient goods and chattels of such occupier be found on the premises to satisfy such distress, the owner of the premises, or if he be absent from the Colony, his agent shall be liable for such rate, charge, or sum and the same may be recovered from him.

Recovery of rates and charges.

Schedule.



1890.

## NEW SOUTH WALES.

## COUNTRY TOWNS WATER AND SEWERAGE ACT OF 1880.

(MUNICIPAL DISTRICT OF WILCANNIA.)

Presented to Parliament, pursuant to Act 44 Vic. No. 14, sec. 13.

## Proclamation.

NEW SOUTH WALES, } Proclamation by His Excellency The Right Honorable CHARLES ROBERT, BARON  
to wit. } CARRINGTON, a Member of Her Majesty's Most Honorable Privy Council,  
(L.S.) Knight Grand Cross of the Most Distinguished Order of Saint Michael and  
CARRINGTON, Saint George, Governor and Commander-in-Chief of the Colony of New  
Governor. South Wales and its Dependencies.

WHEREAS the Council of the Municipal District of Wilcannia have constructed works for Water Supply within and for the purpose of the said Municipal District: And whereas the said Council, in pursuance of the provisions of the "Country Towns Water and Sewerage Act of 1880," have forwarded to me a petition that I will, by Proclamation in the *Government Gazette*, declare that the 13th section of the said Act and the whole of the sections in part two of the said Act—that is, sections 16 to 62 (both inclusive), shall be applied within the said Municipal District, by and with respect to the Council and the inhabitants thereof respectively: Now, therefore, I, CHARLES ROBERT, BARON CARRINGTON, the Governor aforesaid, in pursuance of the power and authority vested in me by the said Act, do, by this my Proclamation, declare that all and every the powers and provisions contained in the 13th section of the said Act and in part two of the said Act—that is to say, sections 16 to 62 (both these sections being included) of the said Act shall be applied within the said Municipal District of Wilcannia, by and with respect to the Council and inhabitants thereof respectively, to the intent that the said sections of the said Act, and the powers and provisions in and by the said sections given, shall, upon the publication of this Proclamation, apply to and be in force within the said Municipal District, and with respect to the said Council and inhabitants, with the same effect for all purposes as if the said Act had specifically declared the said parts, powers, and provisions to be so applied as aforesaid.

Given under my Hand and Seal, at Government House, Sydney, this thirteenth day of May, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## COUNTRY TOWNS WATER AND SEWERAGE ACT.

(NOTIFICATION OF COMPLETION OF WORKS FOR THE BOROUGH OF ORANGE.)

Presented to Parliament, pursuant to Act 44 Vic. No. 14.

## ORANGE WATER-WORKS.

IN accordance with the provisions of the Country Towns Water and Sewerage Act, 44 Vic. No. 14, section 125, I, Bruce Smith, the Minister for Public Works of the Colony of New South Wales, have the honor to report, for the information of His Excellency the Governor and Executive Council, that the works for the supply of water for the Borough of Orange, in the said Colony, which, under the provisions of the before-recited Act, and at the request of the Council thereof, have been constructed under the direction of the Minister for Public Works of the said Colony, have been completed.

Given under my hand, this sixteenth day of June, 1890.

BRUCE SMITH.

Copy of Resolution submitted to and passed by the Council of the Municipality of Orange, at a meeting of the Council thereof, held on the 13th day of October, A.D. 1887:—

*Present:*

His Worship the Mayor (in the Chair)  
and

Aldermen Smith, Lorence, McFadden, Cox, Eyles, Coulson,  
Finagan, and Parker.

Moved by Alderman Flanagan, seconded by Alderman Lorence, and carried,—“That the Council of the Municipality of Orange, having taken into consideration the question of Water Supply for the town of Orange, do hereby request His Excellency the Governor, with the advice of the Executive Council, to take all such steps and cause such works to be executed as may be necessary to provide a Water Supply for the town of Orange; and the said Council, on behalf of the Municipality of Orange, hereby agree to do and undertake all the liabilities and obligations mentioned in section 125 of the Act 44 Vic. No. 14; and it is hereby expressly agreed that such liability is accepted for the total amount to be expended on such works, whatever such amount may be.”

J. M. PAUL,  
Mayor.

NOTIFICATION OF COMPLETION OF WATER-  
WORKS FOR THE BOROUGH OF ORANGE,  
UNDER 44 VICTORIA No. 14.

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her

(L.S.) } Majesty's Most Honourable Privy  
CARRINGTON, } Council, Knight Grand Cross of the  
Governor. } Most Distinguished Order of Saint  
Michael and Saint George, Governor and  
Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, having duly sanctioned the carrying out of certain works for and in connection with the supply of water to the Borough of Orange, in the said Colony, for and towards the completion of which said works public funds were provided by Parliament; and whereas the said works have been reported to me as complete by the Minister for Works, in accordance with the provisions of the 125th section of the before-recited Act: Now I, the Governor aforesaid, with the advice of the Executive Council, hereby declare by this notification that such works are complete, to the intent that the Council of the said Borough of Orange, within and for the purposes of which the said works have been constructed, shall take over the same, and the administration and management thereof, upon the terms and conditions prescribed by the before-cited Act.

In witness whereof, I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this ninth day of July, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## COUNTRY TOWNS WATER AND SEWERAGE ACT.

(MUNICIPAL DISTRICT OF LISMORE—BY-LAWS.)

Presented to Parliament, pursuant to Act 44 Vic. No. 14.

Department of Public Works,  
Sydney, 6th November, 1890.

His Excellency the Governor, with the advice of the Executive Council, has been pleased to approve of the following By-laws in connection with the Water Supply of the Municipal District of Lismore, prepared by the Council of the said District, in accordance with the provisions of the Acts 44 Vic. No. 14 and 51 Vic. No. 18.

BRUCE SMITH.

## MUNICIPAL DISTRICT OF LISMORE.

BY-LAWS made and adopted by the Council of the Municipal District of Lismore, in pursuance of the powers and authority conferred by the Country Towns Water and Sewerage Act of 1880, 44 Vic. No. 14, and the Country Towns Water and Sewerage Act Extension Act of 1887, 51 Vic. No. 18, for regulating the forms of contract and water rates with the said Council for the supply of water, and generally for carrying into effect the purposes of the said Acts.

1. The following rates and charges are those which the owners and occupiers of all lands and tenements within one hundred and fifty feet from the alignment of any street along which the water-pipes of the Council are (or may be) laid, shall pay in respect of water supplied by the Council, although such lands and tenements may not be supplied with water from the said pipes:—

For water supplied for domestic purposes otherwise than by measure.

- (1.) On every house, tenement, or portion of land of ten pounds assessed annual value and under, ten shillings.
- (2.) On every house, tenement, or portion of land above the assessed annual value of ten pounds, a rate of one shilling for each pound sterling on the amount of the assessed annual value.

For water supplied by measure.

- (3.) The rates to be charged for water supplied by measure shall be one shilling and sixpence per one thousand gallons, either for domestic purposes or for purposes other than domestic (except a special contract be entered into between the Council and the consumer). But domestic purposes shall not include a supply of water for stables, manufacturing, irrigation, waterpower, fountains, or for any ornamental purpose, or for watering stock.
- (4.) The Council may at any time, by resolution, reduce the rate levied or assessed in respect of water supply, and likewise the price chargeable by measure, provided that the annual income derivable from the rate and charges at the reduced rate shall be sufficient to retire the yearly payments due on the waterworks and the current yearly expenditure.

2. Assessed rates must be paid half-yearly in advance to the Council Clerk or other authorised officer of the Council at the Council Chambers during office hours. In the case when a meter is used the meter account will not be rendered unless it is in excess of the assessment.

3. The minimum charge for water, whether supplied by meter or otherwise, for domestic purposes or for purposes other than domestic is the assessed annual rate. If the water is supplied by meter and the meter account exceeds the assessment (calculated at one shilling and sixpence per one thousand gallons) then such excess shall be charged for in addition to the assessment.

4. No person shall use water supplied by the Council for other than domestic purposes, except the supply is by meter, or except in the manner hereinafter provided.

5. The Council may supply water for building purposes at the rate of five shillings per room, or by meter, and the Council may supply water for the making or mixing of concrete for foundations of wooden blocks, stone cubes, or other permanent forms of roadway, at the rate of one pound ten shillings per one thousand square yards, by superficial measurement of road surface, and for all other concrete, brick-work or masonry, at the rate of three pence per cubic yard as measured on the work, the minimum in each of these cases to be five shillings.

6. Any person who maintains horses or cows, may be supplied with water (without meter) from the domestic service pipe, for the sum of ten shillings per annum for each animal, in addition to the assessed annual rate of the premises on which such horses or cows are maintained or supplied with water.

7. The Council may supply water for gardens (and for such purposes permit a hose and standpipe to be used) without meter, at the rate of one pound sterling for every seven hundred and fifty square feet superficial area or part thereof, in addition to the assessed annual rate of the premises to which such garden belongs or is attached.

8. The Council may permit a supply of water for water fountains or waterfalls of a size, construction, and form, and in a position previously approved by the Council (without meter), from the domestic service pipe for the sum of ten shillings per annum for each such fountain or waterfall, in addition to the assessed annual rate of the premises on which such fountain or waterfall is maintained.

9. The Council may erect public stand-pipes whenever and wherever it may seem to them advisable or necessary to do so, and may charge for the water supplied from the same either by measure, or may charge any person applying for use of water from the said stand-pipes the sum of one pound sterling per annum for such use, payable half-yearly in advance.

10. Gas-engines and water troughs will be charged for at the rate of one pound sterling per annum each.

11. The Council will not supply water to any bath the outlet of which is not distinct from and unconnected with the inlet or inlets, and the inlet or inlets shall be placed above the highest water level of the bath; the outlet of such bath shall have a perfectly watertight fastening; no bath shall exceed in dimensions six feet six inches in length, two feet six inches wide, and two feet in depth (unless supplied by meter). The Council will not supply water to any bath unless the same shall be so constructed as to prevent a waste of water.

12. If the Council shall in any case be of opinion that the owner or occupier of any premises is wasting or misusing or otherwise illegally dealing with water, or that the whole supply of water to any premises should for any reason be by meter, they may give to the owner or occupier a notice directing him within a time to be named to fix a meter to such premises, and to receive the whole supply of water to such premises through such meter; and after the expiration of the time mentioned in such notice, whether a meter has been fixed in accordance therewith or not, the Council may cut off any supply of water to such premises which is otherwise than by meter. The Council may let meters to any consumer at the rate of ten shillings per annum.

13. The Council may enter into any special contract (consistent with the provisions of the Country Towns Water and Sewerage Act) with any person for special or exceptional supply of water by measure or otherwise.

14. No person without the special consent of the Council shall fix a meter, the dial of which is not capable of registering one million gallons; and no meter shall be fixed until approved by the Council (or some person duly authorised on their behalf) and certified by the Mayor, Council Clerk, or other duly authorised officer of the Council; all meters to be enclosed in a strong wooden box, and the keys of all meters and boxes to be lodged at the Council Clerk's office immediately after the meters are fixed.

15. If any meter shall not correctly indicate the quantity of water passing through it, the Council may charge for the supply of water according to the average daily consumption for any month preceding the date upon which such meter shall have been examined and found to be in order, or at the request of the consumer, or by direction of the Council the said meter shall be tested and the charge for water regulated accordingly; and no person not duly authorised by the Council shall disconnect any meter or other apparatus from the service pipes, or in any way interfere with them.

16. On the application by any person entitled to be supplied with water by the Council, and subject to all the provisions contained in these By-laws, the Council will cause all necessary connections to be made with the water mains, and will provide all pipes, ferrules, and other requisites for extending the same to the kerbing or outer alignment of the footpath with which all extensions of pipes for the supply of water must be made and connected by the applicant. In every case the applicant must deposit with the Council Clerk a sum of two pounds sterling as consideration therefor before any connection with the said main will be permitted; but the pipe laid by the Council must afterwards be maintained by the owner or occupier.

17. Before any person shall have fixed any service pipe to any pipe of the Council or alter, repair, or in any manner interfere with any pipe of the Council or any service pipe, cock, or fitting connected with any pipe of the Council he shall obtain

from the Council a license in that behalf (to execute any such work), such license to be terminable on the thirty-first day of December of each year, and the charge for such license shall be one pound sterling per annum; and any unlicensed person affixing, altering, repairing, or in any way or manner interfering with any such pipe, service pipe, cock, or fitting as aforesaid, shall be liable to a penalty not exceeding ten pounds.

18. Any person who, being an owner or occupier of any house, tenement, or lands, or premises supplied with water under the said cited Act, for the purpose of taking, in a manner not authorised by such Act, any such water, or uses in, or places on, or affixes, or attaches to such lands, tenements, or premises, or to any prescribed fitting any fitting instrument or thing not authorised in that behalf by the Council, or who alters, misuses, injures, or removes any prescribed fitting except for the purpose of necessary repairs, shall upon conviction thereof forfeit and pay to the Council a sum not greater than ten pounds, without prejudice to the rights of the Council to recover from him damages in respect to any injury done by such owner or occupier, or wilfully permitted to be done to the Council's property, and without prejudice to the Council's right to recover from him the value of any water wasted, misused, or unduly consumed.

19. The owner or occupier must at his own expense lay down and maintain all the pipes and apparatus on his premises; all pipes must be of galvanized wrought iron where possible, and where lead pipes are used they must be of equal thickness throughout and of at least the respective weights following:

$\frac{3}{8}$ inch.....	5lbs. per yard.
$\frac{1}{2}$ " .....	6lbs. "
$\frac{3}{4}$ " .....	9lbs. "
1 " .....	12lbs. "
$1\frac{1}{4}$ " .....	16lbs. "
$1\frac{1}{2}$ " .....	20lbs. "

And no person shall lay any service pipe (where subject to traffic) below the ground surface at a depth not less than ten inches.

20. All notices and applications required by these By-laws are to be made upon printed forms, to be obtained at the Council Chambers; notices sent by post must be prepaid, any sums paid by the Council on account of notices sent by post and not prepaid will be charged against the sender.

21. The Council shall be at liberty to discontinue and cut off the supply of water immediately on the discovery of any breach of these By-laws.

22. In the construction of these By-laws the word person shall be deemed to extend to and include a corporation or any body or number of persons, and the masculine and feminine alike, and the masculine shall include the feminine.

23. Any person committing a breach of any of these By-laws to which no specific penalty is attached or who shall neglect or refuse to obey any injunction in any such By-laws shall upon conviction be liable to a penalty not exceeding twenty pounds, and in case of continuing the offence a further penalty not exceeding five pounds for each day after notice of such offence shall have been given by the Council to such offender.

Made and passed by the Council of the Borough of Lismore, and the seal of the said Council was hereunto affixed this nineteenth day of May, in the year of our Lord, one thousand eight hundred and ninety.

(L.S.) JAMES F. O'FLYNN,  
 Mayor.  
 C. A. BARRHAM,  
 Council Clerk.

1890.

## NEW SOUTH WALES.

## LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.

(RESUMPTION IN CONNECTION WITH THE MANLY WATER SUPPLY.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
Council, Knight Grand Cross of the  
(L.S.) Most Distinguished Order of Saint  
CARRINGTON, Michael and Saint George, Governor and  
Governor. Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS the Minister for Public Works is desirous of constructing a Reservoir on the land described in the Schedule at the foot hereof, for the purpose of supplying water to the village of Manly; and it is estimated that the cost of carrying out the said works will not exceed the sum of twenty thousand pounds: And whereas, under the provisions of the "Public Works Act of 1888," I, the Governor aforesaid, with the advice of the Executive Council, have in due form directed that the said works shall be carried out under the provisions of the said Act by the Minister for Public Works aforesaid, who, in respect of the said works, I have declared shall be deemed to be the Constructing Authority; and also, that the land required for carrying out the said works shall be acquired under the provisions of the said Act: And whereas the land described in the Schedule at the foot hereof is the land required for carrying out the said works: Now, therefore, I, CHARLES ROBERT, BARON CARRINGTON, the Governor aforesaid, by this notification, to be published in the Government Gazette, do declare that the said land in the said Schedule described has been and is hereby appropriated for the purpose of constructing thereon a reservoir for the supply of

water to the village of Manly. To the intent that upon the publication of this notification in the Gazette, the legal estate in the said land hereafter described shall forthwith be vested in the Minister for Public Works, as the Constructing Authority on behalf of Her Majesty, under the provisions in that behalf in the 21st section of the said "Public Works Act of 1888": And I declare the following is the description of the lands hereinbefore referred to, that is to say:—

All that piece or parcel of land situate in the parish of Manly Cove, county of Cumberland, and Colony of New South Wales, being allotments 6, 7, and 8 of section I of the Fairlight Estate: Commencing at the junction of the east boundary of Ashley-street with the south boundary of Fairlight-street; and bounded thence by that boundary of Fairlight-street bearing east 126 feet; thence by the west boundary of allotment 9 bearing south 132 feet; thence by the north boundaries of allotments 19, 20, and 21 bearing west 126 feet; thence by the aforesaid east boundary of Ashley-street bearing north 132 feet, to the point of commencement; containing 1 rood 20½ perches, and said to be in the possession of the Fairlight Land, Building, and Investment Company (Limited).

Given under my Hand and Seal of the said Colony, at Government House, Sydney, this tenth day of April, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.  
(RESUMPTION IN CONNECTION WITH THE NORTH SHORE WATER SUPPLY.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
(L.S.) Honourable Privy Council, Knight  
By Deputation from Grand Cross of the Most Distinguished  
the Governor: Order of Saint Michael and Saint  
ALFRED STEPHEN, George, Governor and Commander-in-  
Lieutenant-Governor. Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the supply of water to the Western Suburbs of Sydney and districts north of the Parramatta River, for and towards the completion of which said works public funds are available; and whereas the lands hereinafter described are required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do by this notification, published in the Gazette, and in a newspaper, that is to say, in the "North Shore Times," circulated in the Police District wherein the said lands are situated, declare that the lands hereinafter described have been resumed for the public purposes herein-after mentioned, that is to say, for and in connection with the supply of water to the said Western Suburbs of Sydney and districts north of the Parramatta River, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said lands shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee-simple in possession, freed and discharged from all trusts, obligations, estate, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to the intent, further, that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a trustee, with

the powers stated in the said last-mentioned Act: And I declare that the following is a description of the lands herein-before referred to, that is to say:—

1st. All that piece or parcel of land situate in the parish of Willoughby, county of Cumberland, and Colony of New South Wales, being part of a grant of 25 acres to John Jones: Commencing on the northern side of Mowbray Road West, at the south-eastern corner of the aforesaid grant; and bounded thence on the east by the eastern boundary of that grant bearing northerly 1 chain 3 links; on the north-east, north, and north-west by lines bearing north 75 degrees 59 minutes west 11 chains 79 links, north 86 degrees 23 minutes west 4 chains 72 links, and south 40 degrees 3 minutes west 3 chains 89 links, on the south-west by the Lane Cove River bearing south-easterly to its intersection with the northern boundary of the Mowbray Road West aforesaid; thence on the south-east, south, and south-west by lines bearing north 40 degrees 3 minutes east 3 chains 14 links, north 86 degrees 23 minutes east 4 chains 46 links, and south 75 degrees 59 minutes east 11 chains 89 links, to the point of commencement; containing 1 acre 3 roods and 14 perches, exclusive of a reserve of 100 feet from high-water mark, and said to be in the possession and occupation of Mrs. H. Whatmore.

2nd. All that piece or parcel of land situate in the parish of Willoughby, county of Cumberland, and Colony of New South Wales, being part of a grant of 31 acres to John Roby Hatfield: Commencing on the northern boundary of the Mowbray Road West, at the south-western corner of the aforesaid grant; and bounded on the west by the western boundary of that grant bearing northerly 1 chain 3 links; on the north-east by other part of that grant bearing south 75 degrees 59 minutes east 4 chains 46 links; on the south by the northern boundary of the Mowbray Road West aforesaid bearing north 89 degrees 21 minutes west 4 chains 33 links, to the point of commencement; containing 35½ perches, and said to be in the possession and occupation of John Roby Hatfield.

In witness whereof, I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this twentieth day of January, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

**LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.**  
 ((RESUMPTION NEAR RYDE, IN CONNECTION WITH THE NORTH SHORE WATER SUPPLY.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.

**NOTIFICATION OF RESUMPTION OF LAND UNDER  
 44 VICTORIA No. 16.**

NEW SOUTH WALES, } By His Excellency The Right Honourable  
 to wit. } CHARLES ROBERT, BARON CARRINGTON,  
 a Member of Her Majesty's Most  
 (L.S.) Honourable Privy Council, Knight  
 By Deputation from Grand Cross of the Most Distinguished  
 the Governor: Order of Saint Michael and Saint  
 ALFRED STEPHEN, George, Governor and Commander-in-  
 Lieutenant-Governor. Chief of the Colony of New South  
 Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the supply of water to the Western Suburbs of Sydney and districts north of the Parramatta River, for and towards the completion of which said works public funds are available; and whereas the land hereinafter described is required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification published in the Gazette, and in a newspaper, that is to say, in the "River Times," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purposes hereinafter mentioned, that is to say, for and in connection with the supply of water to the said Western Suburbs of Sydney and districts north of the Parramatta River, to the intent that upon the publication of this notification in the Gazette, the legal estate in the said land shall forthwith be vested in the Minister for Public Works and

his successors on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee-simple in possession, freed and discharged from all trusts, obligations, estate, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever, and to the intent further that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a trustee with the powers stated in the said last-mentioned Act: And I declare that the following is a description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land situate in the parish of Hunter's Hill, county of Cumberland, and Colony of New South Wales, being part of a grant of 160 acres to Wm. Kent: Commencing at a point bearing south 32 degrees 14 minutes 30 seconds east and distant 918 feet 8 inches from the south-eastern corner of William Kent's 100-acre grant; and bounded thence by lines bearing north 9 degrees 49 minutes 10 seconds east 236 feet 8½ inches, north 1 degree 11 minutes 10 seconds west 235 feet 6¼ inches, north 27 degrees 39 minutes 40 seconds west 407 feet 6 inches; thence by a line bearing generally southerly about 888 feet, to the point of commencement,—containing 3 roods 2¼ perches, and said to be in the possession of Mary E. Bowden.

In witness whereof, I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this twenty-fourth day of January, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.

(RESUMPTION FOR SUPPLY OF WATER TO THE TOWN OF RICHMOND.)

Presented to Parliament, pursuant to Act 48 Vic. No. 16, sec. 6.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
Honourable Privy Council, Knight  
(I.S.) Grand Cross of the Most Distinguished  
CARRINGTON, Order of Saint Michael and Saint  
Governor. George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the supply of water to the town of Richmond, for and towards the completion of which said works public funds are available; and whereas the land hereinafter described is required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification, published in the Gazette, and in a newspaper, that is to say, in the "Windsor and Richmond Gazette," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purpose hereinafter mentioned, that is to say, for and in connection with the supply of water to the said town of Richmond, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said land shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estate, interest, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to

the intent further that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a trustee with the powers stated in the said last-mentioned Act: And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land situate at North Richmond, county of Cook, and Colony of New South Wales: Commencing on the south-east side of the proclaimed road leading from South Kurrajong to Richmond, at a point where the north-east boundary of that portion of Bishop's 100-acre grant devised to James Clarke intersects; and bounded on the south-west side by part of the north-east boundary of that land, being a fenced line bearing south 40 degrees 30 minutes east 25 chains 30 links to the Hawkesbury River; thence on the south-east side by said river downwards about 14 chains 18 links to the south corner of the property of George M. Pitt; thence on the north-east side by the south-west boundary of the said property, being a fenced line bearing north-westerly 26 chains 85 links to the road leading from South Kurrajong to Richmond; and thence on the north-west side by the said road south-westerly, to the point of commencement; containing 37½ acres, and said to be in the possession of Charles S. Guest.

In witness whereof, I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this eighteenth day of April, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,

W. MCMILLAN.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

**LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.**  
(RESUMPTION OF LAND IN CONNECTION WITH THE SUPPLY OF WATER TO THE CITY OF SYDNEY,  
PARISH OF ALEXANDRIA.)

**Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.**

NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
Honourable Privy Council, Knight  
(L.S.) Grand Cross of the Most Distinguished  
CARRINGTON, Order of Saint Michael and Saint  
Governor. George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the supply of water to the City of Sydney and its suburbs, in the said Colony, for and towards the completion of which said works public funds are available; and whereas the land hereinafter described is required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do by this notification, published in the Gazette, and in a newspaper, that is to say "The Daily Telegraph," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purposes hereinafter mentioned, that is to say, for and in connection with the supply of water to the said City of Sydney and its suburbs, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said land shall forthwith be vested in the Minister for Public Works and his successors,

on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estate, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to the intent further that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a trustee with the powers stated in the said last-mentioned Act: And I declare that the following is a description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land situate in the parish of Alexandria, county of Cumberland, and Colony of New South Wales: Commencing at a point bearing south 85 degrees 23 minutes east and distant 1 chain and  $\frac{1}{10}$  of a link from the most northerly south-east corner of the Victoria Barrack wall; and bounded thence by lines bearing south 84 degrees 51 minutes east 1 chain  $42\frac{4}{10}$  links, south 1 degree 27 minutes west  $22\frac{2}{10}$  links, north 83 degrees 52 minutes west 1 chain  $39\frac{1}{10}$  links, north 8 degrees 21 minutes west  $20\frac{2}{10}$  links, to the point of commencement, containing  $4\frac{1}{2}$  perches and said to be in the possession and occupation of H. Zions.

In witness whereof I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this eighteenth day of August, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

**LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.**  
(RESUMPTION OF LAND AT PATERSON IN CONNECTION WITH THE CONSERVATION OF WATER.)

**Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.**

**NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.**

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
Honourable Privy Council, Knight  
(L.S.) Grand Cross of the Most Distinguished  
CARRINGTON, Order of Saint Michael and Saint  
Governor. George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the Conservation of Water at Paterson, for and towards the completion of which said works public funds are available; and whereas the land hereinafter described is required for the construction of the said works: Now I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification published in the Gazette, and in a newspaper, that is to say, in the "Maitland Mercury," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purposes hereinafter mentioned, that is to say, for and in connection with the Conservation of Water, to the intent that upon the publication of this notification in the Gazette, the legal estate in the said land shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purposes of the said last-mentioned Act, for an estate of inheritance in fee-simple in possession, freed and discharged from all trusts, obligations,

estate, interests, contracts, charges, rates, rights-of-way, or other encumbrances whatsoever; and to the intent, further, that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a Trustee, with the powers stated in the said last-mentioned Act: And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land situate in the town of Paterson, county of Durham, and Colony of New South Wales, and marked on the map or plan of the lands exhibited at the time of sale "reserve of 10 allotments"; bounded on the south by a line running west from High-street of about 9 chains; on the west by Wilson's allotments by a line running north of about 5 chains; on the north partly by Lake-street by a line running east of about 4 chains to the Lagoon, and then by a line through the Lagoon still running east till it comes to Ward's allotments at the north-east corner of said Lagoon, and after that taking a course south-easterly, partly by a line running east from the said Lagoon, and dividing it from Wilson's allotments, 3 chains 15 links; and on the east by a line running south along High-street 2 chains 24 links to the commencing point,—and said to be in the possession of Herbert H. Brown.

In witness whereof I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this thirteenth day of October, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

# PUBLIC WATERING PLACES ACT, 1884.

(AMENDED REGULATIONS UNDER.)

Presented to Parliament, pursuant to Act 48 Vic. No. 16.

Department of Mines,  
Water Conservation,  
Sydney, 10th January, 1890.

HIS Excellency the Governor, with the advice of the Executive Council, has been pleased to approve of the following as the Regulations for Water Trusts under the Public Watering Places Act of 1884, in lieu of those hitherto in force.

SYDNEY SMITH.

## AMENDED REGULATIONS.

## WATER TRUSTS.

49. Any Public Watering Place may be placed under Trustees, or vested in a Municipal or Borough Council, or in a Divisional Board, subject to these Regulations and the following conditions:—

1. The number of Trustees may be such as the Minister shall decide.
2. The Trustees shall see that the works, appliances, and appurtenances are kept in a thoroughly efficient state.
3. The Trustees shall, within two months of the notification of their appointment in the Government Gazette, frame a scale of charges for the sale of water for domestic use, or for stock belonging to residents within the limits of the Municipality, where the trust is a Municipal one, or within a radius of four miles of the watering place when not within a Municipality. Such charges, upon approval by the Minister, and notification in the Government Gazette, shall be collected by the Trustees or the person appointed by them for such purpose. In the failure of the Trustees to submit such scale of charges within the two months, the Minister may regulate the charges to be made, and after notification in the Gazette the Trustees shall be required to collect them.
4. All travellers, teamsters, and drovers entitled to obtain water at a Public Watering Place shall, on pre-payment of the charges prescribed by Regulation No. 9, be equally entitled at Public Watering Places under Trustees.
5. All watering places under Trustees will be open to inspection by the officers appointed by the Minister for that purpose; and all repairs or alterations needed for maintenance of the Watering Place in an efficient condition shall be effected by the Trustees, upon instructions from the Minister or the officer appointed by him for that purpose.
6. The Trustees must employ a Caretaker, and see that he resides in the immediate vicinity of the Watering Place.
7. The Trustees must forward to the Chief Inspector of Public Watering Places, at the end of each week, completed returns upon the forms which will be supplied to them, and such other particulars as may from time to time be required.
8. The Trustees are not empowered to let the T. L. of the Public Watering Place without the consent of the Minister being specially obtained.
9. The moneys collected by the Trustees shall be applied by the Trustees—
  - (1.) To the payment of interest upon the cost of the works at the rate of £4 per centum, or at any less rate approved by the Minister.
  - (2.) To the payment of a Caretaker's wages.
  - (3.) To the maintenance, repair, and improvement of the works.



1890.

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LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

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## WATER CONSERVATION BILL.

(MESSAGE No. 75.)

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*Ordered by the Legislative Assembly to be printed, 11 December, 1890.*

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ALFRED STEPHEN,  
*Lieutenant-Governor.*

*Message No. 75.*

In accordance with the provisions contained in the 54th section of the Constitution Act, the Governor recommends, for the consideration of the Legislative Assembly, the expediency of making provision to meet the requisite expenses in connection with "A Bill to define and declare the respective rights of the Crown and of private persons to flowing water and other sources of water supply in New South Wales; to provide for the establishment of trusts, and in certain cases to enable the Government to carry out works of water conservation and utilization and of drainage; to empower such trusts to raise loans to be granted or guaranteed by the Government in certain cases and under certain conditions; to authorize the imposition of rates and charges for the purposes of such trusts; to provide for the leasing of Crown Lands subject to drought and floods; for the acquisition of lands and water-rights in certain cases; for the disposal thereof by sale or lease; for the licensing of works for water conservation or utilization; for granting water-rights to private persons, subject to certain conditions and reservations; and for conferring powers and making provision generally for giving due effect to and carrying out the purposes aforesaid."

*Government House,*  
*Sydney, 11th December, 1890.*

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1890.

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LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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BOARD OF WATER SUPPLY AND SEWERAGE  
OFFICES ERECTION BILL.

(MESSAGE No. 19.)

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*Ordered by the Legislative Assembly to be printed, 2 July, 1890.*

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*By Deputation from the Governor,*  
ALFRED STEPHEN,  
*Lieutenant-Governor.*

*Message No. 19.*

In accordance with the provisions contained in the 54th section of the Constitution Act, the Governor recommends for the consideration of the Legislative Assembly the expediency of making provision to meet the requisite expenses in connection with a Bill to sanction the erection of offices for the accommodation of the Board of Water Supply and Sewerage.

*Government House,*  
*Sydney, 25th June, 1890.*

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1890.

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LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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BOARD OF WATER SUPPLY AND SEWERAGE OFFICES  
ERECTION BILL (NO. 2.)  
(MESSAGE NO. 57.)

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*Ordered by the Legislative Assembly to be printed, 9 October, 1890.*

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CARRINGTON,  
*Governor.*

*Message No. 57.*

In accordance with the provisions contained in the 54th section of the Constitution Act, the Governor recommends for the consideration of the Legislative Assembly the expediency of making provision to meet the requisite expenses in connection with a Bill to sanction the erection of offices for the accommodation of the Board of Water Supply and Sewerage.

*Government House,  
Sydney, 9th October, 1890.*

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1890.  

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NEW SOUTH WALES.  

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PARLIAMENTARY STANDING COMMITTEE ON  
PUBLIC WORKS.  

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## REPORT

TOGETHER WITH

MINUTES OF EVIDENCE

RELATING TO THE

PROPOSED RETICULATION

OF THE

WESTERN SUBURBS DRAINAGE SCHEME.

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Presented to Parliament in accordance with the provisions of the Public Works Act,  
51 Vic. No. 37, section 8.

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SYDNEY : CHARLES POTTER, GOVERNMENT PRINTER.



## MEMBERS OF THE COMMITTEE.

## LEGISLATIVE COUNCIL.

The Honorable JOHN LACKEY, Vice-Chairman.  
 The Honorable ANDREW GARRAN.  
 The Honorable FREDERICK THOMAS HUMPHERY.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 The Honorable GEORGE HENRY COX.

## LEGISLATIVE ASSEMBLY.

JOSEPH PALMER ABBOTT, Esquire, Chairman.  
 JACOB GARRARD, Esquire.  
 HENRY COVELL, Esquire.  
 JAMES EBENEZER TONKIN, Esquire.  
 WILLIAM SPRINGTHORPE DOWEL, Esquire.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.  
 CHARLES ALFRED LEE, Esquire.

## GENERAL INDEX

Report by the Committee.  
 Minutes of Evidence taken by the Committee.

## LIST OF WITNESSES.

	PAGE.
Joseph Baring, Esq., Under Secretary for Public Works .....	7
C. H. Olfen Bagge, Esq., Chief Assistant Engineer, Sewerage Department, Department of Roads and Bridges .....	7-8
James M'Donald, Esq., Acting Mayor of Balmain .....	8-10



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

RETICULATION OF THE WESTERN SUBURBS DRAINAGE SCHEME.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, appointed during the first Session of the present Parliament, under the Public Works Act of 1888, 51 Vic. No. 37, and the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, to whom was referred the duty of considering and reporting upon "the expediency of carrying out the work of reticulation of the first section of the works in connection with the scheme of Sewerage for the Western Suburbs of the City of Sydney, and certain further works necessary to complete the said scheme," have, after due inquiry, resolved that it is expedient the proposed works should be carried out; and, in accordance with the provision of sub-section IV, of clause 13, of the Public Works Act, report their resolution to the Legislative Assembly:—

1. The proposed works are necessary in connection with the large and important drainage scheme for the Western Suburbs designed by Mr. G. H. Stayton, M. Inst. C.E., and reported upon to the Legislative Assembly by the Committee in August, 1889. In that report the works now under consideration were set forth, and in the evidence accompanying the report they were very clearly explained. The works which the Committee have already reported upon comprise the trunk sewers or main portion of the scheme; the works referred to more particularly in the present report are the necessary adjuncts or branches of the main sewers. Mr. Stayton's estimate of the cost of the scheme complete is £1,817,896, this amount being made up of £830,304, the cost of the main sewers, £713,592 for additional and subsequent works, and £274,000 for works that are part of the general scheme already executed or nearing completion. The £713,592 represents the cost of the reticulation and of the other works upon which the Committee have now to report. £340,741 is for what Mr. Stayton describes as "the first section of additional works," consisting of 300 miles of subsidiary sewers costing £300,000, the first part of the Canterbury and Enfield main sewer, £20,741, and provision for dealing with the Marrickville storm-water drainage, to cost £20,000. Then come what are termed subsequent works, the estimated cost of which is £372,851, and these comprise another 100 miles of subsidiary sewers, costing £100,000; the completion of the Canterbury and Enfield main sewer, at an expense of £65,410; the establishment of low-level systems which are to cost £119,650; the completion of the western outfall sewer, at a cost of £48,374; the completion of the Marrickville pumping station, costing £6,817; and the completion of the sewage farm at Webb's Grant, at a cost of £32,600. These works, together with the trunk sewers and the works already executed or nearing completion, include, it is stated, all that can possibly be foreseen at the present time, and the sum of money represented by the total estimated cost is believed to be ample to provide for every contingency.

2. The whole matter is dealt with very exhaustively in the report of the Committee made in August last, and in the documents accompanying that report, and

Description  
of proposed  
works.

The plans  
relating to  
the proposed  
works.

and it need not be elaborated here. In their previous consideration of the general scheme for the drainage of the western suburbs, the Committee had before them the plans showing the proposed works as far as they could be shown, and inquired very fully concerning them. These plans are available in connection with the Committee's previous report. It will be found that they do not show in detail the proposed reticulation; but such a work as the reticulation of a large drainage scheme can only be carried out gradually, and as is found expedient, and it would be almost impossible to indicate on a plan or map every instance in which a connection is likely to be made from the various streets and lanes with the main sewers. It is impossible, a witness points out, for any engineer to go further into details with regard to the reticulation than Mr. Stayton has done, and it should be borne in mind that the scheme is a large one, and that its completion will extend over many years.

Examination  
of the esti-  
mates of cost.

3. In the former inquiry, evidence was sought as to the accuracy of Mr. Stayton's estimates of cost, and in the present the subject has not been overlooked, the result in each case being that there appears to be no reason to doubt the correctness of the figures. Absolute accuracy in an estimate of the cost of large works, the construction of which must extend over many years, cannot be expected, but reasonable accuracy can, and everything indicates that Mr. Stayton's estimates have been carefully prepared, that they are reasonably correct, and that they are not likely to be exceeded.

Objection to  
the scheme.

4. The residents of Balmain, one of the municipal boroughs to be drained by the proposed system, are not all in favour of the scheme, but the objection of those opposed to it is based principally on the question of cost. The matter has been discussed by the Municipal Council, and the aldermen have been about equally divided upon it; but no formal expression of opinion upon the subject has been obtained from the people, and it is doubtful whether in view of the important advantages which would accrue to the borough from the adoption of Mr. Stayton's scheme, the public of Balmain are really unfavourable to it. Unquestionably the scheme would be advantageous to the borough, and the cost to the ratepayers would not be excessive. There is, therefore, no good reason why the objection raised by some of the residents of Balmain should interfere with the carrying out of the proposed works.

Chief reason  
in favour of  
the proposed  
reticulation.

5. The chief reason in favour of the proposed reticulation is that without it the main sewers will be useless for the purposes for which they have been designed, and it will not be possible to collect sewerage rates. It is consequently necessary to carry out the additional works in order to make those already approved of useful and remunerative.

Resolution  
of the Com-  
mittee.

6. The evidence taken by the Committee was considered by them on Thursday, 30 January, and the following resolution moved by Mr. Lackey, and seconded by Mr. O'Sullivan, was passed unanimously:—

“That it is expedient the proposed reticulation of the Western Suburbs Drainage Scheme, and the construction of certain further works necessary to complete the said scheme, as referred to the Committee by the Legislative Assembly, be carried out.”

J. P. ABBOTT,  
Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Sydney, 6th February, 1890.

# PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## MINUTES OF EVIDENCE.

### RETICULATION OF THE WESTERN SUBURBS DRAINAGE SCHEME.

TUESDAY, 14 JANUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).

The Hon. JOHN LACKEY.

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHREY.

The Hon. WILLIAM JOSEPH TRICKETT.

The Hon. GEORGE HENRY COX.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

JAMES EBENEZER TONKIN, Esq.

WILLIAM SPRINGTHORPE DOWEL, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

CHARLES ALFRED LEE, Esq.

The Committee proceeded to consider the proposed Reticulation of the Western Suburbs Drainage Scheme.

Joseph Barling, Esq., Under Secretary for Public Works, sworn, and examined:—

1. *Chairman.*] Have you any statement to make in reference to this proposal? This matter has been so fully discussed before the Committee, and a decision having been practically come to on it, I think the best thing I can do is to refer to that part of the report of the Committee on the proposed drainage works for the Western Suburbs which bears upon the subject. I will read a few sentences from page 13 of that report. After referring to the cost of the construction of the main sewers for the drainage of the Western Suburbs the report says:—"Other works, however, will be necessary for the drainage of the low-level areas, and for completing the scheme as a whole, so that a proper system shall be in operation throughout the Western Suburbs; and for these there is a supplementary estimate and statement by Mr. Stayton which, to a certain extent, have been under the consideration of the Committee, and will be laid with this Report before Parliament. This supplementary estimate amounts to £713,592, and is made up of £340,741 for what Mr. Stayton describes as 'the first section of additional works,' and £372,851 for subsequent works. The first section of additional works consists of 300 miles of subsidiary sewers, costing £300,000." Evidence was given on this point, and in reply to a question by Mr. Garrard, who asked "What is the estimated cost of those subsidiary sewers?" Mr. Stayton said "£1,000 a mile is the average. I have taken it at that rate, which makes a total of £300,000 for the first section." The report continues:—"The first part of a main sewer for Canterbury and Enfield, to cost £20,741; and a provision for the storm-water drainage of Marrickville, estimated to cost £20,000. The subsequent works comprise another 100 miles of subsidiary sewers, costing £100,000; the completion of the Canterbury and Enfield main sewer, at an expense of £65,410; the establishment of low-level systems which are to cost £119,650; the completion of the western outfall sewer, at a cost of £48,374; the completion of the Marrickville pumping station, costing £6,817; and the completion of the sewage farm at Webb's Grant, at a cost of £32,600. These proposed additional works, considered in connection with those included in the estimate of £830,304, and with works described by Mr. Stayton as 'already executed or nearing completion,' and meaning the northern and southern outfall sewers, which will be used for the drainage of some portions of the Western Suburbs, are declared by him 'to provide for every contingency,' and to include 'all works which can possibly be foreseen at the present time.' The total suburban area included in the scheme is 14,077 acres, and the existing population on that area is about 170,000 persons; but the scheme has been designed for a prospective population of 482,608 persons, which, at the present rate of increase, may be looked for in the Western Suburbs in from eighteen to twenty years. The comprehensiveness of the proposal is, therefore, quite apparent." At page 33 of the appendix it will be seen how the whole amount is made out.

J. Barling,  
Esq.  
14 Jan., 1890.

C. H. Olfson Bagge, Esq., Chief Assistant Engineer, Sewerage Department, Department of Roads and Bridges, sworn, and examined:—

2. *Mr. Garrard.*] You are an engineer in connection with the Sewerage Board? Yes; under Mr. Hickson.

3. The proposal before us is for the reticulation of the Western Suburbs? Yes.

4. Has anything fresh transpired in reference to it since you and the other officers of the department were examined on the Western Suburbs Scheme in its entirety? Nothing whatever.

5. The reticulation referred to here is the same as that shown on the various plans submitted to the Committee originally? Yes.

C. H. O.  
Bagge, Esq.  
14 Jan., 1890.

6.

- C. H. O. Bagge, Esq.  
14 Jan., 1890.
6. Has there been any objection from any of the local governing bodies, or any demand for an alteration of any kind? There was a request from the Balmain Council that an officer of our department should attend at one or two of their meetings to give information on the subject. I understand that there was some opposition on the part of one or two members of that council, but those gentlemen were not present when we attended the meetings. Other gentlemen examined us as to the cost of the scheme, and the possibility of altering it, and after we had given every explanation that we could, they seemed to be satisfied.
7. When you were examined last time on this matter it was said that an alternative scheme might be adopted for this particular portion of the Western Suburbs—Balmain; has anything been done in regard to that, or is the plan to be carried out as originally submitted? The intention is to carry out the plan which the Committee decided upon.
8. But is it not a fact that Mr. Stayton said that you had an alternative scheme under consideration? Yes.
9. Has anything more been done about that? Nothing has been done because the alternative plan would be far more expensive than the original plan.
10. And the proposal before us now is simply carrying out the original plan in reference to the western suburbs, Balmain included? Yes.
11. Since you met the Balmain Council has the Department received any communication from them as to this or any other proposal? I have not heard of anything of the sort.
12. And there has been no communication from any other Municipality? Not that I am aware of.
13. And there is no deviation in what is now before us from what was put before us in connection with the main scheme? None whatever.
14. *Chairman.*] If the recommendations of this Committee with regard to the important work in connection with the western suburbs are carried out, will they not be useless without this reticulation? They will be quite useless. We must have the reticulation in order to be able to collect the sewage and the revenue.
15. And to utilize the sewers the reticulation must be there? Yes.
16. What is the estimated cost of the reticulation? About £1,000 per mile.
17. You, of course, cannot go into details? It is impossible for any engineer to go further into details than Mr. Stayton has done. It is a large scheme, its completion extending over many years, and I think that an expenditure of £400,000 will suffice for the next fifteen or twenty years.
18. This work will not all be carried out at once, but as it is required? We begin at the outfall works and advance with the three main sewers, and the reticulation must be put in in order that we may collect the revenue as the main work advances.
19. *Mr. Dowel.*] How have you arrived at your estimate of £1,000 per mile? The estimates were prepared by Mr. Stayton.
20. Did you say you had satisfied yourself that £1,000 per mile would be sufficient to carry out this reticulation? I referred to the £400,000 because in an estimate of this kind, where there are so many changes involved, where there are incidental expenses, an engineer can only arrive at a certain average sum. If he put it too high he might be ridiculed; therefore he tries to put it at such a moderate figure as will be reasonable, and will, as prices go down, meet the requirements of the case. I have no doubt that Mr. Stayton thought that the prices would go down as they are doing now, and that £1,000 a mile would cover the expenditure.
21. You have made no calculation in reference to this particular matter? No; but I have in similar matters. We have been building sewers daily and our estimates vary. By way of illustration I may mention that quite recently we were inviting tenders for a sewer contract, the amount of which I estimated at £18,000. That was based upon the lowest figures, at which we all thought the contractors would lose, but when the tenders came in to my utmost astonishment the lowest tender was £11,000. If I had put down this reticulation work at £2,000 a mile, which I could easily have done, in a year or two's time I might have appeared ridiculous.
22. You are of opinion that the whole of the work can be carried out for a sum not exceeding £1,000 a mile? I can only say that on the whole I believe the estimate has been placed carefully before the Committee, that it is a reasonable estimate, and that it will cover the prospective expenditure of this work for the next twelve or fifteen years.

THURSDAY, 23 JANUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN.)

The Hon. JOHN LACKEY.

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

The Hon. GEORGE HENRY COX.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

JAMES EBENEZER TONKIN, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

CHARLES ALFRED LEE, Esq.

The Committee further considered the proposed reticulation of the Western Suburbs Drainage Scheme.

James M'Donald, Esq., Acting Mayor of Balmain, sworn, and examined:—

- J. M'Donald, Esq.  
23 Jan., 1890.
23. *Dr. Garran.*] What position do you hold in Balmain? An alderman.
24. Are you acting as Mayor just now? I am acting as Mayor at the present time.
25. In the absence of the regular Mayor? Yes.
26. Are you acquainted with the proposal for the reticulation of the sewerage arrangements in Balmain? I have seen the plan of it.
27. Has the plan been before your Council? Yes.
28. Has it been discussed there? Yes.
29. Are the aldermen generally favourable or unfavourable to it? I think they are about equally divided on the subject.
30. Which are you? I am for it.

31. Although you are for it can you give me a fair statement of the objections against it? The objection J. M'Donald, Esq. against it is the cost. I believe that that is the principal objection against it.
32. Are the Balmain people unwilling to inflict the cost on the other metropolitan ratepayers or unwilling to bear their own share? We have had no public meeting in respect to the matter. It was merely before the Council. The people have not been called upon to give their opinion on the matter at all. 23 Jan., 1890.
33. I mean the Council as a Council; are they afraid that they will be more heavily taxed than other Municipalities in proportion? I do not know whether they are afraid of that, but they think it will be too heavy for them.
34. You are aware that it is not proposed to tax each Municipality separately—according to the cost of its own separate work—but to throw the whole into one sum? I understand we are to be taxed in the same proportion.
35. So that a Municipality with easy work will pay for a Municipality with expensive work? That is how we understand it.
36. If the Balmain portion will be the most expensive of the whole lot, you will rather be an infliction on the other Municipalities than they on you? Yes, in that case.
37. And you are very anxious not to inflict on other Municipalities;—is that it? I do not know that we have taken that into consideration.
38. Were you examined before the Committee on the sewerage question? No, I was not. It was Mr. Buchanan.
39. Did you read over the evidence then given? Yes.
40. Do you remember what was stated to be the cost of dealing with the sewerage under the present system? Yes; but we had some officers of the Works Department over who gave us the cost, and I think that the cost of the Balmain portion would come to over £203,000. It was stated that it would come to only £90,000 odd, but from the statement which they made at the Council meeting we understood it would cost £203,000 odd.
41. That might be a very good reason why the other Municipalities should object to go into the scheme, but is it a good reason why you should not go? If they had to pay an equal proportion I think they would object.
42. Do you know what it is costing you now to deal with your sewage matter? It is costing us about £4,600. I might mention that we are endeavouring to come to an arrangement with the Eureka Sanitary Company to establish a crematorium at Balmain which would be far better than at present, and cost about the same thing, and if we can arrange I think we will introduce that whether this work goes on or not, as if this goes on it will be some years before it is of any service to us. It is far before the present system, but the soil would remain a day or two in the buckets even then. For my own part I should prefer the underground sewerage.
43. I want to get from you what is your present cost including everything? About £4,600.
44. What is that in a rate? It comes to over £1 per closet.
45. Is that equal to a 6d. or a 5d. rate on the rateable value of your property; what does a 1s. rate give you in Balmain? About £12,000, I think.
46. Then that is about a 4½d. rate? Yes.
47. If you were to come under this system you might have a 7d. rate? We expect so.
48. And the objection at Balmain is to rise from 4½d. to 7d.? They take into account not only the cost of making the sewers but also the connections. The connections would be very expensive, Balmain being all rock, and they say that the greater portion of the Balmain ratepayers are very poor people, and they would hardly be able to pay the cost. Some of the connections would cost from £20 to £30.
49. Would the company set up the crematorium? Yes. We have at present contracts for removing the soil under the present system; one contractor's time is up next year and another's the year following, so we are trying to make an arrangement between these contractors and the Eureka Company so that they can manage till their time is up.
50. At present do you shoot it into a punt? Yes.
51. And take it away? At the foot of Adolphus-street, and they take it out to sea.
52. In the borough where I live there are great complaints of the noise and nuisance of the carts at night, and also great complaints near where the punt is moored; have you any such complaints in Balmain? Yes.
53. Your present system of removing the night-soil is a perceptible nuisance? Yes.
54. And much complained about? Yes.
55. If you had the crematorium you would still have to cart all the stuff to the crematorium instead of to the punt? Yes; but their system is so admirably managed that there is no smell. We went to Newcastle to see how it worked there, and found that it worked very well.
56. Do you mean to say that there is no nuisance at the crematorium, and no nuisance in carting the stuff? We could see none.
57. But if you could cart the stuff through the streets to the crematorium without nuisance, why cannot you cart it to a punt without nuisance? Perhaps different parties have different systems of doing it. They do not do as it is done now—take the bucket and pour the stuff into a cart, but they have a double set of buckets, and they leave a clean one, and take the foul one away, closed up, and air-tight.
58. But that is simply supposing that you are altogether behind the times at Balmain and have got a better system under your nose and will not use it? The new system will be better, because under the old system we have got now they take the buckets and pour their contents into the cart, whereas the Eureka Company have a double set of buckets.
59. I quite understand that, but why could not you carry the stuff with as little nuisance as the Eureka Company is going to carry it? It would cost us a good deal more.
60. That is to say if you diminish the nuisance of carting the night-soil through the streets of Balmain, it will cost you a little more as the Eureka Company propose to do it? Yes. What we understand is that they will do it for about the same as we pay now.
61. You admit that there is a better system of carting it? Yes.
62. And you have not adopted that system? No; but we intend to have it.
63. Do you think that if the crematorium were established you would get rid of the nuisance altogether? I am afraid not; we would still have the slops to deal with—the kitchen slops, and all that sort of thing.

- J. McDonald, Esq.  
3 Jan., 1890.
64. What are you going to do with those? Just as we do now, I suppose.
65. Suppose the Government prohibit you from shooting them into the harbour, on the ground that you foul the foreshore, as they are entitled to do, and what the Board of Health would probably do, what are you going to do? I cannot say.
66. Would you crematorium these as well? We might purify it by some means before it entered the harbour.
67. Do you think that any means you could provide would be cheaper than this rate? I cannot say at present.
68. You are aware that the larger part of the surface of Balmain could have the whole of its sewerage—house-slops as well as night-soil—diverted into the Bondi sewer to go by gravitation out to sea? I am aware of that.
69. That might cost you 7d., 8d., or perhaps 9d.; do you think, taking all things into consideration, that would be so much dearer to Balmain as not to be worth purchasing? For my own part, I would much prefer this underground sewerage, as I know it is cleaner, and would do away with all the nuisance we have to contend against—but my opinion is not everyone's opinion there.
70. Do you not think that some of this opposition is due to an imperfect acquaintance with the cost to every householder of bad smells? Some of them thought that 7d. would be too much.
71. They would rather have bad smells than pay 7d.? I do not know, I am sure, but they would rather keep the money.
72. Do they have doctors, any of them? I do not know that we are more troubled in Balmain than in any other suburb.
73. Is it a healthy suburb? Yes, a very healthy suburb.
74. But at present you admit you get rid of your slops by pouring them into the harbour? Yes.
75. Your streets are mostly very steep? Yes.
76. And the drainage that goes into the street gutters runs freely down into the harbour? Yes.
77. And you admit that wherever your culverts join the harbour you foul the foreshore? I do not think there is much foulness going down. We let the water run down pretty freely sometimes.
78. You dilute it? Yes.
79. You clean the gutters after you have sent the filth away? Yes.
80. And you do not see the filth after it is gone? No.
81. But if you were prevented from sending that filth down you would have to collect it and get rid of it somehow? I suppose so.
82. And therefore your cheapness now really arises from the tolerance of the Government in allowing you to foul the harbour; is it not so? It may be so.
83. Suppose the Government cease to be tolerant and take steps in the matter you are cornered? I think that the Government must make some provision; they have incorporated the place and should make some provision for them.
84. That is asking them to pay the Balmain rates—practically, is it not? Yes.
85. Do you think that the Government ought to pay the rates of Balmain? I do not know.
86. You say you have had no meeting of the householders generally? No. At the Council meeting about a month ago the matter was considered, and it was proposed and carried by a majority of one vote that we should adopt the scheme.
87. *Mr. Garrard.*] Was not another meeting held and that resolution rescinded? No, it was not rescinded.
88. *Dr. Garran.*] Do you think that vote of the Council is a fair test of the opinion of the householders generally? I could not say.
89. Do you not think it is very desirable that before the Committee reports you should hold some kind of meeting in the municipality? I should think so. Then we should know whether the people would be willing to pay the expense or not.
90. I see the force of what you say about the house-connections; that would depend a great deal on the depth at which the sewers are placed, would it not? Yes. In some cases they would have to be very deep, and the rock is very hard in some places.
91. Could not that be partly provided for when the main sewers are being built by carrying up pipes in certain places to receive sewerage at a higher level? Still, that would cost some money.
92. You think that it is the house proprietors, more than the tenants, who are objecting? Yes.
93. The owners of the property? Yes. In fact, I might say we have had no opinion either from owners or tenants; but that is what has been suggested in the Council.
94. All you can testify here is that there is a large amount of public opinion in Balmain adverse to this scheme? Yes. I cannot say as regards the public, but in the Council; the public has not been consulted in the matter at all.
95. But those aldermen represent a great many persons, I suppose? Yes. I may say that none of the ratepayers have spoken to me about it.
96. You have then come here prepared to say the opinion of the Council but not of the householders generally? Yes.
97. *Mr. Trickett.*] There has never been any meeting of residents adverse to it? No meeting whatever in respect to it.
98. It has been pretty well talked of throughout the borough, so far as you know? Very likely. Our meetings have been reported in the papers, and they could see what we were doing.
99. *Mr. Cox.*] Have you ever heard of a dessicating system by which they neutralise all night-soil, in some of the towns in England? I have heard something about that.
100. If that is effective, would not that be a good way out of the difficulty? If it be effective it would be.
101. *Dr. Garran.*] Taking £26 as a fair average rental of your houses in Balmain—which would cover a great many in the place—a 1d. rate would amount to 2s. 2d. a year, and a 7d. rate would be 15s. 2d., and yet you say that the present rate is £1 per house? It comes to a little over £1.
102. And a 7d. rate would be a saving of 5s. a house—on a £26 house? I cannot say. I have not gone into the matter.
103. Do you think that a great many people who are objecting, have not gone into it also? Yes.
104. *Mr. Hurley.*] As Acting Mayor of Balmain, have you studied the question of electrolysis in connection with sewerage? No, I have not.

1890.

## NEW SOUTH WALES.

## METROPOLITAN WATER AND SEWERAGE ACT AMENDMENT ACT OF 1889.

(PROCLAIMING CERTAIN SEWERAGE WORKS.)

Presented to Parliament, pursuant to Act 43 Vic. No. 32.

NEW SOUTH WALES, } Proclamation by His Excellency The Right Honourable CHARLES ROBERT, BARON  
to wit. } CARRINGTON, a Member of Her Majesty's Most Honourable Privy Council,  
(L.S.) } Knight Grand Cross of the Most Distinguished Order of Saint Michael and  
CARRINGTON, } Saint George, Governor and Commander-in-Chief of the Colony of New South  
Governor. } Wales and its Dependencies.

IN pursuance of the provisions of the "Metropolitan Water and Sewerage Act Amendment Act of 1889," I, CHARLES ROBERT, BARON CARRINGTON, Governor aforesaid, do hereby proclaim and declare that the provisions of the thirteenth section of the "Metropolitan Water and Sewerage Act Amendment Act of 1889" aforesaid shall, from the date hereof, come into force in respect of the works hereinafter mentioned, which have been reported complete to me by the Minister for Public Works—

1. Main Northern Outfall Sewer, from Ben Buckler on sea-board to Oxford-street and Liverpool-street, with the following branches:—

- (a) Liverpool and Kent Streets Branches and subsidiary sewers.
- (b) South-western Branch, from Oxford-street to Prince Alfred Hospital, and subsidiary sewers.
- (c) Western Branch, Carlton-street to Bay-street.
- (d) Northern Branch, from Oxford-street to Castlereagh-street, to Bridge-street, to Macquarie-street.
- (e) Overflow Branch, from Main Northern Outfall to Rushcutters' Bay.

2. Main Southern Outfall Sewer, from Sewage Farm to Nobbs-street, Surry Hills, and all subsidiary sewers flowing into same, together with all buildings, machinery, and carrier.

3. That portion of Sewage Farm now being utilized for the filtration and disposal of sewage.

4. All subsidiary sewers constructed by the Government Sewerage Department in the Boroughs of Redfern, Paddington, and Woollahra.

5. Stormwater ducts at the undermentioned places:—

- Wentworth Park.
- Pymont Bridge Road.
- Wattle or Darling Streets.
- Baptist Estate.
- Alexander-street, from Eveleigh Railway Yards to Copeland-street, Alexandria.
- Park-street, Macdonaldtown.
- Dowling-street, Redfern.

Given under my Hand and Seal, at Government House, Sydney, this eighteenth day of December, in the year of our Lord one thousand eight hundred and eighty-nine, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

# METROPOLITAN WATER AND SEWERAGE ACT.

(NOTIFICATION OF COMPLETION OF CERTAIN WORKS)

Presented to Parliament, pursuant to Act 43 Vic. No. 32.

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
(L.S.) } Council, Knight Grand Cross of the  
CARRINGTON, } Most Distinguished Order of Saint  
Governor. } Michael and Saint George, Governor and  
Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

IN pursuance of the provisions of the "Metropolitan Water and Sewerage Act Amendment Act of 1889," I, CHARLES ROBERT, BARON CARRINGTON, Governor aforesaid, do hereby proclaim and declare that the provisions of the 13th section of the "Metropolitan Water and Sewerage Act Amendment Act of 1889" aforesaid shall, from the date hereof, come into force in respect of the works hereinafter mentioned, which have been reported complete to me by the Minister for Public Works:

All subsidiary sewers constructed by the Government Sewerage Department in the Boroughs of Paddington and Woollahra, comprised in Contract Number 47, Sydney Sewerage, and laid in the streets undermentioned, namely:—

### PADDINGTON.

Norfolk-street, from Gurner-street to Suffolk-street.  
Norfolk-lane, from Gurner-street to end of Norfolk-lane.  
Gurner-street, from Cascade-street to Norfolk-street.  
Suffolk-street, from Norfolk-street to Suffolk-lane.  
Cascade-street, from Hargrave-lane to Paddington-street.  
Sutherland-lane, from near Cascade-street to Sutherland-street.  
Sutherland-street, from Cascade-street to Point Piper Road.  
Hargrave-lane, from Cascade-street to Point Piper-lane.  
Hargrave-street, from Cascade-street to Elizabeth-street.  
Windsor-lane, from Cascade-street to Point Piper-lane.  
Paddington-lane, from Cascade-street to Point Piper-lane.  
Paddington-street, from William-street to Point Piper-lane.  
Point Piper-lane, from Sutherland-street to Caledonia-street.  
William-street, from Paddington-street to Oxford-street.  
Underwood-street, from William-street to Perry-lane.  
Albert-lane, from Underwood-street to top of Albert-lane.  
Albert-street, from Albert-lane to end of Albert-street.  
Union-street through private land, from Underwood-street to William-street.  
Lane off Underwood-street, between Albert-lane and Perry-lane, from Underwood-street to end of lane off Perry-lane.  
Little Underwood-street, from William-street to end of Little Underwood-street.

Lane off Little Underwood-street, from Little Underwood-street to Underwood-street.  
Underwood-street, from lane off Little Underwood-street to Elizabeth-street.  
Victoria-place, from Underwood-street to Victoria-lane.  
Victoria-lane, from end to end.  
Lane off Elizabeth-street, between Underwood-street and Victoria-street, from Elizabeth-street into private land.  
Private land between Elizabeth-street and Leicester-street, from Elizabeth-street, terminates in private land.  
Elizabeth-street, from Underwood-street to lane off Elizabeth-street.  
Queen-street, from Paddington-street to lane off Queen-street East.  
Queen-lane, from Queen-street to end of Queen-lane.  
Lane off Queen-street East, from Queen-street to Elizabeth-street.  
Elizabeth-street, from Paddington-street to lane off Elizabeth-street East.  
Lane off Elizabeth-street, from Elizabeth-street to Caledonia-street.  
Caledonia-street, from lane off Elizabeth-street to Point Piper-lane.  
M'Garvie-street, from Caledonia-street to Underwood-street.  
Underwood-street, from Leicester-street to Point Piper Road.  
Leicester-street, from Underwood-street to Tivoli-street.  
Tivoli-street, from Leicester-street to Point Piper Road.  
Wentworth-lane, from Underwood-street to end of Wentworth-lane.  
Victoria-street, from William-street to Elizabeth-street.  
Elizabeth-street, from Victoria-street across Oxford-street to Watson-street.  
Watson-street, from Elizabeth-street to end of Watson-street.  
Oxford-street, from Regent-street to Newcomb-street.  
Newcomb-street, from Oxford-street to Gordon-street.  
Regent-street, from Oxford-street to Gordon-street.  
Gordon-street, from Regent-street to Ulster-street.  
Ulster-street, from Gordon-street to Church-street.  
Church-street, from Ulster-street to end of Church-street.  
Lane off Gordon-street, between Newcomb-street and Stewart-street, from Gordon-street to midway in lane.  
Stewart-street, from Gordon-street to Stewart-place.  
Stewart-place, from Stewart-street to end of Stewart-place.  
Leinster-lane, from Gordon-street to end of Leinster-lane.  
Point Piper Road, from Tivoli-street to Underwood-street.  
Point Piper Road, from opposite Sutherland-street to Ocean-street.

## WOOLLAHRA.

Trelawney-street, from Point Piper Road to Fullerton-street.  
 Fullerton-street, from Trelawney-street to two-thirds along Fullerton-street.  
 Tara-lane, from Trelawney-street to end of Tara-lane.  
 Ocean-street, from Trelawney-street to Wellington-street.  
 Wellington-street, from Ocean-street to Chiswick-lane.  
 Chiswick-lane, from Wellington-street to Fourth-street.  
 Osborne-lane, from Chiswick-lane to lamp hole in Osborne-lane.  
 Fourth-street, from Chiswick-lane to Kilminster-lane.  
 Kilminster-lane, from Fourth-street to end of Kilminster-lane.  
 Pickering-lane, from Kilminster-lane to lamp hole in Pickering-lane.  
 Denison-street, from Point Piper Road to Weldon-lane.  
 Redcliffe-street, from Denison-street to end of Redcliffe-street.  
 Weldon-lane, from Denison-street to Alton-street.  
 Alton-street, from Weldon-lane to Peaker-lane.  
 Queen-street, from near Ocean-street to Dorhauer-lane.  
 Dorhauer-lane, from Queen-street to Wallis-street.  
 John-street, from Dorhauer-lane to near Ocean-street.  
 Bowden-street, from Dorhauer-lane to end of Bowden-street.  
 Bowden-lane, from Bowden-street to lamp hole in Bowden-lane.  
 Wallis-street, from near Dwyer's-lane to between Dorhauer-lane and Bowden-lane.  
 Spicer-lane, from Point Piper Road to Morrell-street.  
 Spicer-street, from Morrell-street to Queen-street.  
 Morrell-street, from near Denison-street to Moncur-street.

Moncur-street, from Morrell-street to Britannia-lane.  
 Britannia-lane, from Moncur-street to Rush-street.  
 Rush-street, from Britannia-street to Hall-lane.  
 Peaker-lane, from near Ocean-street to Moncur-street.  
 Smith-street, from Moncur-street to end of Smith-street.  
 Moncur-lane, from end of lane to near Queen-street.  
 Moncur-street, from Peaker-lane to Trickett-street.  
 Trickett-street, from Moncur-street to Eliza-street.  
 Eliza-street, from Trickett-street to James-street.  
 James-street, from Eliza-street to near Oxford-street.  
 Lane off Trickett-street, between Dwyer's-lane and Eliza-street, from end to end.  
 Dwyer's-lane, from end to end.  
 John-street, from Dwyer's-lane to Eliza-street.  
 Lane off Dwyer's-lane, between John-street and Wallis-street, from Dwyer's-lane to end of lane.  
 Eliza-street, from John-street to Trickett-street.  
 Continuation of Tivoli-street, from Point Piper-lane to end of lane.

Given under my Hand and Seal, at Government House, Sydney, this twenty-ninth day of July, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!

1890.

## NEW SOUTH WALES.

## LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.

(RESUMPTION IN CONNECTION WITH THE SEWERAGE TO THE WESTERN SUBURBS.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
Honourable Privy Council, Knight  
(L.S.) Grand Cross of the Most Distinguished  
CARRINGTON, Order of Saint Michael and Saint  
Governor. George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the Sewerage to the Western Suburbs, for and towards the completion of which said works public funds are available; and whereas the land hereinafter described is required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification published in the Gazette, and in a newspaper, that is to say, in the "Suburban Times," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purposes hereinafter mentioned, that is to say, for and in connection with the sewerage to the said Western Suburbs, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said land shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estate, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever, and to the intent further

that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a Trustee with the powers stated in the said last-mentioned Act: And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land situate in the parish of Alexandria, county of Cumberland, and Colony of New South Wales: Commencing on the south-eastern boundary of Euston Road, at a point bearing south 37 degrees 34 minutes west and distant  $14\frac{1}{2}$  links from the junction of that side of that road with the north-eastern boundary of Harley-street; and bounded thence on the north-east by a line bearing south 40 degrees 18 minutes 31 seconds east 38 chains 18 links; on the south-east by the north-western boundary of the main southern outfall sewer bearing south 35 degrees 45 minutes 34 seconds west 1 chain 3 links; on the south-west by a line parallel to the first described line bearing north 40 degrees 18 minutes 31 seconds west 38 chains  $21\frac{4}{10}$  links; and on the north-west by the aforesaid south-eastern boundary of Euston Road bearing north 37 degrees 34 minutes east 1 chain  $2\frac{2}{10}$  links, to the point of commencement, containing 3 acres 2 roods and  $33\frac{3}{10}$  perches, exclusive of Bourke Road, and said to be owned by Sir Daniel Cooper, and occupied by James Naven, J. Corneily, C. Burgess, See War, and Wan Chun.

In witness whereof, I have hereunto set my Hand and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this nineteenth day of March, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.

(RESUMPTION OF LAND IN CONNECTION WITH THE SEWERAGE TO THE WESTERN SUBURBS,  
PARISHES OF PETERSHAM AND ST. GEORGE.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
(L.S.) } Honourable Privy Council, Knight  
CARRINGTON, } Grand Cross of the Most Distinguished  
Governor. } Order of Saint Michael and Saint  
George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the Sewerage to the Western Suburbs, for and towards the completion of which said works public funds are available; and whereas the lands hereinafter described are required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification published in the Gazette, and in a newspaper, that is to say, in the "Sydney Morning Herald," circulated in the Police District wherein the said lands are situated, declare that the lands hereinafter described have been resumed for the public purposes hereinafter mentioned, that is to say, for and in connection with the sewerage to the said Western Suburbs, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said lands shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estate, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to the intent further that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a Trustee with the powers stated in the said last-mentioned Act: And I declare that the following is the description of the lands hereinbefore referred to, that is to say:—

1st. All that piece or parcel of land situate in the parish of Petersham, county of Cumberland, and Colony of New South Wales, being allotment 18 of section 7 in the Warren Estate subdivision, containing 11 perches, and said to be in the possession and occupation of T. & M. Fennel.

2nd. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being portion of allotment 17 of section 7 Warren Estate subdivision, containing 11 perches, and said to be in the possession and occupation of W. Kay.

3rd. All that piece or parcel of land situate in the parish, county, and colony aforesaid, comprising lots 38 containing 12½ perches, 39 containing 12 perches, 40 containing 12 perches of section 10 of the Warren Estate, and said to be in the possession and occupation of Messrs. J. L. Vaughan, E. Holding, and C. Anderson respectively.

4th. All that piece or parcel of land situate in the parish of St. George, county and colony aforesaid: Commencing at a point on the centre line of the main outfall western sewer bearing 169 degrees 10 minutes and distant 5 chains 99 links from the intersection with the northern boundary of Unwin's Bridge Road; and bounded thence by a line bearing easterly 60 links; thence by a line bearing 169 degrees 10 minutes 2 chains 14 links; thence by the left bank of Wollli Creek upwards about 1 chain; thence by a line bearing 349 degrees 10 minutes 1 chain 75 links; thence by a line bearing easterly 50 links, to the point of commencement,—containing 31 perches. Also, all that piece or parcel of land situate in the parish, county, and Colony aforesaid: Commencing at a point on the centre line of the main outfall western sewer, at its intersection with the northern boundary of Unwin's Bridge Road; and bounded thence by the said boundary of Unwin's Bridge Road bearing 104 degrees 11 minutes 55½ links; thence by a line bearing 349 degrees 10 minutes 6 chains 26½ links; thence by a line bearing 13 degrees 45 minutes 17 chains 35 links; thence by the right bank of Cook's River upwards about 1 chain 10½ links; thence by a line bearing 193 degrees 45 minutes 13 chains 8 links; thence by a line bearing 169 degrees 10 minutes 6 chains 2 links; thence by the northern boundary of Unwin's Bridge Road bearing 104 degrees 11 minutes 55½ links to the point of commencement,—containing 2 acres 1 rood 21½ perches, and said to be in the possession and occupation of the trustees of the late E. Campbell.

5th. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being part of the Tempe House and Grounds subdivision: Commencing on the northern side of Arncliffe-street, at a point bearing 283 degrees 10 minutes and distant 5 chains 95 links from the south-eastern corner of that part of the above subdivision, owned by Henry A. Sheridan; and bounded thence on the south by part of the northern boundary of that street bearing 283 degrees 10 minutes and distant 1 chain 9½ links; thence on the south-west by a line bearing north 10 degrees 30 minutes west and distant 8 chains 95 links to the right bank of Wollli Creek; thence by that creek easterly about 1 chain 5 links; thence on the north-east by a line bearing south 10 degrees 50 minutes east and distant 9 chains 15 links, to the point of commencement,—containing an area of 3 roods 24½ perches, and said to be in the occupation and possession of Henry A. Sheridan.

6th. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being part of allotments 3, 4, 5, and 6 of Tempe House and Grounds: Commencing on the southern boundary of Arncliffe-street, at a point bearing westerly and distant 8 chains 79½ links from its junction with the north-western boundary of Bonor-street; and bounded thence by that boundary of Arncliffe-street bearing north-westerly 3 chains 28½ links; thence by a line bearing 169 degrees 10 minutes 5 chains 50 links; thence by a line bearing 103 degrees 12 minutes 3 chains 28½ links; thence by a line bearing 349 degrees 10 minutes 5 chains 50 links to the point of commencement,—containing 1 acre 2 roods 24 perches, and said to be in the possession and occupation of the Burwood Land, Building, and Investment Company (Limited).

7th. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being part of allotment 25 of the Tempe House and Grounds: Commencing at the western corner of that allotment; and bounded thence by its northern boundary bearing 103 degrees 12 minutes 1 chain  $62\frac{2}{3}$  links; thence by a line bearing 169 degrees 10 minutes 2 chains  $62\frac{2}{3}$  links; thence by the western boundary of the aforesaid allotment bearing 324 degrees 49 minutes 3 chains  $60\frac{1}{2}$  links, to the point of commencement,—containing  $31\frac{2}{3}$  perches, and said to be in the possession and occupation of Agnes Fripp.

8th. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being part of allotment 24, of the Tempe House and Grounds: Commencing at the eastern corner of that allotment; and bounded thence by its north-eastern boundary bearing 324 degrees 49 minutes 2 chains  $57\frac{1}{3}$  links; thence by a line bearing 169 degrees 10 minutes 2 chains  $85\frac{1}{3}$  links; thence by the north-western boundary of Bonor-street bearing 53 degrees 59 minutes 1 chain  $17\frac{1}{3}$  links, to the point of commencement,—containing  $24\frac{1}{3}$  perches, and said to be in the possession and occupation of Thomas Fripp.

9th. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being allotments Nos. 15, 16, and 17 of section 2 of the Station Hill Estate, containing 1 rood  $6\frac{1}{3}$  perches, and said to be in the possession and occupation of J. H. Newman, A. R. Winckler, and G. Lilwall.

10th. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being part of the Innesdale Estate: Commencing on the north-western boundary of Argyle-street, at a point bearing 54 degrees 2 minutes and distant  $4\frac{1}{2}$  chains 784 links from its junction with the north-eastern boundary of Allen-street; and bounded thence by a line bearing 325 degrees 26 minutes 7 chains 67 links; thence by the south-eastern boundary of the Illawarra Road bearing 53 degrees 56 minutes 1 chain and  $\frac{1}{10}$  of a link; thence by a line bearing 146 degrees 26 minutes 7 chains 67 links; thence by the aforesaid north-western boundary of Argyle-street bearing 234 degrees 2 minutes 1 chain and  $\frac{1}{10}$  of a link, to the point of commencement,—containing 3 roods and  $2\frac{1}{3}$  perches, and said to be in the possession and occupation of Edwin Godfrey.

11th. All that piece or parcel of land situate in the parish, county, and Colony aforesaid, being allotments 27, 29, 29, 30, and 31 of section F of the Innesdale Estate, containing 2 roods more or less, and said to be in the possession and occupation of the trustees of John M'Innes.

12th. All that piece or parcel of land situate in the parish, county, and colony aforesaid, being allotments 9, 10, 11, 12, and 13, section F of the Innesdale Estate, containing 2 roods 5 perches, and said to be in possession and occupation of the trustees of the late John M'Innes.

13th. All that piece or parcel of land situate in the parish, county, and colony aforesaid: Commencing on the north-western boundary of Marsh-street, at a point bearing 53 degrees 16 minutes 30 seconds and distant 4 chains  $52\frac{1}{3}$  links from its junction with the south-eastern boundary of the West Botany Road; bounded thence by the said boundary of Marsh-street bearing 53 degrees 16 minutes 30 seconds 5 chains  $22\frac{2}{3}$  links

and 52 degrees 46 minutes 6 chains 8 links; thence by a line bearing 275 degrees 27 minutes 3 chains  $15\frac{2}{3}$  links; thence by a line bearing 233 degrees 16 minutes 4 chains  $12\frac{1}{2}$  links; thence by a line bearing 326 degrees 26 minutes  $47\frac{2}{3}$  links; thence by a line bearing 233 degrees 16 minutes 30 seconds 1 chain; thence by a line bearing 146 degrees 26 minutes  $52\frac{2}{3}$  links; thence by a line bearing 233 degrees 16 minutes 1 chain  $86\frac{2}{3}$  links; thence by a line bearing 191 degrees 57 minutes 3 chains  $29\frac{2}{3}$  links, to the point of commencement, containing 1 acre 3 roods  $85\frac{2}{3}$  perches, and said to be in the possession and occupation of the late John M'Innes.

14th. All that piece or parcel of land situate in the parish of St. George, county of Cumberland, and colony of New South Wales, comprising the following grants: 50 acres to George Newbolt, 27 acres 3 roods to William Beebag, 28 acres to William G. Massingham, 28 acres to Benjamin Eve, 28 acres to Benjamin Eve, 31 acres to Andrew Green, 26 acres to David Bedford, 46 acres and 40 acres to Hughes and Hosking: Commencing at the south-eastern corner of the aforesaid grant of 40 acres to Hughes and Hosking; and bounded thence on the south by the northern boundary, of Beatic-street bearing 279 degrees 3 minutes 40 seconds 23 chains  $68\frac{2}{3}$  links, 279 degrees 30 minutes 35 seconds 22 chains  $66\frac{2}{3}$  links, and 287 degrees 2 minutes 7 chains  $34\frac{2}{3}$  links; on the west by the eastern boundary of Eve-street bearing 9 degrees 13 minutes 20 seconds 12 chains  $64\frac{1}{3}$  links; on the north by a line bearing 99 degrees 13 minutes 20 seconds 2 chains  $50\frac{2}{3}$  links; again on the west by the eastern boundary of Eve-street bearing 9 degrees 13 minutes 20 seconds 57 chains  $80\frac{2}{3}$  links; on the south-west by a line bearing 326 degrees 25 minutes 15 seconds 6 chains  $42\frac{2}{3}$  links; on the north-west by the south-eastern boundary of Marsh-street bearing 52 degrees 58 minutes 30 seconds  $538\frac{1}{3}$  links; on the north by the northern boundary of the aforesaid grant of 50 acres to George Newbolt bearing 97 degrees 41 minutes 40 seconds 37 chains 50 links to the left bank of Muddy Creek, towards the east by that creek upwards to the northern boundary of the aforesaid grant of 40 acres to Hughes and Hosking; again on the north by that boundary and by the northern boundary of the aforesaid 40 acres bearing 99 degrees 12 minutes 10 seconds 39 chains  $4\frac{1}{3}$  links; on the south-east by the north-western boundary of a recreation reserve bearing 224 degrees 30 minutes 5 seconds 27 chains  $3\frac{1}{3}$  links, to the point of commencement, containing 311 acres, and said to be in the possession and occupation of William Beebag, William G. Massingham, Benjamin Eve, Andrew Green, David Bedford, William Winter, H. Humphreys, John Goode, and Richard Goode, and others.

In witness whereof, I have hereunto set my Hand and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this twenty-eighth day of July, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!

1890.

## NEW SOUTH WALES.

**LANDS FOR PUBLIC PURPOSES' ACQUISITION ACT.**  
 (RESUMPTION OF LAND IN CONNECTION WITH THE SEWERAGE TO THE WESTERN SUBURBS,  
 PARISHES OF PETERSHAM AND ST. GEORGE.)

**Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.**

**NOTIFICATION OF RESUMPTION OF LAND UNDER  
 44 VICTORIA No. 16.**

NEW SOUTH WALES, } By His Excellency The Right Honourable  
 to wit. } CHARLES ROBERT, BARON CARRINGTON,  
 a Member of Her Majesty's Most  
 Honourable Privy Council, Knight  
 Grand Cross of the Most Distinguished  
 Order of Saint Michael and Saint  
 George, Governor and Commander-in-  
 Chief of the Colony of New South  
 Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the Sewerage to the Western Suburbs, for and towards the completion of which said works public funds are available; and whereas the lands hereinafter described are required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification, published in the Gazette, and in a newspaper, that is to say, in the "Sydney Morning Herald," circulated in the Police District wherein the said lands are situated, declare that the lands hereinafter described have been resumed for the public purpose hereinafter mentioned, that is to say, for and in connection with the sewerage to the said Western Suburbs, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said lands shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estate, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to the intent further that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a Trustee, with the powers stated in the said last-mentioned Act: And I declare that the following is the description of the lands hereinbefore referred to, that is to say:—

2nd. All that piece or parcel of land situate in the parish, county, and Colony aforesaid, being allotment 17 of section 7, Warren Estate subdivision, containing 11 perches, and said to be in the possession and occupation of W. Kay.

5th. All that piece or parcel of land situate in the parish, county, and Colony aforesaid, being part of the Tempe House and Grounds subdivision: Commencing on the northern side of Arncliffe-street, at a point bearing 283 degrees 10 minutes and distant 5 chains 95 links from the south-eastern corner of that part of the above subdivision, owned by Henry A.

Sheridan; and bounded thence on the south by part of the northern boundary of that street bearing 283 degrees 10 minutes and distant 1 chain 9½ links; thence on the south-west by a line bearing north 10 degrees 50 minutes west and distant 8 chains 95 links to the right bank of Wollie Creek; thence by that creek easterly about 1 chain 5 links; thence on the north-east by a line bearing south 10 degrees 50 minutes east and distant 9 chains 15 links, to the point of commencement,—containing an area of 3 roods 24½ perches, and said to be in the occupation and possession of Henry A. Sheridan.

9th. All that piece or parcel of land situate in the parish, county, and Colony aforesaid, being allotments Nos. 15, 16, and 17 of section 1 of the Station Hill Estate, containing 1 rood 6½ perches, and said to be in the possession and occupation of J. H. Newman, A. R. Winckler, and G. Lilwall.

13th. All that piece or parcel of land situate in the parish, county, and Colony aforesaid: Commencing on the north-western boundary of Marsh-street, at a point bearing 53 degrees 16 minutes 30 seconds and distant 4 chains 52½ links from its junction with the south-eastern boundary of the West Botany Road; bounded thence by the said boundary of Marsh-street bearing 53 degrees 16 minutes 30 seconds 5 chains 22½ links and 52 degrees 45 minutes 6 chains 8 links; thence by a line bearing 275 degrees 27 minutes 3 chains 15½ links; thence by a line bearing 233 degrees 16 minutes 4 chains 12½ links; thence by a line bearing 320 degrees 26 minutes 47½ links; thence by a line bearing 236 degrees 26 minutes 1 chain; thence by a line bearing 146 degrees 26 minutes 52½ links; thence by a line bearing 233 degrees 16 minutes 1 chain 86½ links; thence by a line bearing 191 degrees 57 minutes 3 chains 29½ links, to the point of commencement,—containing 1 acre 3 roods 35½ perches, and said to be in the possession and occupation of the late John M'Innes.

14th. All that piece or parcel of land situate in the parish of St. George, county of Cumberland, and Colony of New South Wales, comprising the following grants: 27 acres 3 roods to William Beehag, 28 acres to William G. Massingham, 28 acres to Benjamin Eve, 28 acres to Benjamin Eve, 31 acres to Andrew Green, 26 acres to David Bedford, 46 acres and 40 acres to Hughes and Hosking, and part of 50 acres to George Newbolt: Commencing at the south-eastern corner of the aforesaid grant of 40 acres to Hughes and Hosking; and bounded thence on the south by the northern boundary of Bestic-street bearing 279 degrees 3 minutes 40 seconds 23 chains 68½ links, 279 degrees 30 minutes 35 seconds 22 chains 66½ links, and 287 degrees 2 minutes 7 chains 34½ links; on the west by the eastern boundary of Eve-street bearing 9 degrees 13 minutes 20 seconds 12 chains 64½ links; on the north by the southern boundary of Eve-street bearing 99 degrees 13 minutes 20 seconds 2 chains 50½ links; again on the west by the eastern

boundary of Eve-street and its prolongation bearing 9 degrees 13 minutes 20 seconds 57 chains  $80\frac{1}{10}$  links; on the south-west by a line bearing 326 degrees 25 minutes 15 seconds 6 chains  $42\frac{1}{10}$  links; on the north-west by the south-eastern boundary of Marsh-street bearing 52 degrees 58 minutes 30 seconds  $538\frac{1}{10}$  links; on the north by the northern boundary of the aforesaid grant of 50 acres to George Newbolt bearing 97 degrees 41 minutes 40 seconds 37 chains 50 links to the left bank of Muddy Creek, towards the east by that creek upwards to the northern boundary of the aforesaid grant of 46 acres to Hughes and Hosking; again on the north by that boundary and by the northern boundary of the aforesaid 40 acres bearing 99 degrees 12 minutes 10 seconds 39 chains  $4\frac{1}{10}$  links; on the south-east by the north-western boundary of a recreation reserve bearing 224 degrees 30 minutes 5 seconds 27 chains  $8\frac{1}{10}$  links, to the point of commencement,—containing 311 acres, and said to be in the possession and occupation of William Beehag, William G. Massingham, Benjamin Eve, Andrew Green, David Bedford, William Winter, H. Humphreys, John Goode, and Richard Goode, and others.

NOTE.—The descriptions in the above notification are in correction of those numbered 2nd, 5th, 9th, 13th, and 14th in the notification published in the Government Gazette No. 404, of the 29th July, 1890.

The corrections are as follows:—As to the 2nd description—The 2nd line, as it appeared in the Gazette above referred to, read "County and Colony aforesaid, being portion of allotment 17 of," but instead of which now reads "County and Colony aforesaid, being allotment 17 of."

As to the 5th description—The 10th line, as it appeared in the Gazette above referred to, read "west by a line bearing north 10 degrees 30 minutes west and," but instead of which now reads "west by a line bearing north 10 degrees 50 minutes west and."

As to the 9th description—The 3rd line, as it appeared in the Gazette above referred to, read "of section 2 of the Station Hill Estate, containing 1 rood," instead of which now reads "of section 1 of the Station Hill Estate, containing 1 rood."

As to the 13th description—The 12th line, as it appeared in the Gazette above referred to, read "thence by a line bearing 233 degrees 16 minutes 30 seconds," but instead of which now reads "thence by a line bearing 236 degrees 26 minutes."

As to the 14th description—The 3rd and 4th lines, as they appeared in the Gazette above referred to, read "Wales, comprising the following grants, 50 acres to George Newbolt, 27 acres 3 roods to William Beehag, 28 acres to," but instead of which now reads "Wales, comprising the following grants, 27 acres 3 roods to William Beehag, 28 acres to." Also the 7th line, as it appeared in the Gazette above referred to, read "Bedford, 46 acres and 40 acres to Hughes and Hosking: Com-," but instead of which now reads "Bedford, 46 acres and 40 acres to Hughes & Hosking, and part of 50 acres to George Newbolt: Com-." Also the 15th line, as it appeared in the Gazette above referred to, read "20 seconds 12 chains  $64\frac{1}{10}$  links; on the north by a line bearing," but instead of which now reads "20 seconds 12 chains  $64\frac{1}{10}$  links; on the north by the southern boundary of Eve-street bearing." Also the 17th line, as it appeared in the Gazette above referred to, read "the west by the eastern boundary of Eve-street bearing 9 degrees," but instead of which now reads "the west by the eastern boundary of Eve-street and its prolongation bearing 9 degrees." Also the 26th line, as it appeared in the Gazette above referred to, read "to the northern boundary of the aforesaid grant of 40 acres to," but instead of which now reads "to the northern boundary of the aforesaid grant of 46 acres to."

In witness whereof, I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereunto affixed, at Government House, Sydney, this twenty-sixth day of September, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,  
BRUCE SMITH.

GOD SAVE THE QUEEN!

1890.

## NEW SOUTH WALES.

**LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.**  
(RESUMPTION OF LAND AT DOUBLE BAY, IN CONNECTION WITH THE SEWERAGE OF THE CITY OF SYDNEY AND ITS SUBURBS.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
Honourable Privy Council, Knight  
(L.S.) Grand Cross of the Most Distinguished  
CARRINGTON, Order of Saint Michael and Saint  
Governor. George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the Sewerage of the City of Sydney and its Suburbs, for and towards the completion of which said works public funds are available: And whereas the land hereinafter described is required for the construction of the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification published in the Gazette, and in a newspaper, that is to say, in the "Daily Telegraph," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purpose hereinafter mentioned, that is to say, for and in connection with the sewerage of the said City of Sydney and its Suburbs, to the intent that upon the publication of this notification in the Gazette, the legal estate in the said lands shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estate, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to the intent further that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said

Minister as a Trustee, with the powers stated in the said last-mentioned Act: And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land situate in the parish of Alexandria, county of Cumberland, and Colony of New South Wales, being part of the Point Piper Estate: Commencing at a point on the southern boundary of 2 acres 2 roods resumed for the Sydney Sewerage by notification in Government Gazette of the 31st May, 1881, at a point bearing south 86 degrees 17 minutes 30 seconds east, and distant 8 chains 60 $\frac{1}{5}$  links from the south-western corner of the aforesaid resumption; and bounded thence by the southern boundary of the aforesaid 2 acres 2 roods bearing south 86 degrees 16 minutes 10 seconds east 1 chain 1 $\frac{1}{2}$  links; thence by lines bearing south 13 degrees 43 minutes west 13 chains 25 $\frac{1}{5}$  links, north 76 degrees 17 minutes west 25 links, south 13 degrees 43 minutes west 6 chains 50 links, south 76 degrees 17 minutes east 25 links, south 13 degrees 43 minutes west 1 chain, north 75 degrees 17 minutes west 1 chain, north 13 degrees 43 minutes east 1 chain, south 76 degrees 17 minutes east 25 links, north 13 degrees 43 minutes east 6 chains 50 links, north 76 degrees 17 minutes west 25 links, and north 13 degrees 43 minutes east 13 chains 7 $\frac{1}{5}$  links, to the point of commencement,—containing 1 acre 2 roods and 38 $\frac{1}{5}$  perches, and said to be in the possession of Sir Daniel Cooper and occupation of Goon Hen and J. R. Watkins.

In witness whereof, I have hereunto set my Hand and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this thirteenth day of October, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

APPLICATION FOR DRAINAGE UNION AT NOWRA.  
(PAPERS RELATING TO.)

*Ordered by the Legislative Assembly to be printed, 6 August, 1890.*

RETURN to an *Order* made by the Honorable the Legislative Assembly of New South Wales, dated 19th June, 1890, That there be laid upon the Table of this House,—

“Copies of all papers and plans relating to the application for Drainage Union at Nowra.”

(Mr. Morton.)

SCHEDULE.

NO.	PAGE.
1. The Under Secretary for Public Works to the Commissioner for Roads, enclosing a petition from certain residents of Nowra for the constitution of a Drainage Union, to be called the “Greenhills Drainage Union”; with minutes and enclosure. 12 December, 1888 .....	2
2. The Acting Surveyor-General to the Under Secretary for Lands, with minutes. 21 January, 1889 .....	3
3. The Under Secretary for Lands to the Under Secretary for Finance and Trade, with minutes. 14 February, 1889 .....	3
4. P. H. Morton, Esq., M.P., to the Commissioner for Roads, with minutes ..	3
5. James Monaghan to the Secretary for Lands, with minutes. 1 April, 1889 .....	3
6. The same to the same, with minutes. 10 June, 1889 ..	4
7. The Acting Surveyor-General to Surveyor Knibbs, with minute. 19 June, 1889 .....	4
8. James Monaghan to the Secretary for Lands. 20 June, 1889 .....	4
9. Surveyor Knibbs to the Acting Surveyor-General, with minutes and enclosure. 21 June, 1889 .....	4
10. James Monaghan to the Secretary for Lands, with minute. 22 July, 1889 .....	5
11. Executive Council minute, with minutes. 29 July, 1889 .....	5
12. <i>Gazette</i> Notice. 6 September, 1889 .....	5
13. James Monaghan to the Secretary for Lands, with minute. 26 September, 1889 .....	6
14. <i>Gazette</i> Notice. 1 October, 1889 .....	6
15. W. Lovegrove to the Secretary for Lands, with minutes and enclosure. 23 October, 1889 .....	7
16. Executive Council minute, with minutes. 16 November, 1889 .....	8
17. P. H. Morton, Esq., M.P., to the Under Secretary for Lands, with minutes. 10 January, 1890 .....	8
18. The Under Secretary for Lands to P. H. Morton, Esq., M.P. 29 January, 1890 .....	8
19. P. H. Morton, Esq., M.P., to the Under Secretary for Lands, with minutes. 3 February, 1890 .....	9
20. The Under Secretary for Lands to P. H. Morton, Esq., M.P. 12 February, 1890 .....	9
21. T. Marriott to the Secretary for Lands, with minutes. 18 March, 1890 ..	9
22. Surveyor Knibbs to the Acting Surveyor-General, with minutes and enclosures. 31 March, 1890 .....	9
23. Memorandum by the Acting Surveyor-General, with minutes. 15 April, 1890 .....	13
24. The Under Secretary for Lands to James Monaghan. 23 April, 1890 .....	14
25. The Acting Mayor, Nowra, to the Secretary for Lands. 25 April, 1890 .....	14
26. The Acting Surveyor-General to the Under Secretary for Lands, with enclosure. 1 May, 1890 ..	14
27. P. H. Morton, Esq., M.P., to the same. 7 May, 1890 .....	15
28. The Under Secretary for Lands to P. H. Morton, Esq., M.P. 12 May, 1890 .....	15
29. James Monaghan to the Secretary for Lands, with minutes. 14 May, 1890 ..	15
30. Executive Council Minute, with minutes. 21 May, 1890 .....	15
31. T. Marriott to the Under Secretary for Lands. 23 May, 1890 .....	15
32. James Monaghan to the same, with minutes. 23 May, 1890 ..	16
33. The Under Secretary for Lands to T. Marriott. 11 June, 1890 ..	16
34. The same to James Monaghan. 11 June, 1890 .....	16
35. T. Marriott to the Under Secretary for Lands, with minutes. 17 June, 1890 .....	16
36. The Under Secretary for Lands to T. Marriott. 4 July, 1890 .....	16

## APPLICATION FOR DRAINAGE UNION AT NOWRA.

No. 1.

Minute by The Under Secretary for Public Works.

Nowra Drainage.

PETITION that certain gentlemen named, owners of land, be constituted a Union, to be known as "Greenhills Drainage Union," for compulsory drainage and contribution under Act 29 Victoria No. 1.  
The Commissioner for Roads for report.

D.C.M'L. (for U.S.), B.C., 7/12/88.

Resubmit with Drainage Act.—J.W.B., 8/12/88. Drainage Act herewith, 11/12/88. There can be no objection on the part of this office, I presume. The Principal Under Secretary will deal with the issue of proclamation. Act herewith.—J.W.B., 21/12/88. Submitted.—J.B., 28/12/88. Forward to Colonial Secretary.—JOHN SUTHERLAND, 29/12/88. The Principal Under Secretary.—J.B., B.C., 29/12/88. The Under Secretary for Lands.—C.W., B.C., 3/1/89.

[Enclosure.]

To His Excellency the Governor, Lord Carrington, and the Executive Council of New South Wales.

THE petition of James Monaghan, James Graham, David Hyam, Mark Walker, John M'Arthur, Joseph Hyam, Lauchlan M'Pherson, Rev. Dr. Wm. Grant,—

SHOWETH—

1. That your petitioners are owners of certain lands situated at Nowra, in the district of Shoalhaven, in the said Colony: Commencing on the eastern side of the old Bomaderry Ferry Road, and on the southern side of the Shoalhaven River; thence along the southern side of that river about forty-five chains fifty links; thence along the western boundary of Maria Glanville and David Hyam's property about forty-six chains and fifty links; thence along the eastern side of Mosses' Creek about thirty-nine chains; thence by a line bearing east about twenty-two chains to the western side of the Terrara Road; thence by the western side of that road seventy-three chains southerly; thence along the north side of the Greenwell Point Road westerly about fifty-nine chains; thence along the eastern boundary of town section number thirty-nine northerly eleven chains; thence along north side of Jervis-street westerly ten chains; thence along eastern side of Wallace-street northerly ten chains; thence along the south side of Douglas-street westerly eleven chains; thence along the southern side of Plunkett-street westerly seventeen chains; thence by a line bearing north eleven chains; thence along the southern side of Worrigece-street easterly six chains; thence along the eastern side of East-street northerly eleven chains; thence along the southern side of Junction-street easterly seven chains; thence along the east side of town section number seven northerly eighteen chains twenty links to the southern side of Terrara Road; thence along the southern side of that road twenty-seven chains fifty links; thence along the eastern side of Bomaderry Ferry Road, to the point of commencement,—as delineated and set forth in the plan hereunto annexed.

2. That the said land is low-lying and liable to be flooded with water, which may at any time accumulate over the same to an extent of three hundred and fifty acres, more or less, the natural channel or outlet having been blocked up by certain Government roads and causes arising from the cultivation of the land between the said land and the Crookhaven River; also, owing to the fact that an existing artificial drain has been filled in by an adjacent landowner, much to the injury and detriment of your petitioners.

3. That your petitioners are desirous that the undermentioned owners of the said tract of land may be constituted a Union within the meaning of an Act intituled "An Act to promote the better drainage of lands," 29 Victoria number 1, such Union to be known by the name of the "Greenhills Drainage Union," for the purpose of compulsory drainage and contribution under this Act:—

Name.	Gross Acreage.			Acreage liable to be flooded.		
	a.	r.	p.	a.	r.	p.
Dr. William Grant .....	10	0	0	3	0	0
Estate of M. Hyam, deceased.....	7	0	0	2	0	0
Frederick Moore .....	2	0	16	0	1	0
Lauchlan M'Pherson .....	12	2	0	7	0	0
John M'Arthur .....	1	0	0	0	1	0
J. Hyam .....	4	0	0	2	0	0
Estate of J. Smith, deceased .....	1	1	24	0	1	0
Mark Walker.....	2	0	0	0	1	0
Mary Anne Horne.....	15	0	0	3	0	0
Maria Glanville.....	35	0	0	17	0	0
David Hyam .....	30	0	0	6	0	0
James Graham .....	368	0	0	175	0	0
James Monaghan .....	260	0	0	120	0	0
Total.....	846	2	0	339	0	0

And your petitioners, as in duty bound, will ever pray, &amp;c.

JAMES MONAGHAN, Greenhills, farmer.  
[Witness to Mr. Monaghan's signature—Thos. Marriott, solicitor, Nowra.]  
JAMES GRAHAM, Greenhills, farmer.  
D. HYAM, Terrara, hotelkeeper.  
M. WALKER, Terrara, storekeeper.  
JOHN M'ARTHUR, Terrara, storekeeper.  
JOSEPH HYAM, Terrara, landholder.  
LAUCHLAN M'PHERSON, Nowra, builder.  
WILLIAM GRANT, Bolong, Presbyterian Minister.

No. 2.

3

No. 2.

The Acting Surveyor-General to The Under Secretary for Lands.

Proposed Green Hills Drainage Union at Nowra.

Ms. 89-232.

21 January, 1889.

UNDER the 5th section of the Drainage Promotion Act, 29 Victoria No. 1, it is provided that the petitioners shall pay into the Treasury such sum as shall be sufficient to reimburse all expenses likely to be incurred by the Government in the matter. The expenses indicated are such as may arise in causing an inquiry into the petition, viz., as to the private and public interests affected, especially in respect of possible damage to other holdings, public roads, reserves, &c. Viewing the conditions of the locality, which are known to me, I think that the cost of such preliminary inquiry and report, as will meet the circumstances of this case, should not exceed £25; and I would suggest that James Monaghan (the first signatory to the petition) be informed that in terms of the Act 29 Victoria No. 1, section 5, it is requisite that a sum of £25 be paid into the Treasury, on behalf of the petitioners, to meet expenses likely to be incurred; and I think it might be added that any unexpended balance of such sum will be returned.

E. TWYNAM.

Submitted, that the action suggested be taken, and that the Treasury be requested to receive the amount when tendered.—R.H.D., 1/2/89. F.H.W. S.F., 1/2/89. Approved.—W.J.L., 5/2/89. Inform Mr. Monaghan and Treasury.—R.H.D., 6/2/89. Cor. Branch,—Mr. Monaghan and Treasury accordingly, 14/2/89.

No. 3.

The Under Secretary for Lands to The Under Secretary for Finance and Trade.

Sir,

Department of Lands, Sydney, 14 February, 1889.

I am directed by the Minister for Lands to request that you will be good enough to accept, when tendered, the sum of £25 to meet expenses likely to be incurred in causing an inquiry to be made into a petition lodged in connection with the proposed Greenhills Drainage Union at Nowra.

I have, &amp;c.,

H. CURRY,

(For the Under Secretary).

The money has been placed in Trust Fund, under the heading, "Greenhills Drainage Union, Nowra," and any expenses to be charged against it must be so marked.—G.E., B.C., Treasury, 13/6/89. The Under Secretary for Lands, to be returned. Please place this with Ms. 89-7,650, sent to Acting Surveyor-General on 17th instant.—R.H.D., 20/6/89. Mr. Briscoe,—Papers were sent to Surveyor Knibbs on 19th instant.—W.T.B., 21/6/89. Mr. De Low.

No. 4.

P. H. Morton, Esq., M.P., to The Commissioner for Roads.

Surveys for Nowra Sewerage.

Extract from M.P. 89-739 W.S.

\* \* \* \* \*  
I HEREWITH attach letter from Mayor of Nowra, asking me to apply to the Government for the services of a responsible officer to make surveys and levels for a sewerage.  
\* \* \* \* \*

PHILLIP H. MORTON, M.L.A.

The Commissioner for Roads.—J.B., B.C., 2/4/89. Hay papers, 89-153. Submitted, 31/1/89. 89-353. Submitted, 15/3/89. Orange papers, 89-370. U.S., 20/3/89. With general minute, re advances to municipalities. Nowra papers, 88-968. Col. Wells, 28/9/88. Lismore papers, 89-364. U.S., 20/3/89. With general minute, re advances to municipalities. Mr. Piper,—Register and resubmit.—W.C.B., 3/4/89. To be placed with similar papers.—F.C.P., 3/4/89. Mr. Hungerford.

No. 5.

Mr. J. Monaghan to The Secretary for Lands.

Sir,

Greenhills, Shoalhaven, 1 April, 1889.

I beg to acknowledge the receipt of your letter of the 14th February (No. 1,168), requesting that the sum of £25 be paid into the Treasury to meet expenses likely to be incurred in making inquiry into the petition of myself and others for a Drainage Union under the Act 29 Victoria No. 1. I wish, sir, to draw your attention to section 3 of the Act, which states that on the receipt of such a petition it should be published in the *Gazette*, and if there is not a counter-petition presented, as provided for in section 4, the Union may be proclaimed. If a counter-petition is presented by the requisite number (as in section 4), then the sum mentioned would require to be paid.

Yours, &amp;c.,

JAMES MONAGHAN.

Writer may be informed that nothing can be done until the required deposit is paid.—R.H.D., 5/4/89. Yes.—F.H.W. (for U.S.), 8/4/89. Cor. Branch, 8/4/89. Monaghan informed, 23/4/89.

No. 6.

## No. 6.

Mr. J. Monaghan to The Secretary for Lands.

Sir, Greenhills, Shoalhaven, 10 June, 1890.  
 I herewith enclose draft for £25, in compliance with your request, to meet expenses of examination and inquiry for a Drainage Union, applied for by myself and others in January last. Trusting that the matter will be proceeded with at once—  
 I am, &c.,  
 JAMES MONAGHAN.

The sum of £25 received, and credited on the within amount this day.—W.N., B.C., Treasury, 11/6/89. F.K. (for U.S.) The Under Secretary for Lands.—G.E.B. The Acting Sur.-Gen.—R.H.D. (for the U.S.), 12/6/89.

## No. 7.

The Acting Surveyor-General to Mr. Surveyor Knibbs.

Proposed Greenhills Drainage Union, near Nowra.

Sydney, 19 June, 1889.  
 AN inspection and comprehensive report is required in this case in order to comply with the provisions of the 4th section of the Drainage Act, the principal object being to ascertain if the scheme be generally practicable and desirable; whether there are any well-founded objections on part of owners of adjacent properties; whether damage will be done by the proposed drainage, beyond limits of the proposed Union, to private estate, to public thoroughfares, or public interests of any sort, and, if so, to what extent; also as to what provision is intended in respect of making good the same (if any).

Of course it is desirable that inquiry be made into the premises of the petition, and the scope of draining area; and several properties affected should be shown on a tracing, together with proposed outfall, and any projected interference with roads, watercourses, or public rights.

Referred to Mr. Surveyor Knibbs for inquiry.

E. TWYNAM,  
 Acting Surveyor-General.

Received 20 June, 1889.—G.H.K. Replied to by my letter of 21st June, 1889, No. 11.—G.H.K.

## No. 8.

Mr. J. Monaghan to The Secretary for Lands.

Sir, Greenhills, Shoalhaven, 20 June, 1889.  
 I received a notice from Mr. G. H. Knibbs, of Petersham, stating that he intends to visit this district to report upon the petition of myself and others for a Drainage Union. I hope that your Department will reconsider the order given, as any such inspection or report is premature. The proper course is clearly shown in sections 2, 3, and 4 of the Act, viz., "After publishing the petition, two months are allowed for objections to be made." If objections are made, the report should deal with them also. I decidedly object to the extra expense of the present report, as the petition and plan show all that is necessary for the present.  
 I have, &c.,  
 JAMES MONAGHAN.

## No. 9.

Mr. Surveyor Knibbs to The Acting Surveyor-General.

Sir, Petersham, 21 June, 1889.  
 In regard to your instructions of 19th June, 1889, No. 2, I have the honor to report that, in obtaining information at the Registrar-General's Office as to the ownership of properties included in the area sought to be brought under the operation of the Act 29 Victoria No. 1, I ascertained the fact that persons other than those referred to in the petition will be affected by the proposed "Drainage Union."

2. Under these circumstances, it appeared desirable that, prior to making the inquiry directed by your letter (referred to above), the procedure indicated in section 3 of the aforesaid Act be followed, viz., that the petition be published in the *Government Gazette*, and a reasonable time allowed to elapse in order to permit objectors, if such exist, forwarding counter-petitions.

3. I am informed by Mr. Monaghan, whose name appears first on the petition, that it is their desire that the petition be published in the *Gazette* prior to an official inquiry into the premises.

4. In view of the fact that interested persons should be properly informed of the existence of this petition, and allowed opportunity of fully stating any objections thereto, and that it is desirable that the inquiry should traverse not only the statements of petitioners, but those of any objectors—which cannot so satisfactorily be done by anticipation—I would respectfully suggest that the inquiry be postponed till after the action proposed has been carried out.

I have, &c.,  
 GEO. H. KNIBBS,  
 Surveyor.

Letter from James Monaghan attached herewith. Proposed Greenhills Drainage Union. Submitted, that the enclosed petition be published in the *Government Gazette*, as provided by section 3 of the Drainage Promotion Act, 29 Victoria, No. 1. Copy herewith. Acting Surveyor-General, 22/6/89. The Under Secretary. Submitted.—J.O.D. F.H.W. S.F., 25/6/89. Approved, J.N.B., 23/7/89.

[Enclosure.]

[Enclosure.]

Dear Sir,

Yours of the 18th instant to hand. The Lands Department do not seem to understand the Drainage Act, 29 Victoria No. 1. The report referred to in your letter is one that should not be made until the petition has been published for two months. That time is allowed for any person who may object to the Union being formed. Your report would then embrace the whole matter, whether objections are made or not. If you will look the Act up, you will at once understand the whole course of procedure. Sections 2, 3, and 4 show it clearly. The plan on tracing furnished with the petition shows all that is necessary for the present. I will write to the Department also by this post, objecting to the course they are taking. Thanking you for your considerate notice.

G. H. Knibbs, Esq.,  
Petersham.

Greenhills, 20 June, 1889.

I remain, &c.,  
JAMES MONAGHAN.

Mr. Monaghan has been informed that action has been suspended. That the matter was being dealt with in this way because it was understood that it was urgent, and it was thought that any objections could be investigated at time of inquiry; but as the petitioners prefer to await while the usual course is being carried out, it has been recommended by me that the inquiry be postponed until after the petition has been published, and sufficient time elapsed to permit of the presentation of the counter-petitions.—G. H. KNIBBS, Surveyor, 21/6/89.

## No. 10.

## Mr. J. Monaghan to The Secretary for Lands.

Sir,

Greenhills, Shoalhaven, 22 July, 1889.

Will you kindly inform me why the petition of myself and others for a Drainage Union has not been published, as directed in section 3 of the Act 29 Victoria No. 1. The matter is of great importance to us. We have suffered a great injury by the delaying of it so long. Our lands are now flooded, and we cannot proceed with the drainage till the Union is formed. Early attention to the matter will oblige.

Yours, &c.,  
JAMES MONAGHAN.

Executive authority is now being obtained for publishing the petition in the *Gazette*.

## No. 11.

## Executive Council Minute.

*Subject*:—Recommending publication of petition that certain landowners at Greenhills (Nowra) be constituted a Drainage Union.

Ms. S9-8,141.

Department of Lands, Sydney, 29 July, 1889.

It is recommended to His Excellency the Governor and the Executive Council that the within petition for the constitution of certain landowners named therein as a Drainage Union, to be known as the "Greenhills Drainage Union," be published in the *Gazette*, in accordance with the provisions of the 3rd section of the Drainage Promotion Act of 1865, 29 Victoria No. 1.

JAMES N. BRUNKER.

The Executive Council advise that the petition, herewith submitted, be published in the manner prescribed by the 3rd section of the Drainage Promotion Act of 1865.—ALEX. C. BUDGE, Clerk of the Council. Approved.—CARRINGTON, 30/7/89. Min. 87-44, 30/7/89. Confirmed, 6/8/89. Gazetted, 6/9/89. J. Monaghan informed, 11/9/89.

## No. 12.

*Gazette Notice.*

## DRAINAGE UNION.

Petition under the Drainage Promotion Act of 1865, Greenhills, Nowra.

Department of Lands, Sydney, 6 September, 1889.

In pursuance of the provisions of the Drainage Promotion Act of 1865, 29 Victoria No. 1, His Excellency the Governor, with the advice of the Executive Council, has directed the publication of a petition, signed by certain landowners at Greenhills, Nowra, praying that they may be constituted a Union, to be called the "Greenhills Drainage Union."

All persons interested are invited to state, within two months from this date, their objections, if any, to the proposed Union.

JAMES N. BRUNKER.

To His Excellency the Governor, Lord Carrington, and the Executive Council of New South Wales.

The petition of James Monaghan, James Graham, David Hyam, Mark Walker, John M'Arthur, Joseph Hyam, Lauchlan M'Pherson, Rev. Dr. Wm. Grant,—

SHOWETH—

1. That your petitioners are owners of certain land situated at Nowra, in the district of Shoalhaven, in the said Colony. Commencing on the eastern side of the old Bomaderry Ferry Road, and on the southern side of the Shoalhaven River; thence along the southern side of that river about forty-five chains fifty links; thence along the western boundary of Maria Glanville and David Hyam's property about forty-six chains and fifty links; thence along the eastern side of Mosses' Creek about thirty-nine chains; thence by a line bearing east about twenty-two chains to the western side of the Terrara Road; thence by the western side of that road seventy-three chains southerly; thence along the north side of the Greenwell Point Road westerly about fifty-nine chains; thence along the eastern boundary of town section number thirty-nine northerly eleven chains; thence along north side of Jervis-street westerly ten chains; thence along eastern side of Wallace-street northerly ten chains; thence along the south side of Douglas-street westerly eleven chains; thence along the southern side of Plunkett-street westerly seventeen chains; thence by a line bearing north eleven chains; thence along the southern side of

Worrige-

Worrigeestreet easterly six chains; thence along the eastern side of East-street northerly eleven chains; thence along the southern side of Junction-street easterly seven chains; thence along the east side of town section number seven northerly eighteen chains twenty links to the southern side of Terrara Road; thence along the southern side of that road twenty-seven chains fifty links; thence along the eastern side of Bomaderry Ferry Road, to the point of commencement,—as delineated and set forth in the plan hereunto annexed.

2. That the said land is low-lying and liable to be flooded with water, which may at any time accumulate over the same to an extent of three hundred and fifty acres, more or less, the natural channel or outlet having been blocked up by certain Government roads and causes arising from the cultivation of the land between the said land and the Crookhaven River; also, owing to the fact that an existing artificial drain has been filled in by an adjacent landowner, much to the injury and detriment of your petitioners.

3. That your petitioners are desirous that the undermentioned owners of the said tract of land may be constituted a Union within the meaning of an Act intituled "An Act to promote the better drainage of lands," 29 Victoria No. 1, such Union to be known by the name of the "Greenhills Drainage Union" for the purpose of compulsory drainage and contribution under this Act:—

Name.	Gross Acreage.			Acreage liable to be flooded.		
	a.	r.	p.	a.	r.	p.
Dr. William Grant .....	10	0	0	3	0	0
Estate of M. Hyam, deceased .....	7	0	0	2	0	0
Frederick Moore .....	2	0	16	0	1	0
Lauchlan M'Pherson .....	12	2	0	7	0	0
John M'Arthur .....	1	0	0	0	1	0
J. Hyam.....	4	0	0	2	0	0
Estate of J. Smith, deceased .....	1	1	24	0	1	0
Mark Walker .....	2	0	0	0	1	0
Mary Anne Horne .....	15	0	0	3	0	0
Maria Glanville .....	35	0	0	17	0	0
David Hyam .....	30	0	0	6	0	0
James Graham .....	368	0	0	175	0	0
James Monaghan .....	360	0	0	120	0	0
Total .....	846	2	0	339	0	0

And your petitioners, as in duty bound, will every pray. &c.

JAMES MONAGHAN, Greenhills, farmer.  
 [Witness to Mr. Monaghan's signature—THOS. MARRIOTT, solicitor, Nowra.]  
 JAMES GRAHAM, Greenhills, farmer.  
 D. HYAM, Terrara, hotelkeeper.  
 M. WALKER, Terrara, storekeeper.  
 JOHN M'ARTHUR, Terrara, storekeeper.  
 JOSEPH HYAM, Terrara, landholder.  
 LAUCHLAN M'PHERSON, Nowra, builder.  
 WILLIAM GRANT, Bolong, Presbyterian minister.

### No. 13.

Mr. J. Monaghan to The Secretary for Lands.

Sir,

Greenhills, Shoalhaven, 26 September, 1889.

I am in receipt of yours of the 11th instant, enclosing a portion of the *Government Gazette*, containing petition for Drainage Union. I did not observe until I saw it published in one of our local newspapers that one of the names was not correct. I refer to that which reads Mary Ann Horne; it should be Mary Ann Holme. The error is an unfortunate one, and if not corrected may lead to some unpleasantness, as she is the only person from whom I anticipate any opposition. Will you kindly have the error corrected at as early a date as possible, and oblige

Yours, &c,  
 S.M. (for JAMES MONAGHAN).

Regazetted, 1/10/89. James Monaghan, with a copy of notice, 11/10/89.

### No. 14.

#### Gazette Notice.

#### DRAINAGE UNION.

Petition under the Drainage Promotion Act of 1865, Greenhills, Nowra.

Department of Lands, Sydney, 1 October, 1889.

In pursuance of the provisions of the Drainage Promotion Act of 1865, 29 Victoria No. 1, His Excellency the Governor, with the advice of the Executive Council, has directed the publication of a petition, signed by certain landowners at Greenhills, Nowra, praying that they may be constituted a Union, to be called the "Greenhills Drainage Union."

All persons interested are invited to state, within two months from this date, their objections, if any, to the proposed Union.

JAMES N. BRUNKER.

To His Excellency the Governor, Lord Carrington, and the Executive Council of New South Wales.

The Petition of James Monaghan, James Graham, David Hyam, Mark Walker, John M'Arthur, Joseph Hyam, Lauchlan M'Pherson, Rev. Dr. Wm. Grant,—

SHOWERH—

1. That your petitioners are owners of certain land situated at Nowra, in the district of Shoalhaven, in the said Colony: Commencing on the eastern side of the old Bomaderry Ferry Road, and on the southern side of the Shoalhaven River; thence along the southern side of that river about forty-five chains fifty links; thence along the western boundary of Maria Glanville and David Hyam's property about forty-six chains and fifty links; thence along the eastern side of Mosses' Creek about thirty-nine chains; thence by a line bearing east about twenty-two chains to the western side of the Terrara Road; thence by the western side of that road seventy-three chains southerly; thence along the north side of the Greenwell Point Road westerly about fifty-nine chains; thence along the eastern boundary of town section number thirty-nine northerly eleven chains; thence along north side of Jervis-street westerly ten chains; thence along eastern side of Wallace-street northerly ten chains; thence along the south side of Douglas-street westerly eleven chains; thence along the southern side of Plunkett-street westerly seventeen chains; thence by a line bearing north eleven chains; thence along the southern side of Worrigeé-street easterly six chains; thence along the eastern side of East-street northerly eleven chains; thence along the southern side of Junction-street easterly seven chains; thence along the east side of town section number seven northerly eighteen chains twenty links to the southern side of Terrara Road; thence along the southern side of that road twenty-seven chains fifty links; thence along the eastern side of Bomaderry Ferry Road, to the point of commencement,—as delineated and set forth in the plan hereunto annexed.

2. That the said land is low-lying and liable to be flooded with water, which may at any time accumulate over the same to an extent of three hundred and fifty acres, more or less, the natural channel or outlet having been blocked up by certain Government roads and causes arising from the cultivation of the land between the said land and the Crookhaven River; also, owing to the fact that an existing artificial drain has been filled in by an adjacent landowner, much to the injury and detriment of your petitioners.

3. That your petitioners are desirous that the undermentioned owners of the said tract of land may be constituted a Union within the meaning of an Act intituled "An Act to promote the better drainage of lands," 29 Victoria number 1, such Union to be known by the name of the "Greenhills Drainage Union," for the purpose of compulsory drainage and contribution under this Act:—

Name.	Gross Acreage.	Acreage liable to be flooded.
Dr. William Grant .....	a. r. p. 10 0 0	a. r. p. 3 0 0
Estate of M. Hyam, deceased .....	7 0 0	2 0 0
Frederick Moore .....	2 0 16	0 1 0
Lauchlan M'Pherson .....	12 2 0	7 0 0
John M'Arthur .....	1 0 0	0 1 0
J. Hyam .....	4 0 0	2 0 0
Estate of J. Smith, deceased .....	1 1 2½	0 1 0
Mark Walker .....	2 0 0	0 1 0
Mary Anne Holme .....	15 0 0	3 0 0
Maria Granville .....	35 0 0	17 0 0
David Hyam .....	30 0 0	6 0 0
James Graham .....	368 0 0	175 0 0
James Monaghan .....	360 0 0	120 0 0
Total .....	846 2 0	339 0 0

And your petitioners, as in duty bound, will ever pray, &c.

JAMES MONAGHAN, Greenhills, farmer.

[Witness to Mr. Monaghan's signature—THOS. MARRIOTT, solicitor, Nowra.]

JAMES GRAHAM, Greenhills, farmer.

D. HYAM, Terrara, hotelkeeper.

M. WALKER, Terrara, storekeeper.

JOHN M'ARTHUR, Terrara, storekeeper.

JOSEPH HYAM, Terrara, landholder.

LAUCHLAN M'PHERSON, Nowra, builder.

WILLIAM GRANT, Bolong, Presbyterian minister.

NOTE.—The above notice is in lieu of that published in the *Gazette* of 6th September, 1889, respecting proposed Drainage Union, Greenhills, Nowra.

### No. 15.

Mr. W. Lovegrove to The Secretary for Lands.

Sir,

109, Pitt-street, 23 October, 1889.

I have the honor to enclose a counter-petition to one published in the *Government Gazette* of the 6th September, on page 6127, for a Drainage Union in the Shoalhaven district.

It will be seen that there is no wish to stop the drainage, if it can be carried out fairly as regards others, and I think it would be well for the inhabitants at large that the present drains should be carefully examined, as the river is subject to heavy floods.

I have, &c.,

W. LOVEGROVE.

Submitted, that Mr. Surveyor Knibbs be instructed to report on the petition and counter-petition, as required by the 4th section of the Act 29 Vic. No. 1. In furtherance of the Acting Surveyor-General's memo. of 19th June, 1889; on cover to misc. 89-7,650.—R.H.D. S.F., 30/10/89.

Approved.—J.N.B., 12/11/89.

The

The 4th section provides that the Governor shall appoint the officer to report; therefore Executive Council minute has been prepared in this case. Papers are now referred to Mr. Surveyor Knibbs for investigation and report.—R.H.D. (for the U.S.), 4/12/89.

*Vide* memo. of instructions of the 19th June, 1889, herewith.—E.T. Report by my letter of 31st March, 1890, No. 3, with which this is enclosed.—GEO. H. KNIBBS, Surveyor.

[Enclosure.]

To His Excellency the Governor and the Honorable the Executive Council of New South Wales,—

The counter-petition of the undersigned inhabitants of Shoalhaven, owners and tenants of lands affected by a petition from James Monaghan, David Hyam, and others, for the drainage of certain lands, published in the *Government Gazette* of the 6th September, 1889, on page 6127,—

RESPECTFULLY SHOWETH :—

That the lands sought to be drained are situated in the parish of Nowra, county of St. Vincent, within the Municipal District of Nowra, and that the drainage is sought to be thrown into the parish of Numba, in the Municipal Districts of Central Shoalhaven and Numba.

That the said lands were sold by the Crown in a condition of swamp, and not with any right to drain.

That such lands, therefore, can only acquire a right to drain subject to prior right of owners, and are not to be drained by turning the neighbouring lands into swamps.

That the principal mover in this petition has already tried ineffectually to drain this swamp into the main river, and has only succeeded in doing injury to the river bank without corresponding benefit.

That the ancestor of said principal mover tried to drain this swamp through lands of Mrs. De Mestre, and did so much damage that the drain was at once partially closed, so as to diminish the volume of water.

That lately said mover, without leave of the owner, reopened the said drain, and was defeated in an action at law, and now seeks to reopen said drain under cover of law.

That your present petitioners have no objection to as much of the swamp being drained as is compatible with their own safe enjoyment of their lands on a plan strictly supervised by the Government, which shall include properly constructed flood-gates and other safeguards, and be under official control.

And your petitioners will ever pray.

HUGH M'KENZIE, owner of 918 acres, lately purchased for the sum of £44,000, and about 150 acres of said land is liable to be damaged by drain alluded to. Address, Terara.

JOHN APPERLY, owner of 43 acres, purchased ten years ago for the sum of £800, of which 7 acres is liable to be flooded by said drain being allowed open. Address, Terara.

JOHN BIRRELL, owner of 34 acres, purchased eight years ago for the sum of £700, and of which 4 acres is liable to be flooded by said drain. Address, Terara.

THOS. CONNOLLY, owner of 43 acres, purchased about six years ago for the sum of £1,005, of which 4 or 5 acres is liable to be flooded by said drain. Address, Berellau.

FRAS. LORD, trustee of Mrs. Holme, the owner of the land through which the drain passes, and which said land is affected thereby to the extent of about 30 acres.

#### No. 16.

#### Executive Council Minute.

*Subject* :—Recommending appointment of Mr. Surveyor G. H. Knibbs to report on petitions.

Ms. 89-15,374.

Department of Lands, Sydney, 16 November, 1889.

It is recommended to His Excellency the Governor and the Executive Council that Mr. Surveyor G. H. Knibbs be appointed, in accordance with the 4th section of the Drainage Promotion Act of 1865, to report on petition for, and counter-petition against, establishment of a Drainage Union at Nowra, to be called "Greenhills Drainage Union."

JAMES N. BRUNKER.

The Executive Council advise that the appointment herein recommended be approved.—H. C. BUDGE, Clerk of the Council. Min. 89-62, 19/11/89. Approved.—CARINGTON, 19/11/89. Confirmed, 26/11/89.

#### No. 17.

P. H. Morton, Esq., M.P., to The Under Secretary for Lands.

Sir,

Shoalhaven, 10 January, 1890.

Kindly inform me what has been done with application of James Monaghan and others for formation of Union under the Drainage Promotion Act.

This was made many months ago, and the applicants are thinking it is time their petition was granted.

I have, &c.,

P. H. MORTON, M.L.A.

Please inform that a counter-petition against constitution of the Union proposed having been received, the papers have been referred to Mr. Surveyor Knibbs, who has been appointed to investigate the matter and report.—R.H.D., 17/1/90. F.H.W. (for U.S.), 17/1/90.

Cor. Branch. Writer notified, 29/1/90.

#### No. 18.

The Under Secretary for Lands to P. H. Morton, Esq., M.P.

Sir,

Department of Lands, Sydney, 29 January, 1890.

I have the honor to acknowledge receipt of your letter of the 10th instant, respecting the application of James Monaghan and others for formation of Union under the Drainage Promotion Act, and to inform you that a counter-petition against the constitution of the Union proposed having been received, the papers were referred to Mr. Surveyor Knibbs, who has been appointed to investigate the matter and report.

I have, &c.,

W. H. CAPPER

(For the Under Secretary).

No. 19.

## No. 19.

P. H. Morton, Esq., M.P. to The Under Secretary for Lands.

Sir,

Shoalhaven, 3 February, 1890.

I would thank you if you would have sent to me a copy of the petition sent in against Drainage Union at Nowra.

Yours, &amp;c.,

P. H. MORTON, M.L.A.

The petition, of which a copy is required, is with the papers under reference to Mr. Surveyor Knibbs for report, and great delay would be occasioned by their recall for the purpose of supplying the copy to Mr. Morton, M.L.A. Mr. Knibbs may, perhaps, be asked to supply a copy of the petition, should he not contemplate making his report immediately. Acknowledge, and say that, as the papers are with Mr. Surveyor Knibbs in the field, the information cannot be forwarded at present.—R.H.D., 7/2/90. Cor. Branch. P. H. Morton, M.P., informed, 12/2/90.

## No. 20.

The Under Secretary for Lands to P. H. Morton, Esq., M.P.

Sir,

Department of Lands, Sydney, 12 February, 1890.

I have the honor to acknowledge the receipt of your letter of the 3rd instant, and to inform you that a copy of the petition sent in against Drainage Union at Nowra cannot at present be forwarded, as the document in question, with other papers connected with the case, are under reference to Mr. Surveyor Knibbs for report.

I have, &amp;c.,

W. H. CAPPER

(For the Under Secretary).

## No. 21.

Mr. T. Marriott to The Secretary for Lands.

Greenhills Drainage Union, 29 Vic. No. 1.

Sir,

Nowra, 18 March, 1890.

Referring to the counter-petition of Hugh M'Kenzie and others to the above drainage petition, I have the honor to draw your attention to the fact that such counter-petition is not a counter-petition within the meaning of the Drainage Promotion Act, 1865, section 4, inasmuch as it does not represent one-fifth of the owners of the land sought to be brought within the Union.

I have, &amp;c.,

THOS. MARRIOTT.

It would seem advisable to forward this letter to Mr. Knibbs for consideration in connection with the case now with him.—J.O'D., 24/3/90. Yes.—R.H.D. (for the Under Secretary), 25/3/90. Mr. Surveyor Knibbs.—W.H. U.S. (*per* J.O'D.), B.C., 27/3/90. Lands. Enclosed with my report of 31st March, 1890, No. 3.—GEO. H. KNIBBS, Surveyor.

## No. 22.

Mr. Surveyor Knibbs to The Acting Surveyor-General.

Papers Ms. 89-17,509 and enclosures, Ms. 90-4,703 and enclosures, illustrative tracing A and locality maps B, C, D, and E, and No. 3, papers marked F and G, herewith. Appendices A and B.

Sir,

Petersham, 31 March, 1890.

Subject of report.

1. In compliance with your instructions of 6th December, 1889, No. 8, and with the terms of my appointment by the Executive Council, dated 19th November, 1889, I have the honor to forward herewith a report upon the petition by James Monaghan and others for the bringing of a certain area at Nowra, parishes of Nowra and Numba, county of St. Vincent, under the provisions of the Promotion of Drainage Act (29 Victoria No. 1), and upon the counter-petition of Hugh M'Kenzie and others relating to the same area.

2. An illustrative tracing, A, locality maps, B, C, D, and E, copies of press reports on case *Monaghan v. M'Kenzie*, F, and further representations in form of counter-petition, G, are enclosed herewith.

Drainage Union, area about 888 acres.

3. The area to which the petition refers is practically that, the boundaries of which are shown by an edging of red tint, on the accompanying tracing (A), and embraces an area of about 888 acres, exclusive of several short lengths of road in the town of Nowra, being situate almost wholly in the parish of Nowra, county of St. Vincent, a portion of about 35 acres only, viz., that in Mrs. Holme's area, being in the parish of Numba.

Premises of petition.

4. In the petition for the Drainage Union it is urged (in the second section) that (I) the land is liable to be flooded with water, which may accumulate to the extent of 350 acres; (II) the natural channel between the land and the Crookhaven River or Creek has been blocked by certain Government roads, and in consequence of the cultivation of the land intermediate; and (III) an artificial drain has been filled in by an adjacent landowner, to the detriment of the petitioners.

Proprietors not signing petition.

5. The petition is signed by all the parties immediately interested, excepting Frederick Moore, J. Smith, (Mrs.) Mary Ann Holme, and Maria Glauville, whose interests are small compared with those of the other persons signing.

Objections advanced against petition by persons affected by proposed union.

6. The allegations of the counter-petition are that (iv) the drainage from the parish of Nowra is sought to be thrown into the parish of Numba; (v) the lands were sold as swamps, without specific right to drain, (vi) in consequence of which (it is contended), in draining, the prior rights of owners of adjacent lands must not be infringed, as they would be by turning their lands into swamps; (vii) James Monaghan had already tried ineffectually to drain the swamp into the Shoalhaven, damaging the river bank, without corresponding benefit; (viii) the ancestor of James Monaghan tried to drain through the lands of Mrs. De Mestre, but the drain was at once partially closed, so as to diminish the volume of water flowing into the Crookhaven Creek; (ix) lately the said James Monaghan reopened the drain, was defeated in the attempt to keep it open by an action at law, and now seeks to reopen it under cover of law; (x) there is no objection to the drainage into the Crookhaven, provided it is prevented from damaging the lands of the counter-petitioners by control with flood-gates and other safeguards under official supervision.

7. The premises of both petition and counter-petition will be reported upon *seriatim*. The attached further objections (C) do not require special notice.

Petitioners' case—Condition of land.

8. The statement (i) is substantially correct. The swamp shown on tracing A is the accumulation referred to. In wet seasons it is extensive, but after a long period of fine weather is quite dry. Its surface generally is but slightly raised above the mean tidal height of the Shoalhaven River, and some portions are below that height. On the occasion of my inspection (after heavy rains) the water in the swamp was about  $4\frac{1}{2}$  feet above this mean tidal level. This runs off very slowly.

Watershed of swamp and annual rainfall.

9. The watershed draining into the swamp is about 2,150 acres, representing an annual fall of 1,556 million gallons, each inch of rain being about 48 million gallons.

Effect of inundation.

10. Those parts of the swamp where water lies for any length of time are covered with a grass known as "swamp couch," which is not killed by excess of water, but whenever rain falls heavily many acres (owing to the flatness) of ordinarily-grassed land are covered, resulting in the rotting of the grass.

Present conditions a nuisance to inhabitants of the whole district, and occasion of loss to proprietors.

11. This decay gives rise to a very disagreeable effluvia, sometimes almost intolerable, and in consequence is an offence, if not also a menace, to the health of the residents of Nowra, and as the foetid water finds its way down the Crookhaven Creek it causes the people along its banks much annoyance, and (it is alleged) occasionally sickness.

12. The decay of the grasses is not only offensive, but is a loss to the owners of the land, the grazing capabilities of which are diminished, and the liability of the area to suffer repeated accumulations of water make its agricultural value very low, though the land is rich.

Rapid drainage necessary to ameliorate—Importance to town of Nowra.

13. These facts explain the desire on the part of the owners to drain the land, and exhibit the desirability of draining rapidly, the slow drainage now existing being insufficient to secure the land against the damage referred to. They also demonstrate the public importance of the drainage, that is, to the town of Nowra.

Position of original natural drainage—Evidence of its insufficiency.

14. (ii) That the natural channel between the land and Crookhaven Creek has been blocked by a Government road is admitted by both parties to be true. The original channel, marked 1 on tracing A, is its old site, but at the present time the water on the east side of the road is higher than that on the western. The blocking by this road was not adverted upon by the petitioners (so they informed me), because of the existence of the drain running into the Crookhaven Creek, viz., the easterly drain (2). It is important to observe that they evidently deemed the drain to confer superior advantages to those of the natural channel at this time; and further, that this natural channel could never have effectually drained the swamp, otherwise this drain would not have been cut, which was done about 1853 or 1856 (as I understand) by Monaghan's father.

Drainage at present into Crookhaven Creek not adequate.

15. (iii) This easterly drain (2 on tracing), referred to in the preceding paragraph, has been in use since the date mentioned, that is, for a period of about thirty-five years, and runs through Mary Ann De Mestre's (now Mrs. Holme's) 100 acres (as per tracing). It was cut under some old agreement, which, it is alleged, by the attorney of Mrs. Holme, was not properly observed; but it is neither sufficiently large nor deep to drain the swamp, and is at present in fair repair only.

Attempt by Monaghan and others to deepen and to clear drain into Crookhaven Creek—Attempt resisted and defeated.

16. The statement that it has been filled in is *ex parte*, and requires explanation. The drain proving inadequate, the flow being controlled by its smallness, and by the reeds growing in it, Monaghan and others had it cleared and deepened, entering upon the land of Mrs. Holme, in order to carry this out, which power, they contend, is conferred by section 21 of the Act 29 Vic. No. 1. M'Kenzie, under the authority of Mrs. Holme's attorney or trustee, had the stuff (removed by Monaghan) thrown again into the drain. This was done because the rise in the Crookhaven, consequent on the influx of this swamp water, flooded lands otherwise fairly dry—that is, lands in the De Mestre subdivision, on Crookhaven Creek, of which M'Kenzie is a large purchaser.

Easterly drain does not cause serious injury at present.

17. The drain, as it is, carries off a considerable body of water, but not sufficient to cause serious injury by rising the Crookhaven.

Objections not strictly a counter-petition within meaning of Act.

18. Before dealing with the allegations of the counter-petition, it is proper to observe that it is perhaps not strictly a counter-petition within the meaning of the Act, inasmuch as it represents less than one-fifth of the number of holdings (*vide* section 4, 29 Vic. No. 1), being signed, generally speaking, only by people whose holdings are without the area sought to be constituted a Drainage Union. The petitioners affect to regard it as irregular, a fact which is testified to also by their communication to the Minister for Lands (1890, 4,703 Misc.).

The

The Crown may consider objections to Union—Petitioners' scheme—Its cost to petitioners slight.

19. (iv) Deeming the Government quite entitled to consider the consequences of granting the Union, either *per se* or in regard to any alleged objections, I turn now to the statements of the counter-petition, and in regard to the first statement, it is, by admission of the petitioners, true—that is to say, the drainage which petitioners propose to effect is that in an easterly direction into Crookhaven Creek. The length of the drain would be small, the cutting is not deep, the fall is good, and altogether the cost would be slight. And this is clearly the reason why petitioners adopt this scheme, and seek to carry it into effect.

Effect of scheme on objectors' lands to be considered—Petitioners' condition at present better than heretofore.

20. (v) That such a procedure will affect the counter-petitioners is true, and this demands the consideration of the extent and value of involved interests. The lands of petitioners have been swampy to a large extent as long as history dates back—as long as there has been any record. When they were bought they were swampy, and so far from being under any disability of modern development, the petitioners have, since the cutting of the existing drains, been better off than heretofore.

Rights of owners of adjacent lands should not be assailed—Petitioners' scheme seriously affects objectors.

21. (vi) It may, therefore, at once be conceded, apart from any inquiry into law, that in draining those swamps the rights of owners of adjacent lands should be respected, and not set at naught by turning their lands into swamps. The implication in this (vi) statement of counter-petitioners is to some extent true, viz., that the uncontrolled outflow of this swamp into the Crookhaven will seriously affect them (the counter-petitioners) by the back-flow resulting from the rising of that creek swamping some portions of their lands, which portions would otherwise be comparatively free from water.

Drainage by Crookhaven Creek conditions—Fall of Crookhaven Creek about 3½ feet in 6¼ miles (from where drain runs into it)—Effect of drainage into Crookhaven Creek upon objectors' lands and generally—To clear Crookhaven of reeds would make it brackish.

22. To understand this it is necessary to remember that Crookhaven Creek is a narrow reedy creek, with a very sluggish, indeed almost imperceptible, flow for the first 3½ miles. When inspected, the water, at the point where petitioners' easterly drain runs into it, was 3½ feet above the mean tidal level at T of the Shoalhaven River (see lithograph B), and consequently is very little more than that above the mean tidal level at the point where it empties itself into the estuary called Crookhaven River, a distance of about 6¼ miles. Although the height was, as stated, so slight, it was sufficient to fill many small channels or hollows (by the back-flow), causing the grass to rot, as before explained. A few inches difference is a matter of some moment in this locality, and it is clear that if a large drain, such as would rapidly empty the swamp, were cut in the position of drain 2, it would, seeing the small fall and the reedy nature of the creek, make the flow along it (Crookhaven) very slow indeed, and cause it to rise, to the detriment of the lands along its course. And if this creek were cleared of the reeds, the water would become brackish by the tidal action, an injury to the grazing capacity of adjoining lands, seeing the owners rely on this creek for watering their stock.

Monaghan's drain (3) in bad repair and dangerous

23. (vii) The reference to Monaghan's drain applies to that marked B, which, like 2, is inadequate. This has been cut only a few years (about thirteen, I understand), and is in a bad state of repair. If not attended to, it may, when the Shoalhaven River is in flood, disastrously affect not only the petitioners' properties, but also those of the counter-petitioners, as the river in flood, if it once burst through the dilapidated flood-gates, will probably make an immense channel in the loose alluvium and carry everything before it. The great changes in the course of the river effected by the 1860 and 1870 floods show what may be anticipated.

Inference from the construction of this drain.

24. It is worth noting that petitioners would not have involved themselves in the large expense of this drain if they had been satisfied they could more effectually drain into the Crookhaven, with the unqualified rights which they now protest they have by existing law.

Actual effect of drainage into Crookhaven Creek.

25. (viii) The reference to the original partial closing of the drain is, so far as I can ascertain, correct. The effect of the rapid flow into Crookhaven Creek was to back it up, and flood lands otherwise comparatively free from water, as pointed out.

Motive of petitioners in seeking to drain into Crookhaven Creek—Inexpensiveness (*per se*) of petitioners' scheme.

26. (ix) It is obviously because Monaghan, through defeat in the District Court action (Monaghan and another v. Mackenzie) was prevented opening this drain (2) that the petitioners seek power, under the Drainage Promotion Act, to effectually drain their land, and they are anxious to do this, not by improving the northerly drain (3), but by enlarging and deepening the easterly one (2), the former being a matter of considerable outlay, the latter not at all costly (*per se*).

Objectors do not oppose limited flow into Crookhaven as at present or by nature.

27. (x) The counter-petitioners raise no objection to the limited flow into the Crookhaven, and there can be no doubt that although originally the whole of the water that escaped from the swamp, other than by evaporation or percolation, found its way into this creek, it did not so prejudicially affect the lands of the counter-petitioners as it now does.

28. I have now to report the attitude of the petitioners in the matter. They hold that they have a right to the easterly drain by user, and, by section 21 of the Act 29 Vic. No. 1, the right to enter upon any lands through which the drain may pass to cleanse and repair. That the counter-petitioners and any other persons have already effective remedy at law in cases where they suffer loss or injury (see section 22 said Act), which remedy they allege will remain equally whether Union be granted or not. That they seek to be constituted a Union in order to properly deal with the *pro rata* contribution by the benefited parties toward the expenses of drainage, and so efficiently set about the undertaking. That they have a natural right to drain into the Crookhaven Creek, seeing that the swamp water originally flowed therein, and that the remedy of the counter-petitioners is to free the 3½ miles of creek of reeds, and otherwise facilitate the flow.

Rejoinder

Rejoinder by objectors, who seek protection against being obliged to defend their interests by actions at law.

29. The counter-petitioners urge that although the petitioners are entitled to receive the benefit of the outflow through the easterly drain, they are not justified in widening or deepening it, or in any way increasing the natural flow, to the detriment of them (the counter-petitioners). That although the remedy at law is always open to them in cases of damage by the action of petitioners, yet the privilege asked for by said petitioners should not be conceded under the Act, excepting under such restrictions as defend their interests, or, in other words, that the concession of privileges by granting the Union should carry with it qualifications protecting those interests palpably and immediately threatened.

Scheme of drainage recommended—Conditions of outfall—Flood-gates required—Drainage would repay for outlay by enhanced value of land.

30. In regard to the best mode of draining, I beg to report that without doubt the swamp can most rapidly and effectively be drained by a sufficiently large cutting in the position of Monaghan's northerly drain (3). Here there is an available fall of 5 feet from water-level at date of inspection in a mile at mean tidal level, a foot less at mean high tide, and a foot more at mean low tide. This cutting would have to be tunnelled through the high river bank (as at present), and proper gates erected to keep back flood-waters in the Shoalhaven. The whole of the work is through soft alluvium, and, if done effectively and well, would, I believe, well repay its cost.

Conditions of outfall into Crookhaven—Damage to Lands along Crookhaven Creek—Protest of objectors reasonable, and objections valid.

31. It is not possible to drain as rapidly by turning the flow into Crookhaven Creek. Here the available fall is 5 feet from water-level at date of inspection in over 7 miles instead of 1 mile. Moreover, the damage to the valuable properties along the creek would be considerable. The attitude of the counter-petitioners appears to me reasonable and fair, and from my calculations of the effect of the outflow into Crookhaven on their properties, and my inspection upon the ground, I feel justified in strongly recommending their protest against granting the Union unlimited powers to your favourable consideration.

Proposed Union a general benefit if limitation urged by objectors be imposed. Petitioners strongly object to limitation—Unreasonableness of protest against the limitation of flow into Crookhaven.

32. With the suggested limitation there is no reason why a Union should not be granted. It would be a public benefit, as well as an advantage to the petitioners. In regard to the suggested limitation, I should report that the petitioners altogether decline to consent to the idea of flood-gates at the easterly drain, inasmuch as it prevents them getting the water off the swamp before it has rotted the grass; but they propose, really, to get rid of this nuisance at the expense of the landholders along the Crookhaven Creek. They deny that this is the alternative, but having given the matter my most careful consideration, having taken the necessary levels, and computed the effects, I am strongly of opinion that the protest against unlimited flow along drain 2. and the request for flood-gates or other limitation, is reasonable.

Date of examination.

33. The examination, survey, and general inspection was made by me during the period of 3rd to 5th March, 1890.

34. The petitioners were permitted to take a copy of the counter-petition, the persons signing the latter being agreeable.

35. I saw every person in the district immediately interested, and heard the allegations of both sides, before making the survey, which was, therefore, undertaken with a comprehensive knowledge of the scope of examination required.

I have, &c.,  
 GEORGE H. KNIBBS,  
 Surveyor.

Forwarded. Mr. Knibbs' report is of an exhaustive character, and from the thorough manner in which he has evidently considered every detail, it appears that the conclusion he has arrived at is a just one.—D. M. MITTLAND, 8/4/90.

[Enclosures.]

F.

Extract from the *Shoalhaven Telegraph*, of Wednesday, 29th August, 1888.

Shoalhaven District Court—Before His Honor Judge M'Farland—James Monaghan and another v. Hugh M'Kenzie—Destruction of property, £200.

MR. DAVIES, instructed by Mr. Marriott, with Mr. Whittell, for plaintiff; Mr. Bennett, instructed by Mr. Richards, for defendant.

Jury:—W. Strong, Jas. Ryan, J. D. Caines, and J. Caffery.

Mr. Davies, in opening the case, pointed out to the Jury that it was rather a peculiar one, and would demand their closest attention. The case had been brought under the Drainage Promotion Act, which was a very useful one, and dated from the year 1865. This Act was passed to enable persons whose land was liable to be swamped to cut a drain leading to any running stream in the neighbourhood, no matter if the land of some other person intervened. The object of the Legislature was that land might be reclaimed which was liable to be swamped, and they thought that people who might own land between that requiring draining and a running stream should not be allowed to act in a dog-in-the-manger sort of way by preventing the drainage of the water to a running stream. Messrs. Monaghan, Hyam, and Graham owned the land at the foot of the town, which was exceedingly good land if it were only drained; there was a running stream of water called the Crookhaven Creek, into which the water could be drained, but there was a strip of land lying between that stream and the land to be drained which belonged to a Mrs. Holme, and in which Mr. M'Kenzie had an interest. This slip of land was higher than that owned by Messrs. Monaghan, Hyam, and Graham, and it was found necessary to cut a drain through it: this was the object of the Act. [He here read sections 21, 23, and 25 of the Act.] Mr. M'Kenzie, through his servants, had interfered with that drain, and prevented the water flowing into the Crookhaven Creek; it was a most extraordinary action, and thoroughly inexplicable to him. [He here read an agreement signed by Patrick M'Manus, who at the time occupied the strip of land through which the drain was cut, stating that he was agreeable to the work being done, as Mrs. De Mestre had given her consent.] The drain was cut in the year 1856, and now, after the lapse of all those years, Mr. M'Kenzie tried to prevent the water being drained into the creek. The two men who had been employed by Mr. M'Kenzie to fill in the drain were brought before the Bench of Magistrates, but they (the Magistrates) dismissed the case, as they did not consider the men were liable for the action of their master. On that occasion Mr. M'Kenzie went into the witness-box and took all the responsibility upon himself. The jury should take into account the damage already resulting by the closing up of the drain. Should rain come there were 500 acres of land rendered useless if there was no drain to carry off the water.

Defendant pleaded not guilty—that the work had been done by the authority of the owner.

James

*James Monaghan* deposed : The land requiring to be drained is known partly by the name of the Greenhills Swamp, and partly by the name of the Greenhills Estate ; Messrs. Hyam and Graham are adjoining owners ; between the swamp and the Crookhaven Creek there is a piece of land in which defendant has an interest ; the drain was cut through the Greenhills Swamp, commencing at the corner of the town and running through the swamp and Ferrara Estate to the Crookhaven ; the drain was cut to drain land owned by Messrs. Hyam, Graham, and myself ; it was cut thirty-three years ago.

Mr. Davies pointed out the Drainage Promotion Act was passed in 1865.

Mr. Bennett here contended that the plaintiff must prove that the drain which had been cut previous to the passing of the Drainage Prevention (Promotion) Act came under the provisions of that Act, and he proceeded to read certain clauses of the Act. The defendant (query, plaintiff) must prove that the Drainage Prevention (Promotion) Act was in existence so far as this drain was concerned, and that the formalities of the Act had been complied with. He applied for a nonsuit.

After hearing arguments, His Honor held that as the drain had been cut some years before the passing of the Act it could not have been cut in contemplation of the Act, and therefore did not come under its provisions. There was nothing in its provisions that placed a drain cut previous to the passing of the Act on the same footing as a drain subsequently made. He, therefore, nonsuited plaintiff.

Mr. Davies asked His Honor to make a note that he objected to His Honor's ruling—that the drain did not come under the provisions of the Act.

His Honor allowed defendant four witnesses' expenses.

Extract from *Broughton Creek Register*, of Saturday, 1st September, 1888.

Shoalhaven District Court—Friday, 24th August, 1888—Before His Honor Judge M'Farland.

Lord v. Monaghan.

In this case the plaintiff, as a trustee for Mrs. M. A. Holme, claimed £200 from James Monaghan for damage to property.

Mr. Bennett, instructed by Mr. Richards, for plaintiff ; Mr. Davies, with Mr. Whittell, instructed by Mr. Marriott, for defendant.

Mr. Bennett said that plaintiff merely claimed for interference with the drain, and not for any damages.

Mr. Davies argued that plaintiff, as trustee, had no possible right to sue there at all. Mr. Monaghan did not claim the right to go upon the land to cut the drain, but he claimed the right, under an agreement made in 1853, to have the drain cleared out and repaired. He claimed the right of the drain by user, and when he set up that bona fide title the jurisdiction of the Court was ousted.

After hearing the evidence of Thomas Robson and James Monaghan, which was similar to that given in the case heard before the Bench of Magistrates,—

His Honor held that sufficient evidence had been adduced to show what defendant had done was by right of user. He accordingly struck the case out, as that Court had no jurisdiction in the matter. No costs allowed.

Enclosed with my report of 31st March, 1890, No. 3.—GEO. H. KNIBBS, Surveyor.

G.

To His Excellency the Right Honorable Charles Robert Baron Carrington, Governor-in-Chief, and to the Honorable the Executive Council of New South Wales, the petition of the undersigned,—

RESPECTFULLY SHOWETH,—

1. That on the 6th day of September, 1889, a petition was published in the *Government Gazette*, on page 6127, for a Drainage Union, to be known as the "Greenhills Drainage Union."

2. That an inquiry has been ordered into the merits of the said Drainage Union.

3. That your petitioners are owners of lands in fee a reversum, which will be adversely affected by the said drainage, should it be unskillfully carried out, or should the fall prove insufficient to effect a quick drainage.

4. Your petitioners trust, therefore, that as by the wording of the Act it is not necessary to grant their prayer, their petition may only be acceded to on their signing a bond to execute their work under scientific direction, and with such safeguards as may prevent the Drainage Union from transferring their water to your present petitioners' land.

And your petitioners will ever pray.

H. de M. Williams.

F. H. Williams.

P. F. Williams.

A. de Mestre, landowner.

Mary Ryan, landowner.

John J. Emery, freeholder.

Daniel Walsh, leaseholder.

Michael Lenehan, leaseholder.

Joseph Forsyth, jun., leaseholder.

James Pollock, leaseholder.

Edward Connolly, leaseholder.

Thomas J. Connolly, farmer and leaseholder.

John East, farmer and leaseholder.

P. Manning, leaseholder.

Alex. Fleming, landowner.

Walter Caffery, farmer and leaseholder.

George Smith, farmer and leaseholder.

James Condon, farmer and leaseholder.

John Caffery, farmer and leaseholder.

Jacob Hewett, farmer and leaseholder.

H. Wheatley, landowner.

Enclosed with my report of 31st March, 1890, No. 3.—GEO. H. KNIBBS, Surveyor.

## No. 23.

### Memo. by The Acting Surveyor-General.

Petition for Greenhills Drainage Union, parish of Nowra, county St. Vincent, within Municipal District of Nowra.

THIS is an application by certain proprietors to be constituted a Drainage Union, by name of "The Greenhills Drainage Union," under the Act to promote the better drainage of lands, 29 Victoria No. 1.

The petition has been duly published, and a survey made, with levels ; and a comprehensive report is herewith.

The tract of land to be drained is shown by red edging on the accompanying tracing or sketch plan marked "A." It contains about 888 acres, comprising thirteen holdings, of which the owners, excepting three, concur in the petition ; and one of these three, viz., Mrs. Holme, has subscribed to a counter-petition.

The counter-petition is lodged by five owners, one having a holding within, and the others having holdings without, the said tract of land proposed to be drained. This counter-petition may not perhaps be regarded as in conformity with the law, which prescribes that a counter-petition may be presented by other owners of such tract of land being not less than one-fifth in number of holdings, nevertheless it should probably receive due consideration on public grounds.

A part (about half) of the said tract of land is known as Worrigece Swamp, and is subject to inundation to a greater or lesser extent, according to rainfall. The watershed of the swamp is about 2,150 acres, including part of the town of Nowra.

The

For enclosure  
see No. 22.

The swamp, under present conditions, is shown to be an offensive nuisance to inhabitants, and the better drainage thereof would be beneficial to the promoters of the Union and to the public.

As before stated, there is a counter-petition by certain owners (which may, perhaps, be informal), representing objections, and alleging that their interests would be detrimentally affected by the scheme of drainage intended to be adopted by petitioners. It is shown that such objections are reasonable, and are tenable under the circumstances.

Under the Act 29 Victoria No. 1 there are provisions for compensation for any damages consequent on drainage; and therefore it might be held that those objecting (by counter-petition, possibly of informal character), who are apprehensive of probable damage, should be left to such remedy as the law allows.

It is shown that considerable damage to vested interests would result from the scheme of drainage desired by petitioners, viz., *via* Crookhaven Creek.

Referring to the Act above mentioned, section 4, it is provided that the person authorized to survey shall report on the best mode of effecting the drainage of such tract, whence it may be inferred that a Drainage Union may be constituted conditionally, *i.e.*, subject to adoption of a means or scheme of drainage to be indicated as the best.

For the reasons set forth at length by Mr. Surveyor Knibbs in his report, a scheme or means of drainage northward to the Shoalhaven River, indicated by Monaghan's drain marked "3" on sketch plan, is, in my opinion, the best, and is recommended for approval—its principal feature being a sufficient outfall, about 5 feet in 1 mile, by a drain about midway through the aforesaid tract of land; whilst, by the means proposed by petitioners, viz., *via* Crookhaven Creek, a like outfall may be obtained in 7 miles. The effect of such latter discharge of storm-waters would be to cause damage to other lands, the proper protection of which would involve considerable expenditure in works, possibly as much as by the more direct drainage or discharge suggested northward into the Shoalhaven River.

I have briefly summarised the results of Mr. Surveyor Knibbs' inquiry and report, which is of comprehensive character.

E. TWYNAM,  
15 April, 1890.

In view of this report, it is submitted that Executive authority be obtained for proclamation of Greenhills Drainage Union, under the 3rd section of the Drainage Promotion Act of 1865, as applied for by petitioners (*vide* petition published 1st October, 1889), the drainage to be effected by drain known as Monaghan's northerly drain, No. 3 on plan, discharging into the Shoalhaven River. Attention is invited.—R.H.D., 26/4/90.

Submitted for approval.—W.H., 2/5/90. Approved.—J.W.B., 6/5/90. Inform Mr. P. H. Morton, M.P., of proposed action.—W.H., 2/5/90. Mr. Morton, M.P., informed.—12/5/90.

#### No. 24.

The Under Secretary for Lands to Mr. J. Monaghan.

Sir,

Department of Lands, Sydney, 23 April, 1890.

Referring to your letter of the 1st instant respecting the sum of £25 to be paid into the Treasury to meet certain preliminary expenses in connection with the proposed Greenhills Drainage Union of Nowra, I have the honor to inform you that nothing can be done until the required deposit is paid.

I have, &c.,

W. H. CAPPER  
(For the Under Secretary).

#### No. 25.

The Acting Mayor, Nowra, to The Secretary for Lands.

Hon. Sir,

Council Chambers, Nowra, 25 April, 1890.

I have the honor to inform you that at a meeting of this Council, held on Tuesday last, it was unanimously resolved, "That the Minister for Lands be respectfully requested to take immediate steps to have the Drainage Union applied for a few months back proclaimed." In transmitting the foregoing resolution, I might point out that the portion of land sought to be drained is termed the Greenhills Swamp, and is situated on the easterly side of the town of Nowra, and covers a considerable area. The stench from this at the present time is intolerable, owing to the large quantity of decaying vegetable matter. To this is attributed the great amount of sickness at present prevailing in our midst, during the last few months there having been nine deaths amongst children in and adjacent to the town. In the interests of the public health it is hoped that you will not lose any time in having the Union referred to above proclaimed.

I have, &c.,

R. PATTERSON,  
Acting Mayor.

#### No. 26.

The Acting Surveyor-General to The Under Secretary for Lands.

Greenhills Drainage Union at Nowra, Shoalhaven, under 29 Victoria No. 1.

1 May, 1890.

In compliance with provisions of the Drainage Promotion Act (section 5), a sum of £25 was paid into the Treasury as a fund to meet expenses incurred. An inquiry and survey in respect of the petition for this Drainage Union was lately made by Mr. Surveyor Knibbs, the cost of whose services amounts to £22 14s., which sum is chargeable against the fund.

E. TWYNAM.

[Enclosure.]

## [Enclosure.]

Greenhills Drainage Union at Nowra.

It will be requisite to arrive at the expenditure incurred for this survey and report, to be charged against the fund.  
Mr. Maitland is requested to supply statement in detail.

The cost of this survey was as follows:—	£ s. d.	E.C.T.
Mr. Knibbs, 6 days in field )	16 1 0	
Do. 4½ do office {	1 8 0	
Labourers' wages .....	4 10 0	
Travelling allowance for 6 days .....	0 15 0	
Coach fares.....	£22 14 0	
	D. M. MAITLAND,	30th April, 1890.

## No. 27.

P. H. Morton, Esq., M.P., to The Under Secretary for Lands.

Sir,

The Southern Club, Sydney, 7 May, 1890.

I would thank you if you could supply me with a copy of the report sent in by Mr. Surveyor Knibbs on the application for Drainage Union at Nowra.

I am, &amp;c.,

P. H. MORTON, M.L.A.

Submitted, as to whether Mr. Morton, M.P., should be supplied with copy of Mr. Knibbs' report respecting proposed Drainage Union at Nowra.

## No. 28.

The Under Secretary for Lands to P. H. Morton, Esq., M.P.

Sir,

Department of Lands, Sydney, 12 May, 1890.

Referring to the petition, as per copy enclosed, I have the honor to inform you that the Secretary for Lands has approved of Executive authority being sought for the proclamation of the Greenhills Drainage Union, under the 3rd section of the Drainage Promotion Act of 1865, the drainage to be effected by a drain known as Monaghan's northerly drain, discharging into the Shoalhaven River, this route being reported by the surveyor as preferable to the one by way of Crookhaven Creek, suggested in the petition.

I have, &amp;c.,

WM. HOUSTON,

Under Secretary (*per* R.H.D.)

## No. 29.

Mr. J. Monaghan to The Secretary for Lands.

Sir,

Greenhills, Shoalhaven, 14 May, 1890.

I am in receipt of yours of the 12th instant to P. H. Morton, Esq., M.P. I will put it before the other petitioners as soon as possible, but for myself I hereby give you notice not to include my name or property in any such proclamation, as I will not accept of any substitute for what has been asked for in the original petition.

Yours, &amp;c.,

JAMES MONAGHAN.

Misc. Branch,—Please connect the previous papers.—R.L. (*pro* E.A.B.), 19/5/90. Required papers with Misc. 90-6,978, which stands noted to Mr. Stuart, 22/5/90.—W.T.W., 22/5/90., Mr. Stuart.

## No. 30.

Executive Council Minute.

*Subject*:—Recommending Proclamation of a Drainage Union at Nowra, to be named "Greenhills Drainage Union."

Ms. 90-6,978.

Department of Lands, Sydney, 21 May, 1890.

It is recommended to His Excellency the Governor and the Executive Council, that, in accordance with the provisions of section 3 of the Drainage Promotion Act of 1865, the landowners (and their successors) named in the enclosed copy of petition for the constitution of a Drainage Union at Nowra, which was published in *Gazette* of 1st October, 1889, be now declared to be a Drainage Union, to be known as the "Greenhills Drainage Union," for the purpose of draining the tract of land the boundaries of which are shown by red edge on the enclosed plan A, and which shall be effected by means of the northerly drain marked 3 on plan, and discharging into the Shoalhaven River.

J. H. CARRUTHERS.

Approved.

## No. 31.

Mr. T. Marriott to The Under Secretary for Lands.

Sir,

Nowra, 23 May, 1890.

I have the honor to request that a copy of the report furnished by Mr. Knibbs, Government surveyor, on the proposed drainage of the Greenhills land at Nowra, be forwarded to me, as solicitor to the petitioners seeking to constitute themselves a Union under the provisions of the Drainage Promotion Act of 1865, 29 Vic. No. 1.

I have, &amp;c.,

THOS. MARRIOTT.

No. 32.

16

No. 32.

Mr. J. Monaghan to The Under Secretary for Lands.

Sir,

Sydney, 23 May, 1890.

On behalf of the petitioners for constitution of a Drainage Union at Nowra (Greenhills), I beg to request that you will be so good as to supply me with a copy of Mr. Surveyor Knibbs' report in connection therewith, and also a copy of the tracing accompanying such report, the expense thereof to be defrayed out of the deposit of £25 lodged in connection with this matter. I have further to request that all proceedings for constitution of the Union be stayed until petitioners have had an opportunity of making further representations respecting the proposals made in Mr. Knibbs' report referred to.

I have, &amp;c.,

JAMES MONAGHAN.

Submitted, that a copy of Mr. Surveyor Knibbs' report and accompanying tracing be supplied to Mr. James Monaghan, and proceedings stayed, as requested. The sum of £2 6s. is available to defray expenses of copying, &c., being balance of deposit of £25 lodged by petitioners. Mr. Morton, M.P., also applies for a copy of the surveyor's report, which may perhaps be supplied to him. Mr. Marriott, who represents himself as solicitor for the petitioners, has also asked for a copy of the report. Submitted, as to whether the copy should be sent to him or to Mr. Monaghan.—J.O'D., 3/6/90.

Perhaps it will be well to furnish a copy to Mr. Marriott, and to inform others of such.—R.H.D., 4/6/90. Submitted.—F.H.W. (for U.S.), 5/6/90. Approved.—J.N.B., 6/6/90. Mr. Smith copied the report. The cost was 16s. 8d.—R.H.D., 9/6/90. Cor.—James Monaghan, Thomas Marriott, with copy of report, 11/6/90. Will the Chief Draftsman please state the cost of supplying a copy of the tracing accompanying Surveyor Knibbs' report.—J.O'D., 14/6/90. The Chief Draftsman. Mr. Shaw. to supply to Mr. De Low.—C.J.S., 12/6/90. A copy of the tracing would cost 10s. 6d.—M.S., 19/6/90. Misc. Lands.

No. 33.

The Under Secretary for Lands to Mr. T. Marriott.

Sir,

Department of Lands, Sydney, 11 June, 1890.

Referring to your letter of 23rd ultimo, asking, on behalf of the petitioners for constitution of a Drainage Union at Nowra (Greenhills), for a copy of Mr. Surveyor Knibbs' report in connection therewith, I have the honor to forward herewith a copy of the report, as desired; cost of copying, 16s. 8d.

I have, &amp;c.,

WM. HOUSTON,

Under Secretary (*per* R.H.D.).

No. 34.

The Under Secretary for Lands to Mr. J. Monaghan.

Sir,

Department of Lands, Sydney, 11 June, 1890.

Referring to your letter of the 23rd ultimo, applying, on behalf of the petitioners for constitution of a Drainage Union at Nowra, for a copy of Mr. Surveyor Knibbs' report in connection therewith, I have the honor to inform you that a copy of the report in question was sent to Mr. Marriott, solicitor for the petitioners, in reference to his letter of even date to your communication.

I have, &amp;c.,

WM. HOUSTON,

Under Secretary for Lands.

No. 35.

Mr. T. Marriott to The Under Secretary for Lands.

Sir,

Nowra, 17 June, 1890.

Referring to your letter dated 11th instant, Misc. 90-7,714, forwarding copy of Mr. Surveyor Knibbs' report on the proposed Drainage Union, I have the honor to request that a tracing of the plan prepared by that gentleman be also furnished to the petitioners, and also that the costs for supplying same, together with the cost for copying the report, be defrayed from the funds lodged by the petitioners, and now remaining in your hands.

I have, &amp;c.,

THOS. MARRIOTT,

Solicitor for Greenhills Union.

Cost of tracing will be 10s. 6d. A balance of £1 9s. 4d. remains, from which cost can be paid. Please prepare tracing.—J.O'D., 23/6/90. Mr. M'Lean. Special. Mr. Shaw.—R.M., 23/6/90. Tracing herewith.—M.S., 25/6/90. Mr. O'Dwyer. Forward tracing to Mr. Marriott, please.—J.O'D., 27/6/90. Cor. Branch. Received, 27th June, 1890. Mr. Marriott, solicitor, with tracing, 4/7/90.

No. 36.

The Under Secretary for Lands to Mr. T. Marriott.

Sir,

Department of Lands, Sydney, 4 July, 1890.

In response to the request in your letter of the 17th ultimo, I have the honor to forward herewith a copy of the tracing showing proposed scheme for the Greenhills Drainage Union, price 10s. 6d., which will be defrayed from the fund in hand.

I have, &amp;c.,

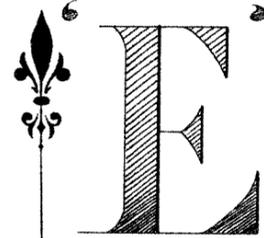
WM. HOUSTON,

Under Secretary (*Per* R.H.D.)

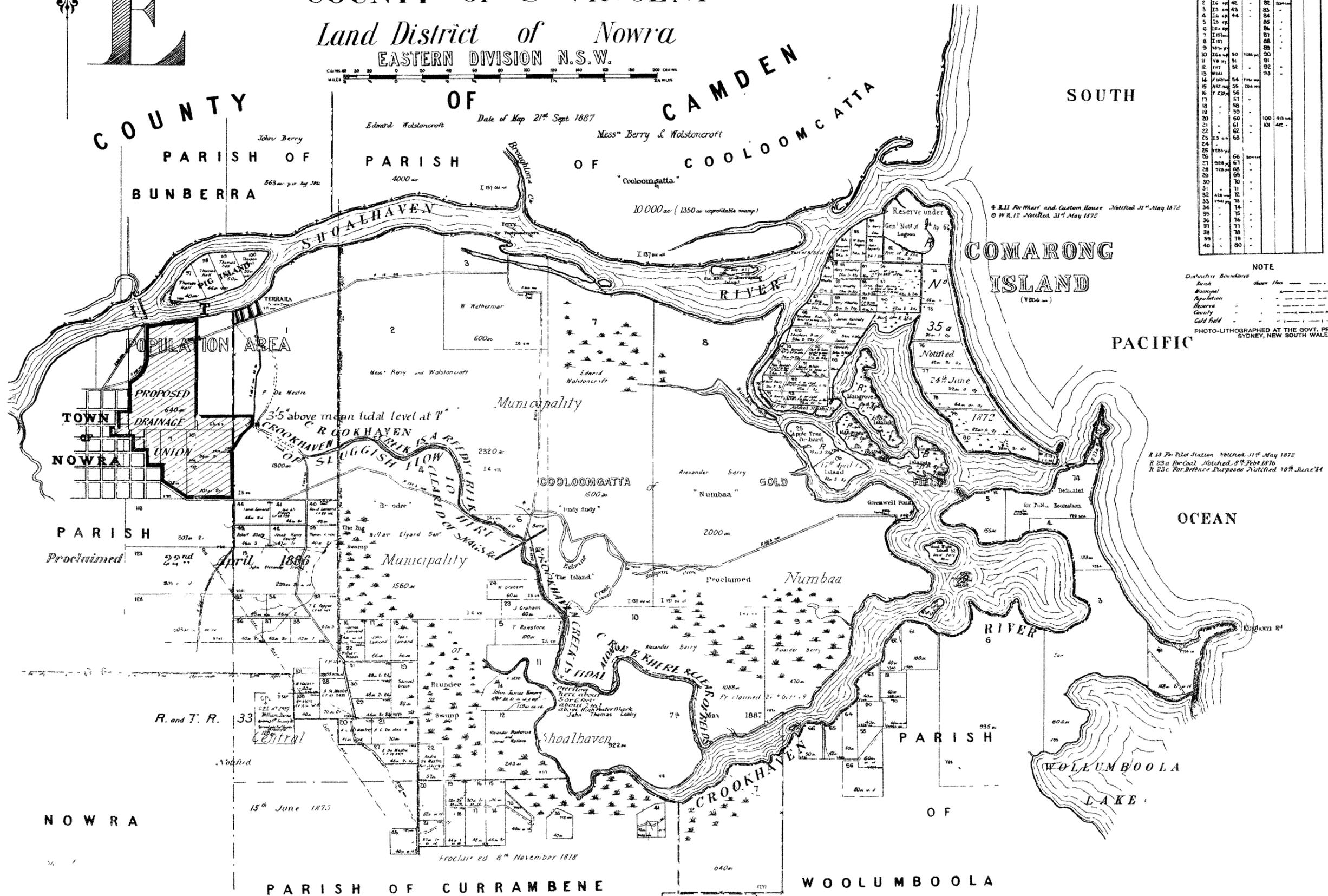
[Two Plans.]

# PARISH OF NUMBAA COUNTY OF ST VINCENT

## Land District of Nowra EASTERN DIVISION N.S.W.



Date of Map 21<sup>st</sup> Sept 1887



### REFERENCE TO PARISH N<sup>o</sup>s

Parish N <sup>o</sup>	Area	Parish N <sup>o</sup>	Area
1	23 ac	81	104 ac
2	16 ac	82	234 ac
3	15 ac	83	-
4	15 ac	84	-
5	15 ac	85	-
6	15 ac	86	-
7	15 ac	87	-
8	15 ac	88	-
9	15 ac	89	-
10	15 ac	90	-
11	15 ac	91	-
12	15 ac	92	-
13	15 ac	93	-
14	15 ac	94	-
15	15 ac	95	-
16	15 ac	96	-
17	15 ac	97	-
18	15 ac	98	-
19	15 ac	99	-
20	15 ac	100	-
21	15 ac	101	-
22	15 ac	102	-
23	15 ac	103	-
24	15 ac	104	-
25	15 ac	105	-
26	15 ac	106	-
27	15 ac	107	-
28	15 ac	108	-
29	15 ac	109	-
30	15 ac	110	-
31	15 ac	111	-
32	15 ac	112	-
33	15 ac	113	-
34	15 ac	114	-
35	15 ac	115	-
36	15 ac	116	-
37	15 ac	117	-
38	15 ac	118	-
39	15 ac	119	-
40	15 ac	120	-

### NOTE

- Distinctive Boundaries
- Reserve
- Municipal
- Population
- Reserve
- County
- Gold Field

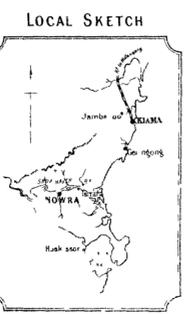
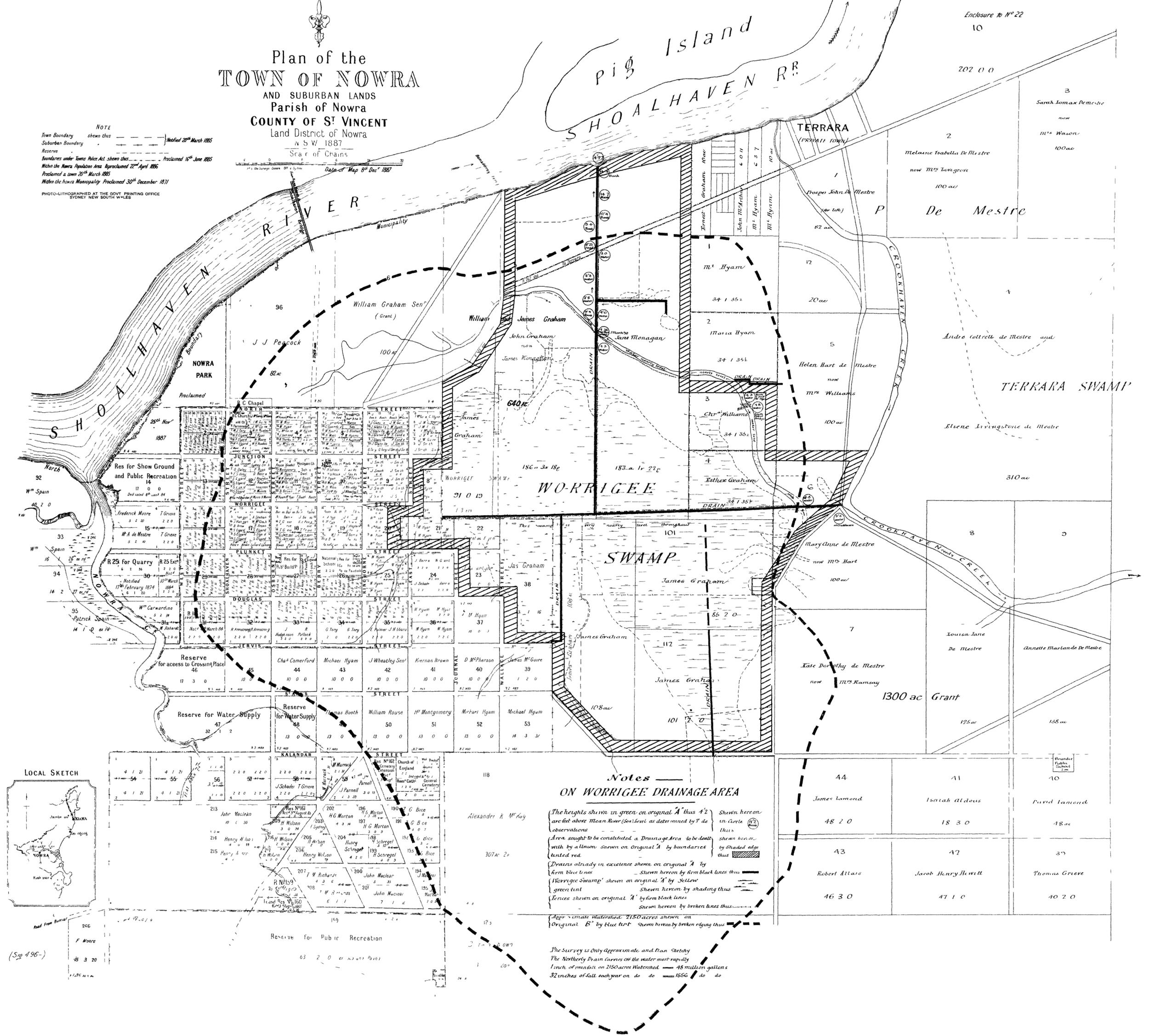
PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES

R 13 For Pilot Station Notified 31<sup>st</sup> May 1872  
R 23a For Coal Notified 8<sup>th</sup> Feb 1876  
R 23c For Defence Purpose Notified 10<sup>th</sup> June 84

# Plan of the TOWN OF NOWRA AND SUBURBAN LANDS Parish of Nowra County of St Vincent Land District of Nowra N S W 1887

**NOTE**  
Town Boundary shown thus Notified 20th March 1885  
Suburban Boundary shown thus Proclaimed 15th June 1885  
Reserve boundaries under Towns Police Act shown thus Proclaimed 15th June 1885  
Within the Nowra Population Area. Reproclaimed 22nd April 1886  
Proclaimed a town 20th March 1885  
Within the Nowra Municipality. Proclaimed 30th December 1871  
PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE  
SYDNEY NEW SOUTH WALES

Scale of Chains  
Date of Map 8th Dec 1887



### Notes ON WORRIGEE DRAINAGE AREA

The heights shown in green on original 'A' thus 42 are feet above Mean River (Sea) level as determined by T de observations. Shown here on original 'A' by blue tint. Area sought to be constituted a Drainage Area to be dealt with by all laws shown on original 'A' by boundaries tinted red. Shown here on original 'A' by firm black lines thus. Drains already in existence shown on original 'A' by firm blue lines thus. Shown here on original 'A' by yellow green tint. Worrigee Swamp shown on original 'A' by yellow green tint. Shown here on original 'A' by firm black lines thus. Fences shown on original 'A' by firm black lines thus. Shown here on original 'A' by broken lines thus. Approximate Watershed: 2150 acres shown on original 'B' by blue tint. Shown here on original 'B' by broken edging thus.

The survey is only approximate and plan sketchy. The Northern Drain carries off the water most rapidly. 1 inch of rainfall on 2150 acres Watershed = 48 million gallons. 32 inches of fall each year on do do = 1556 do do

44	41	40
James Lamond	Isarah Aldous	David Lamond
48 2 0	18 3 0	48 ac
43	42	39
Robert Allars	Jacob Henry Hewitt	Thomas Greer
46 3 0	47 1 0	40 2 0

(S. 496-)

1890.

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LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

---

WESTERN SUBURBS (CITY OF SYDNEY) SEWERAGE  
SCHEME RETICULATION AND COMPLETION BILL.

(MESSAGE No. 20.)

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*Ordered by the Legislative Assembly to be printed, 2 July, 1890.*

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*By Deputation from the Governor,*  
ALFRED STEPHEN,  
*Lieutenant-Governor.*

*Message No. 20.*

In accordance with the provisions contained in the 54th section of the Constitution Act, the Governor recommends for the consideration of the Legislative Assembly the expediency of making provision to meet the requisite expenses in connection with a Bill to sanction the carrying out of certain works in connection with the reticulation and completion of the Western Suburbs Sewerage Scheme.

*Government House,*  
*Sydney, 25th June, 1890.*

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

COOK'S RIVER ROAD.  
(EXPENDITURE ON.)

*Ordered by the Legislative Assembly to be printed, 2 October, 1890.*

[Laid upon the Table in answer to Question No. 1 of 23 September, 1890.]

Question.

(1.) COOK'S RIVER ROAD:—MR. SCHEY asked THE SECRETARY FOR PUBLIC WORKS,—Will he please lay upon the Table of this House a Return showing the amount of money expended by the Government on the Cook's River Road, showing separately the amounts expended on that portion of the said road over which it is now proposed to run a tramway?

Answer.

Expenditure on Cook's River Road:—

Total Expenditure.	Amount Expended on that portion over which it is proposed to run a Tramway.
<p>£    s.    d. 65,982 11    7</p>	<p>£ 14,100 (approximately).</p>



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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**ROADS.**

(EXPENDITURE ON, IN GUNNING DISTRICT.)

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*Ordered by the Legislative Assembly to be printed, 21 May, 1890.*

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*Return prepared in fulfilment of a promise made by the Honorable the Secretary for Public Works, in reply to a Question, No. 1, Votes No. 11, 21 May, 1890, by Thomas Colls, Esq., M.P., viz. :—*

**Question.**

What amount of money has been expended on the road from Wheoco to Gunning, *via* Byalla, also from Gunning to Grabben Gullen, *via* Clear Hills, also from Wheoco to Crookwell, from January, 1887, up to December, 1889; and what amount of money (if any) is available up to present date?

**Answer.**

**ROADS.**

Wheoco Post Office, *via* Byalla, to Gunning :—

£459 16s.—Expended from January, 1887, to December, 1889.  
£57 12s.—Expended during present year, 1890.  
£118 8s.—Amount now available.

Gunning, *via* Clear Hill, to Grabben Gullen :—

The above-mentioned road forms portion of road from Crookwell, *via* Grabben Gullen, to Gunning.  
£688 19s.—Expended from January, 1887, to December, 1889, on the whole road.  
£399 15s. 6d.—Expended on portion of road referred to in the question.  
£506 1s.—Now available for whole road.

Wheoco to Crookwell :—

£661 6s.—Expended from January, 1887, to December, 1889.  
£204 10s. 6d.—Now available.

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

ROADS.

(PAPERS RESPECTING REPAIR OF—FROM MILLTHORPE TO LUCKNOW, *VIA* SPRING HILL.)

*Ordered by the Legislative Assembly to be printed, 17 July, 1890.*

[*Laid upon the Table in answer to Question No. 19, on 17 July, 1890.*]

(19.) ROAD MILLTHORPE TO LUCKNOW, *via* SPRING HILL.—MR. DALTON ASKED THE SECRETARY FOR PUBLIC WORKS,—

(1.) Has he any objection to lay upon the Table of this House, all papers, petitions, and other documents, relative to the application of the residents of Millthorpe, requesting a grant for the repair of the road from Millthorpe to Lucknow, *via* Spring Hill?

(2.) If there is no objection, will he kindly say upon what date the said papers will be laid upon the Table as desired?

Road Millthorpe to Lucknow.

[Presented by Thomas Dalton, M.P., urging immediate report, 2/6/90. Acknowledged, 4/6/90.]

Petition.

To the Honorable The Secretary for Public Works,—

Sir,

Millthorpe, 19 May, 1890.

We, the undersigned, residents of the district and users of the undermentioned road, beg respectfully to apply to have a sum of money granted for repair of the road Millthorpe to Lucknow, *via* Spring Hill. This road is a main road, and a very large amount of traffic is carried on it to the railway stations. It passes through a large farming district, and, being at present not even cleared, is quite unfitted for the requirements. We would therefore ask you to have inquiries made in the proper quarter, with a view to speedy remedy.

And your petitioners will ever pray, &c.

[Here follow 14 signatures.]

Please send to-night for report of local officer.—J.B., 2/6/90. B.C., Commissioner for Roads.  
Mr. Adams for report. Is road on schedule?—P.J.F., 4/6/90.

Have examined this road; it is in a very bad state. Would recommend that some clearing and forming be done, and that the Vote "Millthorpe to Lewis Ponds" be debited with same, as the road is common to both for some distance from Millthorpe.—J.H.A., 20/6/90. The Assistant Engineer, B.C.

Minute by Mr. Assistant-Engineer Nardin.

Road Millthorpe to Lucknow, *via* Spring Hill.

23 June, 1890.

MR. J. H. ADAMS, the local officer, reports that this road is in a very bad state, and he recommends that some forming and clearing be done and the cost charged against Vote "Millthorpe to Lewis Ponds," on the ground that, for some distance, the road is common to both places.

I advise that this be done, only Mr. Adams must furnish fuller particulars and estimate.

E. A. NARDIN,

The Commissioner and Engineer-in-Chief, Roads and Bridges.

Assistant-Engineer.

Mr. Adams for estimate.—R.H., 23/6/90. I find that there are 4 miles of road which should be formed, metalled, drained, &c. This will cost £421 per mile = £1,684. Only a small portion of this could fairly be taken from "Millthorpe to Lewis Ponds" Vote. It might therefore be advisable to place this road on schedule next year.—J.H.A., 4/7/90. The Assistant Engineer, B.C.

Mr. Adams estimates the amount required at £1,684 (?) a sum which, of course, cannot be charged in the manner he suggests. Will he say if this construction can, in his opinion, stand over until next year? —E.A.N., 5/7/90. Mr. J. H. Adams, B.C.

Yes. The work can stand over until next year.—J.H.A., 6/7/90. The Assistant Engineer, B.C., —I think some provision may be made for next year.—E.A.N., 7/7/90. The Commissioner, B.C. Recommended to stand over till next year.—R.H., 8/7/90. Under Secretary. Submitted.—J.B., 9/7/90. Approved.—B.S., 10/7/90. Inform.—J.B., 14/7/90. T. Dalton, Esq., M.P., 14/7/90.

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The Under Secretary for Public Works to T. Dalton, Esq., M.P.

Sir,

14 July, 1890.

Referring to the petition presented by you from certain residents of Millthorpe requesting a grant for the repair of the road from that place to Lucknow, *via* Spring Hill, I am directed by the Secretary for Public Works to inform you that the consideration of this matter must stand over until next year.

I have, &c.,

J. BARLING.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

## ROADS.

(RETURN SHOWING AMOUNTS VOTED AND EXPENDED ON—TUENA TO BINDA, BINDA TO PEELWOOD, &c.)

*Ordered by the Legislative Assembly to be printed, 29 July, 1890.*

[Laid upon the Table in answer to Question No. 7, on the 29th July, 1890.]

## Question.

7. MR. BALL asked THE SECRETARY FOR PUBLIC WORKS.—What money has been voted and expended on the following roads for the years 1888 and 1889 :—Road from Tuena to Binda, *via* Junction Point; road Peelwood to Binda; road Laggan to Binda; road Binda to Wheeo; road Binda to Crookwell; road Wheeo to Old Man Ganyah Creek, on road from Goulburn to Burrowa; road Laggan to Taralga?

## Answer.

Road from Tuena to Binda, *via* Junction Point :—

Vote for 1888, £160; expenditure, £159 2s. 3d. Vote for 1889, £160; expenditure, £124 12s.

Road Binda to Peelwood :—

Vote for 1888, £112; expenditure, £79 4s. 6d. Vote for 1889, £112; expenditure, £58 17s. 6d.

Road Laggan to Binda :—

Vote for 1888, £130; expenditure, £105 19s. Vote for 1889, £130; expenditure, £154 1s.

Road Wheeo to Binda :—

Vote for 1888, £180; expenditure, £180. Vote for 1889, £180; expenditure, £175 7s.

Road Crookwell to Binda :—

In the year 1888 this road was included in the vote "Goulburn, *via* Crookwell, to Binda," of which £1,550 was given to the Crookwell District, *viz.* Mount Wayo, *via* Crookwell, to Binda, and the expenditure on the Crookwell to Binda portion was £499 1s. 9d. Vote for 1889, £350; expenditure, £350.

Road Wheeo to Old Man Ganyah (portion of the road from Wheeo to Burrowa) :—

Vote for 1888, £150; expenditure, £147 6s. Vote for 1889, £150; expenditure, £144 17s.

Road Laggan to Taralga :—

In 1888 and 1889 this formed portion of the road Gullen, *via* Crookwell and Laggan, to Taralga, with vote of £850; the principal expenditure being between Crookwell and Laggan. Amount spent between Laggan and Taralga—1888, £99 2s.; 1889, £114 6s. 6d.



1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

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## ROAD BETWEEN NARRABRI AND THE QUEENSLAND BORDER.

(PETITION FROM CERTAIN RESIDENTS OF THE TERRITORY BETWEEN NARRABRI AND THE QUEENSLAND BORDER.

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*Received by the Legislative Assembly, 20 November, 1890.*

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To the Honorable Members of the Legislative Assembly of New South Wales, in Parliament assembled.

The Petition of the undersigned, residents of or interested in that portion of the territory of the Colony lying between the Town of Narrabri and the Queensland Border, about and beyond Angledool,—

HUMBLY SHOWETH :—

That the said Territory contains some of the best land in New South Wales ; that said land is being rapidly and extensively taken up and used under the various provisions of the Crown Lands Act ; that numerous and large consequences are involved (greater, we believe, than obtain in regard to most other routes or roads in the north-west), in the direct line of road or route starting at Narrabri, ending at the Border beyond Angledool, *via* Bulcarrol, Nowli, Bulyeroi, Colletudla, Merriwinebone, Pockataroo Old Station, Collarendabri, the 60-mile track on to Angledool, and, may be, Currawdinghi, covering some 160 or may be more miles ; that for lack of some rough but substantial bridges, culverts, embankments, drainage, water provision or storage, and sundry other reasonable works, a large and valuable portion of the Colony is periodically shut off from supplies as well as from civilization for months together ; or an immense traffic in stock, wool, and sundries has to go round some scores of miles to obtain water, which no doubt can be stored or obtained ; that these conditions involve immense losses to the State, and to the individuals, rendering steady permanent industry all but impossible ; that certain teams laden with wool from the Border stations have not yet (31st August) reached their natural output (the nearest railway station), although they have been *en route* since January ; that, in consequence, the lessces or owners of those stations purpose sending (it is reported to your Petitioners) their future fleeco to the seaboard, *via* the sister Colony ; that Her Majesty's mails have kept no time at all during the year ; that supplies for stations, townships, or families have been all the present year trying to reach their destination, which should have been accomplished in two or three weeks ; that thirty or more teams in batches of that number are periodically delayed several months, especially at the Thalaba, and thence to Collarendabri, or at other watercourses that could be easily made crossable at reasonable times.

Your Petitioners therefore pray your Honorable House to order that the abovementioned line of road be classified forthwith as a second-class road, and that the various works required to make it usable at all reasonable times be done without unnecessary delay.

And your Petitioners will ever pray.

[*Here follow 241 signatures.*]

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1890.

## LEGISLATIVE ASSEMBLY.

## NEW SOUTH WALES.

RESUMPTION OF MOLESWORTH-STREET, LISMORE.  
(PAPERS IN CONNECTION WITH.)*Ordered by the Legislative Assembly to be printed, 29 July, 1890.*

RETURN to an *Order* made by the Honorable the Legislative Assembly of New South Wales, dated 10th June, 1890, That there be laid upon the Table of this House,—

“Copies of all papers, &c., in connection with resumption of Molesworth-street, Lismore.”

*(Mr. Ewing.)*

## SCHEDULE.

No.	PAGE.
1. The Mayor of Lismore to the Surveyor-General, with minutes and enclosure. 27 June, 1879 . . . . .	2
2. The Council Clerk, Lismore, to the Under Secretary for Mines, with minute. 28 June, 1879 . . . . .	2
3. The same to the same, with minutes. 5 September, 1879 . . . . .	3
4. Office memorandum, with minutes. 23 September, 1879 . . . . .	3
5. District-Surveyor Donaldson to the Surveyor-General, with minutes. 25 September, 1879 . . . . .	3
6. J. P. Landers to District-Surveyor Donaldson, with minute. 29 September, 1879 . . . . .	3
7. District-Surveyor Donaldson to the Surveyor-General. 29 September, 1879 . . . . .	3
8. Licensed-Surveyor Ewing to the Surveyor-General, with minute and enclosure. 30 October, 1880 . . . . .	4
9. Office memorandum, with minutes. 31 October, 1881 . . . . .	4
10. The same, with minutes. 27 September, 1882 . . . . .	5
11. The Surveyor-General to the Under Secretary for Mines, with minutes and enclosure. 5 April, 1883 . . . . .	5
12. Executive Council Minute, with minutes. 12 April, 1883 . . . . .	6
13. Gazette Notice, with enclosure. 20 May, 1883 . . . . .	6
14. The Bench of Magistrates, Lismore, to the Under Secretary for Mines. 30 May, 1883 . . . . .	7
15. The Clerk of Petty Sessions, Lismore, to the same. 4 July, 1883 . . . . .	7
16. The Clerk of the Executive Council to the Under Secretary for Mines, with minutes. 19 July, 1883 . . . . .	7
17. Executive Council Minute, with minute and enclosure. 12 October, 1883 . . . . .	8
18. John Currie to the Secretary for Mines. 23 October, 1883 . . . . .	8
19. District-Surveyor Donaldson to Surveyor-General, with minutes and enclosures. 26 October, 1883 . . . . .	9
20. The Under Secretary for Mines to the Surveyor-General, with enclosure. 17 December, 1883 . . . . .	10
21. Extract from Minute Book of the Lismore Borough Council, with minutes. About February, 1884 . . . . .	10
22. The Surveyor-General to the Under Secretary for Mines, with minutes. 12 February, 1884 . . . . .	11
23. The Under Secretary for Mines to S. W. Gray, Esq., M.P. 19 February, 1884 . . . . .	11
24. John Currie to the Secretary for Mines, with minutes. 11 March, 1884 . . . . .	11
25. District-Surveyor Donaldson to the Surveyor-General. 14 May, 1884 . . . . .	12
26. E. W. Allingham to the Under Secretary for Mines, with minutes and enclosures. 20 May, 1884 . . . . .	12
27. Office Memorandum (Mines), with minutes. 29 July, 1884 . . . . .	13
28. The Under Secretary for Mines to Samuel W. Gray, Esq., M.P. 10 September, 1884 . . . . .	13
29. The Mayor of Lismore to the Secretary for Mines, with minutes. 11 September, 1884 . . . . .	13
30. The Surveyor-General to the same, with minutes. 13 September, 1884 . . . . .	14
31. The Under Secretary for Mines to the Mayor of Lismore, with enclosure. 17 September, 1884 . . . . .	14
32. Executive Council Minute, with minutes. 19 September, 1884 . . . . .	14
33. District-Surveyor Donaldson to the Surveyor-General. 21 September, 1884 . . . . .	14
34. Memorandum by the Secretary for Mines, with minutes. 29 September, 1884 . . . . .	15
35. The Surveyor-General to the Secretary for Mines, with minutes. 10 October, 1884 . . . . .	15
36. The Under Secretary for Mines to Samuel W. Gray, Esq., M.P., with enclosure. 14 November, 1884 . . . . .	15
37. The same to the Council Clerk at Lismore. 17 November, 1884 . . . . .	15
38. The Mayor of Lismore to the Under Secretary for Mines, with minutes and enclosures. 12 December, 1884 . . . . .	16
39. The Surveyor-General to the Under Secretary for Mines, with minutes. 18 February, 1885 . . . . .	16
40. The Under Secretary for Mines to the Mayor of Lismore, with enclosure. 25 February, 1885 . . . . .	16
41. The Mayor of Lismore to the Under Secretary for Mines, with minutes. 29 May, 1885 . . . . .	17
42. Thos. Ewing, Esq., M.P., to the Secretary for Mines, with minutes and enclosure. 12 December, 1885 . . . . .	17
43. Thos. Ewing, Esq., M.P., with minutes and enclosure. 19 December, 1885 . . . . .	17
44. The Under Secretary for Mines to Thomas T. Ewing, Esq., M.P. 16 January, 1886 . . . . .	18
45. The same to the same. 23 February, 1886 . . . . .	18
46. The Mayor of Lismore to the Under Secretary for Mines. 9 April, 1886 . . . . .	18
47. Thomas Ewing, Esq., and P. Hogan, Esq., Ms.P., to the Secretary for Mines, with minutes and enclosures. 12 April, 1886 . . . . .	18
48. The Under Secretary for Mines to Thomas T. Ewing, Esq., and P. Hogan, Esq., Ms.P. 19 April, 1886 . . . . .	19
49. Office memorandum with minutes. 27 April, 1886 . . . . .	19
50. District-Surveyor Donaldson to the Surveyor-General, with minutes and enclosure. 31 May, 1886 . . . . .	19
51. John Currie to the Secretary for Mines, with minutes. 1 June, 1886 . . . . .	20
52. District-Surveyor Donaldson to the Surveyor-General, with minutes and enclosures. 16 September, 1886 . . . . .	20
53. The Under Secretary for Mines to Thomas T. Ewing Esq., and P. Hogan, Esq., Ms.P. 22 December, 1886 . . . . .	22

468—A

[870 copies—Approximate cost of printing (labour and material), £51 10s. 10d.]

No.	PAGE.
54. Thomas Ewing, Esq., M.P., to the Under Secretary for Mines, with minutes. 13 January, 1887.....	22
55. The Under Secretary for Mines to Thomas T. Ewing, Esq., M.P. 12 February, 1887.....	22
56. Thomas Ewing, Esq., M.P., to the Under Secretary for Mines, with minutes and enclosure. 19 March, 1887 ...	22
57. The Mayor of Lismore to the Secretary for Mines, with minutes. 26 June, 1887.....	23
58. Thomas Ewing, Esq., and F. G. Crouch, Esq., Ms.P., presenting Petition. 12 August, 1887.....	23
59. The same presenting Petition, with minute and enclosure. 18 August, 1887.....	23
60. A. F. Parker, M.D., to the Secretary for Mines, with minutes. 7 October, 1887.....	24
61. The same to the Secretary for Lands. 7 October, 1887.....	24
62. Thomas Ewing, Esq., and F. G. Crouch, Esq., Ms.P., to the Under Secretary for Mines, with minutes and enclosure. 12 October, 1887.....	24
63. A. F. Parker, M.D., to the Under Secretary for Lands, with minutes. 23 October, 1887.....	24
64. The Acting Surveyor-General to the Under Secretary for Lands, with minutes. 5 November, 1887.....	25
65. The Under Secretary for Lands to A. F. Parker, M.D. 8 November, 1887.....	25
66. The same to T. T. Ewing, Esq., and F. G. Crouch, Esq., Ms.P. 8 November, 1888.....	25
67. Thos. Ewing, Esq., M.P., to the Under Secretary for Lands, with minutes. 12 November, 1887.....	25
68. The Under Secretary for Lands to Thos. T. Ewing, Esq., M.P. 21 November, 1887.....	26
69. The Acting Surveyor-General to the Under Secretary for Lands, with minutes. 6 December, 1887.....	26
70. The Under Secretary for Lands to T. T. Ewing, Esq., M.P., with enclosure. 23 December, 1887.....	26
71. Thos. Ewing, Esq., M.P., to the Secretary for Lands, with minutes and enclosures. 3 January, 1888.....	27
72. The Council Clerk, Lismore, to the Secretary for Mines, with minutes. 21 September, 1888.....	28
73. The Surveyor-General to the Under Secretary for Lands, with minutes. 4 October, 1888.....	29
74. Thos. Ewing, Esq., M.P., to the Under Secretary for Lands, with minutes. 9 October, 1888.....	29
75. The same to the Secretary for Lands, with minute. 11 October, 1888.....	29
76. The Under Secretary for Lands to the Council Clerk, Lismore. 12 October, 1888.....	29
77. The Council Clerk, Lismore, to the Secretary for Lands, with minutes. 23 November, 1888.....	30
78. C. A. Barham to the same, with minutes. 11 January, 1889.....	30
79. The Under Secretary for Lands to Mr. C. A. Barham. 5 February, 1889.....	31
80. The Acting Surveyor-General to the Under Secretary for Lands, with minutes. 1 March, 1889.....	31
81. Synopsis of Molesworth-street, Lismore, case, with enclosure. 16 March, 1889.....	31
82. Thos. Ewing, Esq., M.P., to the Secretary for Lands, with minute. 6 April, 1889.....	33
83. Memorandum by the Under Secretary for Lands, with minutes. 8 April, 1889.....	33
84. District-Surveyor Donaldson to the Surveyor-General, with minutes. 12 June, 1889.....	33
85. The Under Secretary for Lands to T. T. Ewing, Esq., M.P. 9 July, 1889.....	34
86. Thos. Ewing, Esq., M.P., to the Secretary for Lands, with minutes. 13 July, 1889.....	34
87. The same to the Secretary for Lands, with minutes. 23 May, 1890.....	34
88. The Under Secretary for Lands to T. T. Ewing, Esq., M.P. 29 May, 1890.....	34
89. A. F. Parker, M.D., to the Under Secretary for Lands. 12 June, 1890.....	34

## No. 1.

## The Mayor of Lismore to The Surveyor-General.

Sir,

Council Chambers, Lismore, 27 June, 1879.

I have the honor to enclose herewith copy of a motion passed at the last meeting of the Municipal Council of Lismore, requesting that you will be good enough to give the necessary instructions for the setting out of the foot and carriage ways of the Township of Lismore, in pursuance of the Acts 2 Victoria No. 2, and 19 Victoria No. 10.

2. Perhaps it is unnecessary to intimate to you that application has been made twice before this for the alignment of the streets of the Township of Lismore—once before and once since it has been proclaimed a Municipality—and I would further beg to add that several police cases have had to be abandoned in consequence of not being able to prove legally the boundary lines of the streets. The alignment of the streets are further urgently required to enable the Municipal Council to proceed with Municipal provisions for the prevention of epidemic and infectious diseases, which have often been a serious cause of alarm in this locality during the summer months.

I therefore trust the matter will receive early attention.

I have, &amp;c.,

JAMES STOCKS.

Mayor.

In the first instance, it is recommended that the information customarily furnished to new Municipalities be supplied to the Lismore Council, and they be asked to comply with the circular letters relative to particularizing those streets they propose to form or expend money upon, and to provide alignment posts and cost of erecting them under the supervision of the surveyor.—ROBT. D. FITZGERALD (for Surveyor-General), 10th July, 1879.

Inform.—H.W., 15/7/79. The Council Clerk, Lismore, informed, 16th July, 1879. Await reply, 16.

[Enclosure.]

ALDERMAN ALLINGHAM moved, and Alderman Coleman seconded, "That His Worship the Mayor apply to the Surveyor-General, requesting that he or his deputy set out the breadth of the carriage and foot ways of the Township of Lismore, and to mark the footways by posts wherever necessary, in pursuance of the Acts 2 Victoria No. 2, and 19 Victoria No. 10." Carried unanimously.  
Wm. CARSON,  
Acting Town Clerk.

## No. 2.

## The Council Clerk, Lismore, to The Under Secretary for Mines.

Sir,

Council Chambers, Lismore, 28 July, 1879.

I beg to acknowledge receipt of your letter of the 16th instant, together with circulars, dated respectively 1st February, 1878, and 14th September, 1876, conveying instructions of your Department as to the alignment of the streets of this municipality, and in reply thereto, beg to state as follows:—The necessary posts will be immediately provided, size 9 in. x 9 in., squared above ground, and to be sunk 2 ft. 6 in. Will you be good enough to let me know if the size of the posts herein described is in accordance with the requirements. Should no reply be received, the Council will take the necessary steps to have them prepared at once ready for the surveyor, whose arrival is anxiously anticipated by the Council.

I have, &amp;c.,

WM. OSBORNE HARMAND,

Council Clerk.

The Surveyor-General.—G.E.H. (for U.S.), B.C., 6/8/79.

No. 3.

## No. 3.

The Council Clerk, Lismore, to The Under Secretary for Mines.

Sir,

Council Chambers, Lismore, 5 September, 1879.

I do myself the honor to call your attention to a letter of His Worship the Mayor of Lismore to the Surveyor-General, dated 27th June, and your reply thereto dated 16th July (Roads No. 79-2,339), respecting the alignment of streets in the township of Lismore, and to which letter, by the direction of His Worship the Mayor, I replied on 28th July, stating that your instructions as to alignment posts would be complied with immediately, and pressing upon you the necessity of early attention to the matter. To this communication no reply has been received, and I am instructed again to request your attention to this matter, as serious inconveniences are already arising from the inability of the Council to carry out the provisions of Municipalities and Towns Police Act until the streets shall be aligned.

Will you have the goodness to say,—first, whether you approve of the dimensions of the sizes of alignment posts submitted to you? Second: How soon may the Council expect the alignment to be made?

I have, &amp;c.,

WM. OSBORNE HARMAND,  
Council Clerk.

Surveyor-General.—G.E.H. (for U.S.), B.C., 12/9/79.

It is recommended that the Borough Council of Lismore be informed that the dimensions of the alignment posts they propose to erect referred to in a previous letter, namely—9 in. x 9 in., squared above ground, to be sunk 2 ft. 6 in. in the ground, are considered satisfactory, although 3 ft. in the ground would be better; also, that Mr. Surveyor Ewing has this day been instructed to make the necessary survey of the streets needing alignment, and he will proceed to Lismore for the purpose so soon as his other professional duties will permit.—ROBT. D. FITZGERALD (for Surveyor-General), 4th October, 1879.

Inform.—G.E.H. (for U.S.), 9/10/79. The Council Clerk, Lismore, informed 9th October, 1879.

## No. 4.

Office Memorandum.

23 September, 1879.

FURTHER application having been made relative to alignment of Lismore, *vide* Roads 79-3,332, will the Surveyor-General be good enough to say if he has determined on the appointment of a surveyor for the duty?

I have &amp;c.,

A. J. STOPPS.

Telegraph Mr. Donaldson. Alignment of Lismore urged. Shall I send a surveyor? How long will it take him?—P.F.A., 25. Telegram sent, 25 September, 1879.

Mr. Surveyor Ewing is requested to survey for alignment such streets within the municipality of Lismore as the Council propose to form or to expend money upon, and to superintend the erection of thoroughly substantial alignment posts, to be supplied by the municipality, as also must be the necessary labour to erect them. The attention of Mr. Surveyor Ewing is drawn most particularly to the sheet of general instructions accompanying this, and also the two sheets of diagrams, a careful compliance with which is strictly enjoined.—ROBT. D. FITZGERALD (for Surveyor-General), 4th October, 1879. No. 8.

Replied to by letter of 30th October, 1880. No. 80/94.—THOS. T. EWING.

## No. 5.

Telegram from Mr. District-Surveyor Donaldson to The Surveyor-General.

ALIGNMENT of Lismore. I do not think it is necessary to send up a surveyor. I can spare one in a fortnight, and the work will take about another fortnight.

P. R. DONALDSON,

District Surveyor.

Roads Branch, 26 September.—P.F.A.

Reply noted. Surveyor-General.—Should not Mr. Donaldson be asked to name the surveyor he proposes to employ in order that explicit instruction should issue to him? A fortnight appears to me inadequate for the work.—A.J.S., 25/9/79.

Yes; by telegraph.—P.F.A., 29/9/79. Mr. Landers.—A.J.S., 29/9/79. Telegram sent.—P.E.E., 29/9/79.

## No. 6.

Telegram from Mr. J. F. Landers to Mr. District-Surveyor Donaldson.

Sydney, 29 September, 1879.

PLEASE give the name of the surveyor you propose to employ in alignment of Lismore.

J. F. LANDERS.

I propose to employ Mr. Ewing on alignment, Lismore.—P.R.D., 29/9/79.

## No. 7.

Telegram from Mr. District-Surveyor Donaldson to The Surveyor-General.

Grafton, 29 September, 1879.

I PROPOSE to employ Mr. Ewing on alignment, Lismore.

P. R. DONALDSON,  
District-Surveyor.

No. 8.

## No. 8.

Mr. Licensed-Surveyor Ewing to The Surveyor-General.

Sir,

Lismore, 30 October, 1880.

I have the honor herewith to transmit plan of streets in the Town of Lismore, proposed to be aligned under Act of Council 2 Victoria No. 2, surveyed in accordance with instructions of 4 October, No. 79-8.

The alignment posts are erected as shown. The Council have now all the streets aligned that they intend improving for some considerable time.

From plan it will be seen that Molesworth-street (though supposed to be so surveyed originally) is not on a continuous bearing. To produce the most suitable building line from the southern end of the town would not only make the road impassable near and at the foot of Zadoc-street, but would also go well into the roadway between Zadoc and Orion Streets, thus interfering with building line in the western side of street; while to adopt the most suitable bearing from northern end of Molesworth-street, and carry it through would so interfere with holdings in the most valuable part of the town that the alignment would be protested against and not be accepted. Boundaries are very little interfered with. A few fences encroach a little, and a wooden building of not a substantial nature in Zadoc-street.

The northern side of Wilson-street is all dense brush; there is nothing to guide to be found. Posts would be valueless till the brush is cleared.

I have, &amp;c.,

THOS. T. EWING.

Roll plan and field-book, Roads 79-3636 and plan herewith.—G.W.

## No. 9.

## Office Memorandum.

MEMORANDUM of subjects requiring explanation or completion in connection with survey and plan of alignment of Lismore, parish of Lismore, county of Ross, transmitted by Mr. Licensed-Surveyor Ewing, letter No. 80-24 of 30th October, 1880, on which Mr. Ewing's report in explanation is requested.

Subject.	Report.
1. Whether pegs have been placed at the intersection of Conway and Dawson Streets, and if Conway-street from Keen-street to Dawson-street has been aligned, no notes being given on field-book.	1. Yes; they should be shown on plan. Yes; there are no improvements to show.
2. Why building lines are in some instances shown by broken red lines.	2. This is unintentional. The lines should be firm.
3. Section 34 does not close by 4.1 links and 4.9 links; section 6 by 1.4 and 1.5; section 5 by 1.8 links and 1.8 links.	3. I have investigated the matter and herewith subjoin lengths and bearings of these sections; these are shown wrongly on plan doubtless:— Section 34.—111° 30' 631, 78° 44 $\frac{1}{2}$ , 348° 10' 00, 258° 5' 41, 201° 30' 782. Close—N 1070 7, E 1023 7. S 1070 9, W 1023 4. Section 6.—111° 09' 1010 $\frac{1}{2}$ , 201° 30' 1206, 291° 09' 1007 $\frac{1}{2}$ , 21° 19' 1206. Close—N 1486 7, E 1381 1. S 1486 6, W 1381 3. Section 5.—111° 30' 1000, 201° 30' 1006, 291° 09' 1011, 22° 08' 1012. N 1302, E 1311 5. S 1302, W 1311 4.
4. In Zadoc-street a building is shown on plan as encroaching, but in field-book it is within the building line.	4. An offset is shown from traverse line (which is outside building line) to building the building encroaches.
5. Whether pegs have been placed at intersection of Keen and Bounty Streets.	5. On the western side of Keen-street they should be shown on plan.
6. Whether house encroaches on Orion-street as stated in schedule and shown on field-book, the plan not showing such encroachment.	6. This is erroneously shown in schedule. There is no house encroachment on Orion-street; the field-book does not show it.
7. Has the Northern side of Orion-street, between Keen-street and Richmond River, been aligned, no length being given on plan or on field-book.	7. There are no improvements thereon; any pegs put in would be over bank of river. The southern side of street is well defined by posts at intersection of Keen and Orion Streets, Orion and Molesworth Streets, and lane through section 4.
8. Meridian lines at regular distances should have been shown on plan.	8. Will put them on in future.

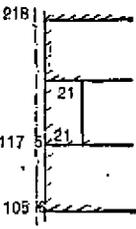
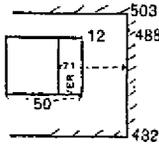
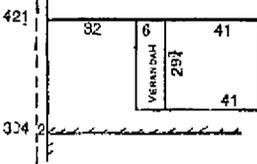
A. J. STOPPS  
(for Surveyor-General), 31/10/81.

THOS. T. EWING, 13/4/82.

No. 10.

Office Memorandum.

MEMORANDUM of subjects requiring explanation or completion in connection with the survey and plan of Lismore, parish of Lismore, county of Ross, transmitted by Mr. Surveyor Ewing, letter No. 91, of 30th October, 1880, and on which Mr. Ewing's report in explanation is requested.

Subject.	Report.
FIELD-BOOK.—Page 11. No distance on chain line for offset given to southern corner of building described as "Commercial School."	 <p>The distance on chain line is 140 links.</p>
Page 13. No offset given to south-eastern corner of building as "Private Cottage."	 <p>Offset 12 links.</p>
Page 13. A building described as "Chronicle Office," not shown on plan. The length of this building, facing the road, is given as 29½, but as it is situated between 394 and 421 on the chain line.—Can it be plotted between these distances?	 <p>This building may be plotted between 394 and 421; at time of survey it was very dilapidated—it has been now removed altogether—it was scarcely worth showing.</p>
In several instances it is not stated of what material the houses are composed—whether of brick, stone, or wood, which should always be done.	All buildings are wood unless otherwise stated.
A. J. STOPPS (For Surveyor-General), Folio 208, No. 12. 27th September, 1882.	T. T. EWING, 20/11/82.

No. 11.

The Surveyor-General to The Under Secretary for Mines.

THE accompanying plan and book of reference of the streets, as per margin, in the Municipality of Lismore are forwarded with the view to the proclamation of the streets under the Act of Council, 4 William IV., No. 11, previous to their alignment in accordance with Act of Council, 2 Victoria No. 2.

B.C., 5 April, 1883.

A. J. STOPPS  
(For the Surveyor-General).

Catalogue No. L.I. 2263 herewith. Tracing ready for the Bench of Magistrates at Lismore. Streets referred to—Bounty, Cathcart, Conway, and other streets as per Book of Reference.

Submitted.—G.E.H. (for U.S.), 10/4/83. 12/4/83.

Approved.—J. P. ABBOTT, 11/4/83.

Minute.

[Enclosure.]

## [Enclosure.]

Book of Reference of Streets in the Municipality of Lismore, County of Ross, proposed to be aligned under Act of Council 2nd Victoria No. 2, after having been confirmed under the Act of Council, 4 William IV, No. 11.

Portion of Road.	Bearings.	Length in Chain.	Breadth of Road.	Area.	Remarks.
RESERVED ROADWAY.					
1. Bounty-street, from Molesworth-street to Keen-street (north side only).	S.E.	10'00	12 ft. (footway only)	a. r. p. 0 0 29	Fence obstruction.
2. Cathcart-street, from Leycester-street to Wilson-street (west side only).	N.W.	10'00	12 ft. „ „	0 0 29	
3. Conway-street, from Richmond River to Dawson-street.	S.E.	29'13 (max.)	99 ft.....	4 1 14	
4. Dawson-street, from south side of Conway-street to Orion-street (west side only).	N.E.	48'06	12 ft. (footway only)	0 3 20	
5. Dawson-street, from Leycester-street to Wilson-street.	N.W.	10'00	99 ft.....	1 2 0	
6. Keen-street, from Bounty-street to Wilson-street.	N.E.	67'44 (max.)	99 ft.....	10 0 7	Fence encroachment.
7. Leycester-street, from Orion-street to Cathcart-street (north side only).	N.E.	13'95	12 ft. (footway only)	0 1 0	
8. Magellan-street, from Richmond River to Dawson-street.	S.E.	27'90 (max.)	99 ft.....	4 0 27	
9. Molesworth-street, from Ballina-street to Orion-street.	N.E.	62'98 (min.)	26 ft. 4 in. to 105 ft. 3 in.	8 1 0	Fence obstruction and encroachment.
10. Orion-street, from Wilson's Creek to Dawson-street.	S.E.	23'01 (max.)	86 ft. to 99 ft.....	3 1 32	Fence encroachment.
11. Wilson-street, from Wilson's Creek to Cathcart-street (south side only).	N.E.	19'90	12 ft. (footway only)	1 0 18	
12. Woodlark-street, from Wilson's Creek to Dawson-street.	S.E.	30'10½ (max.)	99 ft.....	4 1 20	
13. Zadoc-street, from Molesworth-street to Dawson-street.	S.E.	21'50	99 ft.....	3 0 36	Fence encroachment and house encroachment.

## No. 12.

## Executive Council Minute.

## PRELIMINARY NOTIFICATION OF STREETS, MUNICIPALITY OF LISMORE

Department of Mines, Sydney, 12 April, 1883.

THE authority of His Excellency the Governor and the Executive Council is sought for the opening of the undermentioned lines of streets, as shown by the accompanying plan and book of reference, in accordance with the provisions of the Act 4th Wm. IV, No 11, previous to alignment, in accordance with Act of Council 2 Victoria No. 2 :—

1. Bounty-street, from Molesworth-street to Keen-street (north side only).
2. Cathcart-street, from Leycester-street to Wilson-street (west side only).
3. Conway-street, from Richmond River to Dawson-street.
4. Dawson-street, from south side of Conway-street to Orion-street (west side only).
5. Dawson-street, from Leycester-street to Wilson-street.
6. Keen-street, from Bounty-street to Wilson-street.
7. Leycester-street, from Orion-street to Cathcart-street (north side only).
8. Magellan-street, from Richmond River to Dawson-street.
9. Molesworth-street, from Ballina-street to Orion-street.
10. Orion-street, from Wilson's Creek to Dawson-street.
11. Wilson-street, from Wilson's Creek to Cathcart-street (south side only).
12. Woodlark-street, from Wilson's Creek to Dawson-street.
13. Zadoc-street, from Molesworth-street to Dawson-street.

J. P. ABBOTT.

The Executive Council advised that the intended formation of the streets referred to be notified in the manner prescribed by the Act 4th Wm. IV, No. 11.—ALEX. C. BUDGE, Clerk of the Council. Min., 83/15, 14/4/83. Confirmed, 25/4/83. Approved.—A.L., 14/4/83. Bench Lismore forwarded plans, &c., 23 May, 83. Notified, 29th May, 83. Folio 2958. C. X. C., 30th May, 83. Advertised, 31/5/83. In a month, 31/5/83.

## No. 13.

## Gazette Notice.

## PRELIMINARY NOTIFICATION OF STREETS IN THE MUNICIPALITY OF LISMORE.

Department of Mines, Sydney, 29 May, 1883.

HIS Excellency the Governor, with the advice of the Executive Council, having deemed it expedient to open and make the several streets mentioned in the Schedule appended hereto: Notice is hereby given that in accordance with the provisions of the Act 4th William IV, No. 11, plans and books of reference showing the intended lines of the streets in question are now deposited at the office of the Surveyor-General in Sydney, and at the Police Office mentioned.

It is requested that any well-grounded objections that may exist to the formation of the streets in question may be transmitted in writing to the Clerk of the Executive Council within one month from this date.

By His Excellency's command,  
JOSEPH P. ABBOTT.

[Enclosure.]

[Enclosure.]

SCHEDULE referred to.

Roads No.	Description of Streets.	Names of reputed owners or occupiers through whose properties the streets pass.	Police Office at which the Plan and Book of Reference has been lodged.
83.1661. 82.159.1. S.G. L. 1.2263.	1. Bounty-street, from Molesworth-street to Keen-street (north side only) ..... 2. Cathcart-street, from Leycester-street to Wilson-street (west side only)..... 3. Conway-street, from Richmond River to Dawson-street ..... 4. Dawson-street, from south side of Conway-street to Orion-street (west side only) 5. Dawson-street, from Leycester-street to Wilson-street ..... 6. Keen-street, from Bounty-street to Wilson-street ..... 7. Leycester-street, from Orion-street to Cathcart-street (north side only) ..... 8. Magellan-street, from Richmond River to Dawson-street ..... 9. Molesworth-street, from Ballina-street to Orion-street ..... 10. Orion-street, from Wilson's Creek to Dawson-street..... 11. Wilson-street, from Wilson's Creek to Cathcart-street (south side only)..... 12. Woodlark-street, from Wilson's Creek to Dawson-street..... 13. Zadoc-street, from Molesworth-street to Dawson-street .....	Reserved Roadways.	Lismore.

## No. 14.

The Bench of Magistrates, Lismore, to The Under Secretary for Mines.

Lismore, 30 May, 1883.

THE plan and book of reference, as per number in margin, and description, have been duly received for exhibition as required by law. Mines,  
No. 83-1,661.

## Description of Streets.

1. Bounty-street, from Molesworth-street to Keen-street (north side only).
2. Cathcart-street, from Leycester-street to Wilson-street (west side only).
3. Conway-street, from Richmond River to Dawson-street.
4. Dawson-street, from south side of Conway-street to Orion-street (west side only), and nine other streets in Municipality of Lismore.

H. WOORE, P.M.  
(For the Bench).

## No. 15.

The Clerk of Petty Sessions, Lismore, to The Under Secretary for Mines.

Lismore, 4 July, 1883.

THE plan and book of reference, as per number in margin, and description, have been duly exhibited for thirty days, as required by law. Mines,  
No. 83-1,661.

## Description of Streets.

1. Bounty-street, from Molesworth-street to Keen-street (north side only).
2. Cathcart-street, from Leycester-street to Wilson-street (west side only).
3. Conway-street, from Richmond River to Dawson-street.
4. Dawson-street, from south side of Conway-street to Orion-street (west side only), and nine other streets in Municipality of Lismore.

WM. CARSON, C.P.S.  
(For the Bench).

## No. 16.

The Clerk of the Executive Council to The Under Secretary for Mines.

Sir,

Executive Council Office, 19 July, 1883.

Referring to your letter of the 30th May, I do myself the honor to inform you that no objection has been lodged with me to the formation of the proposed streets noted in the margin.

I have, &amp;c.,

ALEX. C. BUDGE,  
Clerk of the Council.

Bounty and  
twelve other  
streets, Municipality of  
Lismore.

The Surveyor-General.—G.E.H., (for U.S.), B.C., 24/7/83. Confirmation of these streets is now recommended.—A. J. STOPPS (for Surveyor-General), 2/10/83. Submitted.—G.E.H. (for U.S.), 5/10/83. Approved.—J. P. ABBOTT, 11/10/83. Minute, 12/10/83.

No. 17.

## No. 17.

## Executive Council Minute.

## Confirmation of Streets, Municipality of Lismore.

Department of Mines, Sydney, 12 October, 1883.

It is recommended, for the approval of His Excellency the Governor and the Executive Council, that the undermentioned lines of streets, which have been duly advertised in the *Government Gazette*, be now confirmed, in accordance with the provisions of the 4th Wm. IV, No. 11, previous to alignment, in accordance with Act of Council 2 Victoria No. 2, viz. —

1. Bounty-street, from Molesworth-street to Keen-street (north side only).
2. Cathcart-street, from Leycester-street to Wilson-street (west side only).
3. Conway-street, from Richmond River to Dawson-street.
4. Dawson-street, from south side of Conway-street to Orion-street (west side only).
5. Dawson-street, from Leycester-street to Wilson-street.
6. Keen-street, from Bounty-street to Wilson-street.
7. Leycester-street, from Orion-street to Cathcart-street (north side only).
8. Magellan-street, from Richmond River to Dawson-street.
9. Molesworth-street, from Ballina-street to Orion-street.
10. Orion-street, from Wilson's Creek to Dawson-street.
11. Wilson-street, from Wilson's Creek to Cathcart-street (south side only).
12. Woodlark-street, from Wilson's Creek to Dawson-street.
13. Zadoc street, from Molesworth-street to Dawson-street.

J. P. ABBOTT.

[Enclosure.]

Department of Mines, Sydney, 6th November, 1883.

## CONFIRMATION OF STREETS.—MUNICIPALITY OF LISMORE.

NOTICE is hereby given, in conformity with the provisions of the Act 4th William IV, No. 11, that His Excellency the Governor, with the advice of the Executive Council, has been pleased to confirm the Streets mentioned in the annexed Schedule (notwithstanding any objections that might have been urged), and it is hereby declared expedient to open and make the Streets referred to, according to the plan and book of reference to be seen at the Police Offices mentioned.

Any persons intending to claim compensation in respect of the said line are reminded that notice must be served on the Secretary for Mines within forty days from the date hereof, as provided by the 6th section of the Act above referred to, or they will be for ever foreclosed from such claim.

By His Excellency's Command,  
JOSEPH P. ABBOTT.

## SCHEDULE REFERRED TO.

Roads No.	Description of Streets.	Date of Gazette of previous Notice of intended opening of Streets	Plans, &c., lodged at the Police Office at—
83-4278 83-159-5 S. G. L. 1-2263	1. Bounty-street, from Molesworth-street to Keen-street (north side only). 2. Cathcart-street, from Leycester-street to Wilson-street (west side only). 3. Conway-street, from Richmond River to Dawson-street ..... 4. Dawson-street, from south side of Conway-street to Orion-street (west side only) ..... 5. Dawson-street, from Leycester-street to Wilson-street ..... 6. Keen-street, from Bounty-street to Wilson-street ..... 7. Leycester-street, from Orion-street to Cathcart-street (north side only)..... 8. Magellan-street, from Richmond River to Dawson-street ..... 9. Molesworth-street, from Ballina-street to Orion-street ..... 10. Orion-street, from Wilson's Creek to Dawson-street ..... 11. Wilson-street, from Wilson's Creek to Cathcart-street (south side only). 12. Woodlark-street, from Wilson's Creek to Dawson-street ..... 13. Zadoc-street, from Molesworth-street to Dawson-street .....	29 May, 1883, folio 2958.	Lismore.

The Executive Council advise that the course recommended be approved.—ALEX. C. BUDGE, Clerk of the Council. Min. 83-43, 16/10/83. Confirmed, 23/10/83. Approved.—A.L., 16/10/83. Notified, Nov., 1883, folio 6,000; advertised, 8/11/83. Resub., 17/12/83.—8/11/83. No claims; Records.—W.B., 17/12/83.

## No. 18.

## Mr. J. Currie to The Secretary for Mines.

Sir,

Lismore, Richmond River, 23 October, 1883.

I take the liberty of addressing you regarding the road in Molesworth-street, that the local Council wants the Government to resume land so as to widen said street. I beg to state that this is a river bank road. If the Government goes to the expense of resuming land now, and the Council allows heavy traffic along this road without making some provision in the shape of a retaining wall to protect the river bank, it is only a question of time until the Government will be called upon again to resume more land. This is purely a municipal work, but, unfortunately, we have a very unworkable Council, the one end of the town fighting against the other as to sites for public buildings, to further local ends, at the expense of the general taxpayers. Were it otherwise this road would have been repaired long ago, fit for traffic; or if the town was not incorporated property-holders interested would have had the road at landslip repaired long ago, as it only involved the matter of a couple of hundred pounds. A case is now pending in the Supreme Court against the Council for neglect. I thought it my duty to bring this matter under the notice of the Honorable the Minister.

I am, &amp;c.,

JOHN CURRIE.

No. 19.

## No. 19

## Mr. District-Surveyor Donaldson to The Surveyor-General.

Sir,

District Survey Office, Grafton, 26 October, 1883.

With reference to instructions of 10 July, 83-156, to report on the application of the Lismore Municipality to resume sufficient land from the adjacent allotments to give the full width to Molesworth-street where it is not that width, &c. :

I have the honor to report that the published plan of the Village of Lismore, dated 1856, shows Molesworth-street to be not only the full width, but that there is fully two chains in width between that street and the river opposite the north part of section 5 and south part of section 4.

2. From the sketch which I forward herewith it will be seen that there is no land between the street and the river at the north corner of section 5 and south part of section 4, but that there is only a width of 47 links of that part of the street at the end of Zadoc-street, and for a distance of about 6 chains no part is more than 80 links wide, and I am of opinion that the difference arises from an error in the original design of the town.

3. Until about three years ago a roadway was in existence from the principal business part of the town (which is Molesworth-street from Woodlark-street North to next street) to the wharf shown on sketch herewith, which was then the depôt of the ocean steamers, but has since in a great measure been superseded by the erection of the public wharf near the end of Magellan-street, but a landslip which took place about three years ago has rendered this roadway useless, as it has cut away the river bank up to the north-west corner of section 5, leaving a perpendicular descent of about 30 feet, and traffic is now permitted on suffrance across the corner of allotment 18 of section 5, and thence through front of allotments 1, 2, and part of 3 of section 4, as shown on sketch.

4. I am informed by Mr. Coleman, the owner of allotments 2 and 3 of section 4, that he offered to repair, pile, and guarantee the stability of the work of remaking this road when the slip took place for £150.

5. That part of Molesworth-street from Zadoc-street to corner of allotment 3 is only about 4 feet above high-water, and the ascent of Zadoc-street is too steep for wheel traffic, and could not be made practicable unless by raising the land at the water, which would be very costly, and liable to be carried away by floods.

6. The bank of Brown's Creek opposite, a part of allotment 19 of section 5, is very steep; and a fence for the protection of the persons using the road has been erected on the top of the steep bank, which leaves a width of only 31 links for the traffic, and this is further reduced in consequence of the road being on a side cutting, rendering it necessary to leave some of the land on the east side for the stability of the fence and for the slope of the cutting.

7. It will be seen from the above that as it will be necessary, if any land is resumed, that part of section 5 will be required as well as part of section 4, and that the suggestion to increase the width of the lane to a 100-link street would not meet the requirements; it would also be more expensive, as the land is higher than that in Molesworth-street, and more valuable. The Church of England would also be close on the new street boundary, and the new Government stable buildings would be on the street and required to be removed.

8. A cutting 12 feet deep has been made through the crown of the ridge in Zadoc-street and part of the lane in section 4; and the only practicable route for traffic now, without encroaching on the alienated allotments, is *via* this cutting, the lane and Orion-street, and the front of section 4. Until the slip is repaired, or resumption made, this is not only circuitous but steep on the north of section 4.

9. To resume sufficient land to make Molesworth-street the full width as applied for by the Municipal Council would, in my opinion, cause unnecessary injury to the owners of allotments 18 and 19 of section 5, by taking away so much of their land that the residue would be deteriorated in value; and as the street would have to be cut down below the level of the land left, access would be very difficult.

10. But I would submit that, if the land could be obtained at a reasonable rate, and if the proposal would meet the views of the Municipal Council, it might be desirable to resume so much of the land as is shown by red tint on the sketch herewith, which would admit of a roadway 35 feet wide at the narrowest part and a footpath on the east side of the street 8 feet wide, which would, I am of opinion, be sufficient for the traffic from this part of the town.

11. The larger depth of land to be resumed in allotments 1 and 2 of section 4 is necessary, in consequence of the land being so low on the 50 links nearest the water and steep and broken on the next 50, leaving only about 50 links of fair roadway on the highest part; but, as it is all subject to inundation, its value is less than that of the part of section 5 which is so much higher.

12. As the owners of the land which it is suggested it may be desirable to resume would be all more or less benefited by having a good street direct to the business part of the town, it would be to their interest to accept a reasonable value for the land; and I would submit whether the Municipal Council might not be invited to ascertain and furnish to the Government the amount of compensation which the several owners would be willing to accept for the land proposed to be resumed should such proposal be satisfactory to that body. The matter is one of great moment to the municipality, as the cost of reforming or reconstruction of Molesworth-street where the slip took place would be considerable.

13. The extent of the land which it is suggested may be resumed, as shown in red on sketch herewith, would be—

- (a) 2 chains to Molesworth-street, by 1 chain to Zadoc-street, of allotment 1, section 4; area, 32 perches, more or less; owner, Dr. Parker.
- (b) 2 chains to Molesworth-street, by 1 chain deep, except a small corner at north boundary of allotment 2, section 4; area, 31 perches, more or less; owner, E. Coleman.
- (c) 1 chain to Molesworth-street, by a depth of 70 at south end to *nil* at north end of allotment 3, section 4; area, 6 perches, more or less; owner, E. Coleman.
- (d) 2½ chains to Molesworth-street, by a depth of 50 links and 40 links respectively, mean depth 45 links, of allotment 18 of section 5; area, 18 perches, more or less; owner, A. Currie.
- (e) About 3 chains to Molesworth-street, by a depth of 40 links and about 15 links respectively; mean about 27½ links of allotment 19, of section 5; area, about 14 perches, more or less; owner, the Commercial Bank of Sydney.

I have, &amp;c.,

P. R. DONALDSON,

District Surveyor.

Mis. 83/8665 and sketch herewith. The Surveyor-General.

This report, in connection with your B.C. minute of 10th July last on 83/8665 Mis. enclosed, is submitted. It is to the effect that so much of allotments 1, 2, and 3 of section 4, and allotments 18 and 19 of section 5, as are shown by red tint on accompanying tracing, should if possible be resumed.—Jno. J.C., 23rd November, 1883.

This being an application for the widening of a street, it should have been sent to the Roads Branch instead of the Charting Branch. It appears to be a case which might be more readily dealt with by the Municipal Council than by the Government. Referred to Mr. Stopps.—E.T. (for the Surveyor-General), 13/12/83.

### No. 20.

#### The Under Secretary for Mines to The Surveyor-General.

Department of Mines, Sydney, 17 December, 1883.

THE period allowed by law for making claims for compensation under the provisions of the Act 4 William IV, No. 11, having elapsed in connection with Bounty and twelve other streets in the Municipality of Lismore, no claims have been received, and the papers are forwarded to the Surveyor-General for action.

GERARD E. HERRING

(For the Under Secretary).

[Enclosure.]

Executive Council Office, Sydney, 1 October, 1884.

#### ALIGNMENT OF STREETS, MUNICIPALITY OF LISMORE.

HIS Excellency the Governor, with the advice of the Executive Council, directs it to be notified, in conformity with the provisions of the Act of Council 2 Victoria No. 2, that the breadths of the carriage and foot ways of the streets herein specified in the Municipality of Lismore, shall be those set forth in the annexed Schedule; and that consequently it will not be lawful for any person to erect any building within the said distances so set forth from the curbstone or the exterior edge of the said footways as delineated on the plan submitted to His Excellency and the Executive Council, in conformity with the said Act, which said plan lies at the office of the Surveyor-General for the inspection of the public.

By His Excellency's Command,  
ALEX. C. BUDGE,  
Clerk of the Council.

#### SCHEDULE REFERRED TO.

Name of Street.	From	To	Width of Carriage way.	Width of each Footway.	Total Width.	Remarks.
Bounty-street.....	Molesworth-street ..	Keen-street .....	feet.	12 feet	feet.	Fence obstruction.
Cathcart-street .....	Leycester-street ..	Wilson-street .....	.....	(north side only)	.....	
Conway-street.....	Richmond River ...	Dawson-street .....	75	12 feet	99	
Dawson-street.....	Conway-street ...	Orion-street .....	.....	(west side only)	.....	
Dawson-street .....	Leycester-street ..	Wilson-street .....	75	12 feet	99	
Keen-street.....	Bounty-street .....	Wilson-street .....	75	12 "	99	Fence encroachment.
Leycester-street .....	Orion-street .....	Cathcart-street.....	.....	(north side only)	.....	
Magellan-street .....	Richmond River ...	Dawson-street .....	75	12 feet	99	"
Molesworth-street...	Ballina-street .....	Conway-street .....	.....	(east side only)	.....	"
Molesworth-street...	Conway-street .....	Woodlark-street ...	75	12 feet	99	"
Orion-street .....	Wilson's Creek	Dawson-street	75	12 "	99	"
	and	and				
	Molesworth-street	Leycester-street				
Wilson-street.....	Wilson's Creek ...	Cathcart-street.....	.....	(south side only)	.....	
Woodlark-street ..	Wilson's Creek.....	Dawson-street .....	75	12 feet	99	"
Zadoc-street .....	Molesworth-street..	Dawson-street .....	75	12 "	99	Fence and house encroachments.

### No. 21.

#### Extract.

EXTRACT from Minute-book of Municipal meeting, held 16th April, 1883.

Present :—His Worship the Mayor in the Chair, Aldermen Barrie, Larkin, Brett, and Glasgow.

ALDERMAN BARRIE moved,—That from the unskilful manner Molesworth-street has been laid out in the original survey of this township, inasmuch as no way of access has been left to section No. 4 by that street to the great injury of those who inadvertently purchased land and built houses and business places on the said section fronting the said street, this Council is of opinion that the Government should be requested to resume sufficient land from the adjacent allotment to form the said Molesworth-street to the full width where it is shown to be in Wilson's Creek in the plan of the township of Lismore. That the foregoing resolution be forwarded to the Member for this district with the strongest recommendation this Council can give it, that the request it contains be pressed upon the Government, so that the matter may receive the earliest attention it is possible to give it.

Seconded by Alderman Larkin, and carried.

Please

## 11

Please post receipt to Mayor of Lismore, but find answer to me.—S. W. GRAY. For report of Survey Office.—F.H.W., 11/6/83.

Referred to the District Surveyor at Grafton for early consideration and comprehensive report. Perhaps it might be feasible to convert the lane through section 4 into a street 100 feet wide (with tracing from R. 193).— (for Surveyor-General), 10/7/83. No. 156.

The Secretary and Cashier.—Jno. C.C., 11/7/83. Replied to by 83-205.—P. R. DONALDSON, D.S.

## No. 22.

## The Surveyor-General to The Under Secretary for Mines.

Diagram.

THE Borough Council of Lismore desires the Crown to take land from town allotments to afford access from one part of Molesworth-street to another, on the ground that the street was so ill-designed by the Government Surveyor that the north arm of the Richmond River occupies so much of what should be street that traffic along it is impossible.

The facts are that when the allotments were measured in the town the north arm of the Richmond River was distant 2 chains to the west of Molesworth-street, which street was  $1\frac{1}{2}$  chains wide, but the erosion of the river bank has not only carried away the land on the north-western side of the street, but very nearly all the street at that bend of the river.

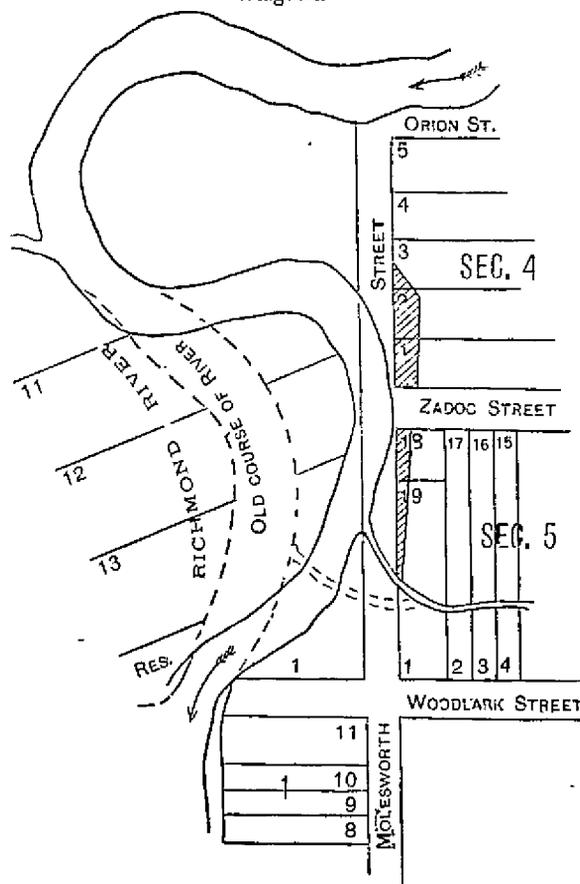
It appears that any action requisite to make a practicable thoroughfare of Molesworth-street is a work that is purely municipal, and should be carried out by the Borough Council.

The Crown might survey the deviation provided the Borough Council undertake to satisfy all claims that may be made.

Attention is invited to Mr. Currie's letter, Roads, S.G.O., 83-188 herewith.

A. J. STOPPS  
(For Surveyor-General),  
12th February, 1884.

Lismore was gazetted a municipality on 5th March, 1879. Submitted.—G.E.H. (for the Under Secretary), 14/2/84. Approved.—J. P. ABBOTT, 19/2/84. S. W. Gray, M.P., informed, 19/2/84.



Scale 8 chains to an inch.

Land required to be taken to connect the two parts of Molesworth-street shown thus .....  
(Coloured purple on original.)

## No. 23.

## The Under Secretary for Mines to S. W. Gray, Esq., M.P.

Sir,

Department of Mines, Sydney, 19 February, 1884.

With reference to the Municipal Council's (of Lismore) request that the Crown will take land from town allotments to afford access from one part of Molesworth-street to another, as the north arm of the Richmond River now occupies so much of what should be the street that traffic is impossible, I am directed by the Secretary for Mines to inform you that when the allotments were measured in the town the north arm of the Richmond River was distant 2 chains to the west of Molesworth-street, which street was  $1\frac{1}{2}$  chains wide, but the erosion of the river bank has carried away the land that formed the street, the making of Molesworth-street a practicable thoroughfare should, therefore, be carried out by the Borough Council.

I have, &amp;c.,

HARRIE WOOD,  
Under Secretary.

## No. 24.

## Mr. J. Currie to The Secretary for Mines.

Sir,

Lismore, Richmond River, 11 March, 1884.

I take the liberty to state that I note by the local Council's proceedings on instant, that they received a letter from the Department *re* landslip near Dr. Parker's residence to which they are not satisfied. This is purely municipal work. The Council made a beginning to fill in slip as a cover for an action against them

them now before the Supreme Court, but not yet settled. A good and true man proffered to make the road as fit for traffic as it was before slip for £200. This did not suit the Council as then formed, they had another object in view, *re* site for New Court-house, that object being to block the authorities by having no road at least on river side of site.

I am, &c.,  
JOHN CURRIE.

Molesworth-street, Lismore.—Mr. Currie's letters of 23rd October, 1883, and March 11th, 1884, will be duly considered before final action is taken.—T.C.B. (for U.S.), 14/2/84. Acknowledged, 14/3/84. The Surveyor-General.—G.E.H. (for U.S.), B.C., 30/4/84.

No. 25.

Mr. District-Surveyor Donaldson to The Surveyor-General.

Sir,

District Survey Office, Grafton, 14 May, 1884.

With reference to the alignment of Lismore, plan of which was forwarded with Mr. Surveyor Ewing's letter, 30th October, No. 80-94, I have the honor to inform you that application has been made by the Municipality some time ago to resume some of the land on the east side of Molesworth-street, between Woodlark and Orion Streets, there not being sufficient land in parts between the building line and the river to permit of a roadway and footpath as well.

It would, therefore, not be desirable to proclaim that part of the street in question.

P. R. DONALDSON, D.S.

No. 26.

Mr. E. W. Allingham to The Under Secretary for Mines.

Landslip, Lismore.

Sir,

Lismore, 20 May, 1884.

Referring to your letter addressed to S. W. Gray, Esq., M.P., of date the 19th February, 1884, on the subject mentioned above, I have the honor to transmit you, under instructions received from the parties interested, declarations of Archibald Currie, John Peate, and Thomas T. Ewing, as to certain facts in connection with the circumstances of this landslip. I shall be glad to hear from you on the subject of this letter at your earliest convenience.

I have, &c.,  
E. W. ALLINGHAM.

Acknowledge.—G.E.H. (for U.S.), 23/5/84. Acknowledged, 23/5/84. The Surveyor-General.—G.E.H. (for U.S.), B.C., 23/5/84.

[Enclosures.]

I, ARCHIBALD CURRIE, of Lismore, in the Colony of New South Wales, storekeeper, do solemnly and sincerely declare as follows:—

1. I have resided at Lismore, in the immediate vicinity of Wilson's Creek, and where what is now known as "The Landslip," for the past twenty-nine years, and I am consequently well and thoroughly acquainted with that creek, from its confluence with Leicester Creek, and where it traverses what is known as Molesworth-street, past the foot of Zadoc-street and site of Landslip, to lot 3 of section 4, as shown on the map of Lismore, a lithographic copy whereof is hereto annexed.

2. When I arrived in Lismore the survey was in course of preparation, and I have seen the *locus in quo* every day from that time to the present, and have never known any material erosion of either bank of the creek, excepting the landslip of one thousand eight hundred and eighty at any time during my twenty-nine years' residence.

3. The first map of the town of Lismore showed Molesworth-street a full width of 99 feet, and two allotments on the western boundary of it, of about 2 roods each, opposite allotments 18 and 19 of section 5, and lot

Whereas the said street in the plan indicated was never more than its present width, except where the said slip of one thousand eight hundred and eighty has occurred, and there never were at any time any allotments on the western boundary of Molesworth-street, opposite lots 18 and 19 of section 5, except on the plan itself.

4. The nature of the soil composing and the vegetation growing on either side of the banks of the creek, and the present width of the creek itself, precludes the possibility of a conclusion that a natural erosion of the bank would lessen the width of Molesworth-street and account for its present narrowness.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales and to substitute declarations in lieu thereof and for the suppression of voluntary and extra judicial oaths and affidavits."

ARCHIBALD CURRIE.

Declared at Lismore, in the Colony of New South Wales, }  
this seventh day of April, 1884, before me,— }

JAMES STOCKS, J.P.

I, JOHN PEATE, of Lismore, in the Colony of New South Wales, storekeeper, do hereby solemnly and sincerely declare as follows:—

1. I have resided at Lismore, in the immediate vicinity of Wilson's Creek, and where what is now known as "The Landslip," for the past thirty years, and I am, consequently, well and thoroughly acquainted with that creek from its confluence with Leicester Creek and where it traverses what is now known as Molesworth-street past the foot of Zadoc-street and site of Landslip to lot three of section four as shown on the map of Lismore, a lithographic copy whereof is hereto annexed.

2. When I arrived at Lismore the survey was in course of preparation, and I have seen the *locus in quo* every day from that time to the present, and have never known any material erosion of either bank of the creek, excepting the landslip of one thousand eight hundred and eighty at any time during my thirty years' experience.

3. The first map of the town of Lismore showed Molesworth-street a full width of ninety-nine feet, and two allotments on the western boundary of it about two roods, each opposite allotments eighteen and nineteen of section five.

Whereas the said street in the plan indicated was never more than its present width, except where the said slip of one thousand eight hundred and eighty has occurred, and there never were at any time any allotments on the western boundary of Molesworth-street opposite lots eighteen and nineteen of section five, except on the plan itself.

4. The nature of the soil composing and the vegetation growing on either side of the banks of the creek, and the present width of the creek itself, precludes the possibility of a conclusion that a natural erosion of the bank would lessen the width of Molesworth-street and account for its present narrowness.

And

## 13.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits." Declared at Lismore, in the Colony of New South Wales, }  
this seventh day of April, 1884, before me, — } JOHN PEATE.

JAMES STOCKS, J.P.

I, THOMAS THOMSON EWING, of Lismore, in the Colony of New South Wales, a Justice of the Peace, do hereby solemnly and sincerely declare as follows:—

1. I am a licensed surveyor.  
2. I have resided at Lismore for the past six years, and I am well and thoroughly acquainted with Wilson's Creek, from its confluence with Leicester Creek and where it traverses what is known as Molesworth-street, past the foot of Zadoc-street and site of landslip to lot 3 of section 4, as shown on the map of Lismore, a lithographic copy whereof is annexed to the declaration.

3. I have seen the *locus in quo* every day from the time I arrived to the present, and have never known any material erosion of either bank of the creek, excepting the landslip of one thousand eight hundred and eighty, at any time during my six years' experience.

4. The first map of the town of Lismore showed Molesworth-street a full width of ninety-nine feet, and two allotments on the western boundary of it of about two roods each, opposite allotments eighteen and nineteen of section five.

Whereas the said street in the plan indicated was never more than its present width except where the said landslip of one thousand eight hundred and eighty has occurred, and there were never at any time any allotments on the western boundary of Molesworth-street opposite lots eighteen and nineteen, section five, except on the plan itself.

The nature of the soil composing, and the vegetation growing, on either side of the banks of the creek itself, preclude the possibility of a conclusion that a natural erosion of the bank would lessen the width of Molesworth-street, and account for its present narrowness.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled "An Act for the more effectual abolition of oaths and affirmations taken and made in the various departments of the government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits." Declared at Lismore, in the Colony of New South Wales, }  
this ninth day of May, 1884, before me, — } THOS. T. EWING,  
WM. CARSON, a Commissioner for Affidavits.

No. 27.

## Office Memorandum.

[Urgent.]

MR. S. W. GRAY, M.P. Telegram from Mayor, Lismore:—What has been done in the matter of opening Molesworth-street, Lismore?

Will the Surveyor-General please say how the case stands.—C.E.H. (for U.S.), B.C., 29/7/84. The Surveyor-General.

Notwithstanding the declarations of Archibald Currie, John Peate, and Thomas T. Ewing (herein enclosed), it is believed that the facts as reported by the Surveyor-General on 12th February last on S.G.O. 83 <sup>1/2</sup>, cannot be controverted, and, consequently, the Crown does not appear to be responsible for securing a means of access in lieu of that part of Molesworth-street which has been destroyed by the action of the waters of the river. It is, moreover, proposed to omit from recommendation of sanction for proclamation of alignment certain streets in the town of Lismore—that part of Molesworth-street in question situate between Woodlark-street and Orion-street. A. J. STOPPS (for Surveyor-General), 8/8/84.

Submitted.—G.E.H. (for U.S.), 11/8/84. Approved. Inform Mr. Gray.—J. P. ABBOTT, 4/9/84. S. W. Gray, M.P., informed. 10th September, 1884.

No. 28.

The Under Secretary for Mines to S. W. Gray, Esq., M.P.

Sir,

Department of Mines, Sydney, 10 September, 1884.

With reference to your inquiry respecting the opening of Molesworth-street, Lismore, I am directed by the Secretary for Mines to inform you that as the facts of the case conveyed to you in my letter of the 19th February last cannot be controverted, the Crown does not appear to be responsible for securing a means of access in lieu of that part of Molesworth-street which has been destroyed by the action of the waters of the river.

I am to add that it is proposed to omit from recommendation for proclamation of alignment certain streets in the town of Lismore, that part of Molesworth-street, situate between Woodlark-street and Orion-street.

I have, &c.,

HARRIE WOOD.

Under Secretary.

No. 29.

The Mayor of Lismore to The Secretary for Mines.

Sir,

Council Chambers, Lismore, 11 September, 1884.

Referring to previous correspondence, I have the honor, on behalf of the Municipal Council of Lismore, to call your attention to the long delay which has taken place in resuming the land in Molesworth-street (in sections 4 and 5), required for the widening of that street.

I trust that I have only now to call attention to the subject to have it immediately dealt with, and thereby remove a local grievance which has been the occasion of much personal ill-feeling which the Council has felt itself powerless to remedy or allay, from its having arisen out of gross blunder in the original survey, which the affidavits supplied by competent persons amply show.

I have, &c.,

JAMES BARRIE,

Mayor.

Forward copy of letter addressed to S. W. Gray, Esq., M.P., under date 10/9/84.—G.E.H. (for U.S.), 10/9/84. The Mayor of Lismore informed, 17/9/84.

No. 30.

## No. 30.

## The Surveyor-General to The Secretary for Mines.

## Alignment of Streets.

THE accompanying plan and schedule of twelve streets in the Municipality of Lismore are forwarded with the view to the alignment of the streets in accordance with the Act of Council, 2nd Victoria No. 2, the same having already been confirmed under the Act of Council 4th William IV, No. 11.

A. J. STOPPS

13 September, 1884.

(For Surveyor-General).

Plan herewith, Cat. L.I., 2,263. Submitted.—G.E.H. (for Under Secretary), 17/9/84. Approved.—J. P. ABBOTT, 18/9/84. Minute, 19 September, 1884.

## No. 31.

## The Under Secretary for Mines to The Mayor of Lismore.

Sir,

Department of Mines, Sydney, 17 September, 1884.

With reference to your letter of the 11th instant, drawing attention to the delay in resuming land for the widening of Molesworth-street, Lismore, I have the honor to inform you that the attached is a copy of a letter sent to Mr. S. W. Gray, M.P., on the subject on the 10th instant.

I have, &amp;c.,

HARRIE WOOD,

Under Secretary.

[Enclosure.]

Sir,

Department of Mines, Sydney, 10 September, 1884.

With reference to your inquiry respecting the opening of Molesworth-street, Lismore, I am directed by the Secretary for Mines to inform you that as the facts of the case conveyed to you in my letter of the 19th February last cannot be controverted the Crown does not appear to be responsible for securing a means of access in lieu of that part of Molesworth-street which has been destroyed by the action of the waters of the river.

I am to add that it is proposed to omit from recommendation for proclamation of alignment certain streets in the town of Lismore, that part of Molesworth-street situate between Woodlark-street and Orion-street.

I have, &amp;c.,

HARRIE WOOD.

Samuel W. Gray, Esq., M.P., "Tara," Ocean-street Woolahra.

## No. 32.

## Executive Council Minute.

## Alignment of Streets, Municipality of Lismore.

Department of Lands, Sydney, 19 September, 1884.

It is recommended, for the approval of His Excellency the Governor and the Executive Council, that the undermentioned lines of streets, which have been duly advertised in the *Government Gazette*, be now aligned, in accordance with the provisions of the Act of Council 2 Victoria No. 2, viz. :—

1. Bounty-street, from Molesworth-street to Keen-street.
2. Cathcart-street, from Leycester-street to Wilson-street.
3. Conway-street, from Richmond River to Dawson-street.
4. Dawson-street, from Conway-street to Orion-street.
5. Dawson-street, from Leycester-street to Wilson-street.
6. Keen-street, from Bounty-street to Wilson-street.
7. Leycester-street, from Orion-street to Cathcart-street.
8. Magellan-street from Richmond River to Dawson-street.
9. Molesworth-street, from Ballina-street to Conway-street.
10. Molesworth-street, from Conway-street to Woodlark-street.
11. Orion-street, from Wilson's Creek and Molesworth-street to Dawson-street and Leycester-street.
12. Wilson-street, from Wilson's Creek to Cathcart-street.
13. Woodlark-street, from Wilson's Creek to Dawson-street.
14. Zadoc-street, from Molesworth-street to Dawson-street.

J. P. ABBOTT.

The Executive Council advise that the streets referred to be now aligned in terms of the Act of Council 2 Victoria No. 2.—ALEX. C. BUDEN, Clerk of the Council. Min. 84-40, 23/9/84. Confirmed, 30/9/84. Approved.—A.L., 23/9/84. For alignment notices see *Gazette* of 3/10/84. Advertised, 9/10/84. The Surveyor-General.—T.C.B. (for U.S.), B.C., 9/10/84.

It is recommended that the accompanying tracing showing streets in the Municipality of Lismore be forwarded to the Municipal Council of Lismore, and that they be informed that the streets shown thereon, having been confirmed and aligned, are now in their charge.—A. J. STOPPS (for Surveyor-General), 13/11/84.

Submitted.—G.E.H. (for U.S.), 15/11/84. Approved.—J. P. ABBOTT, 15/11/84. The Council Clerk, Lismore, with tracing informed, 17/11/84. The Surveyor-General.—G.E.H. (for U.S.), B.C., 18/11/84. Records.—H.W., 19/11/84.

## No. 33.

## Memo. from Mr. District-Surveyor Donaldson to The Surveyor-General.

In connection with the Molesworth-street, Lismore, resumption case.

District Survey Office, Grafton, 21 September, 1884.

THE original papers of the owners' claims are returned herewith. They became inadvertently detached from the papers (Roads S3-<sup>1</sup>/<sub>2</sub>) when my report of the 16th instant (86-124) was forwarded to the Surveyor-General.

P. R. DONALDSON,

District Surveyor.

No. 34.

15

No. 34.

## Memorandum by The Secretary for Mines.

29 September, 1884.

Ask the Surveyor-General to send a surveyor to report upon the necessity of widening Molesworth-street in sections 4 and 5 in the town of Lismore. I want this done as quickly as possible.

J. P. ABBOTT.

Obtain papers from the Executive Council and forward to the Surveyor-General.—G.E.H. (for U.S.), 29/9/84. Papers herewith.—A.C.B., 30/9/84. The Surveyor-General.—G.E.H. (for U.S.), B.C., 30/9/84.

The matter of suggested widening of Molesworth-street is being dealt with as a separate matter, and need not delay the proposed alignment of the streets approved of by the Executive Council. The papers are therefore returned to allow of the action relative to them to be carried out.—A. J. STOPPS (for Surveyor-General), 30/9/84.

Return papers, with thanks, to the Clerk of the Executive Council.—G.E.H. (for U.S.), 1/10/84. The Clerk of the Executive Council.—G.E.H. (for U.S.), B.C., 1/10/84.

No. 35.

## The Surveyor-General to The Secretary for Mines.

Molesworth-street, Lismore.

10 October, 1884.

REPORTS in this case have already been made and decision given, *vide* S.G.O., 83-1, 2, herein.

The previous minutes of the Surveyor-General are based on the assumption that the course of the river has shifted since the land in question was surveyed twenty-eight years ago. This view is supported by the fact that the side lines of allotments on the right bank of the river and opposite to the part of Molesworth-street referred to are shown by more recent surveys to be greatly in excess of the length by the original survey and as given under the deeds, while the left bank at the particular place appears to have been eroded, and the area of the land greatly lessened, and there has been a landslip of late years, which is admitted. If this view be incorrect, and so far there is nothing to prove that it is, then the plan of survey by which the village was designed must be grossly and exceptionally incorrect, and it then becomes a question whether it would be advisable to comply with the request herein contained, and by doing so to virtually admit that the Crown is responsible for claims made on the ground of inaccuracy of survey when the alleged inaccuracy has not been proved.

It is very probable that other and considerable discrepancies of a similar kind, where the land shown by original survey does not correspond with the land as it now is, occur in the same village.

A. J. STOPPS

(For Surveyor-General).

Tracing of a lithograph is herewith, which shows the lands measured for sale in Lismore at the time of the publication of the lithograph, namely, 1856.—A.J.S. (for Surveyor-General), 10/10/84.

Secn. Send Mr. Gray, M.P., a copy of the lithograph with an explanation.—J. P. ABBOTT, 12/11/84.

Tracing of lithograph, showing allotments of land for sale in 1856, is herewith for comparison with a lithograph of the town compiled from more recent data (also herewith) for the information of Mr. S. W. Gray, M.P.—A. J. STOPPS (for Surveyor-General), 12/11/84.

S. W. Gray, M.P., informed, 14/11/84, with litho. and tracing. Submitted.—G.E.H. (for Under Secretary), 18/10/84.

No. 36.

## The Under Secretary for Mines to S. W. Gray, Esq., M.P.

Sir,

Department of Mines, Sydney, 14 November, 1884.

With reference to the matter of the opening of Molesworth-street, Lismore, I am directed by the Secretary for Mines to forward you the accompanying lithograph and tracing, which show the lands measured for sale at Lismore at the time of the publication of the lithograph, namely, in the year 1856. The decisions already given in the case are based on the assumption that the course of the river has shifted since the land in question was surveyed, twenty-eight years ago. This view is supported by the fact that the side lines of allotments on the right bank of the river, and opposite to the part of Molesworth-street, are shown by more recent surveys to be greatly in excess of the lengths by the original survey, and as given under the deeds, while the left bank at this particular place appears to have been eroded and the area of the land greatly lessened, besides which there has been other slips of late years. Under these circumstances, there appears to be no reason why previous decisions in the matter should be altered.

I have &amp;c.,

HARRIE WOOD,

Under Secretary.

No. 37.

## The Under Secretary for Mines to The Council Clerk, Lismore.

Sir,

Department of Mines, Sydney, 17 November, 1884.

I am directed by the Secretary for Mines to forward you the accompanying tracing, showing Bounty and thirteen other streets in the municipality of Lismore, and to inform you that as such streets have been confirmed and aligned they are now in charge of the Borough Council.

I have, &amp;c.,

GERARD E. HERRING

(For the Under Secretary).

No. 38.

## No. 38.

## The Mayor of Lismore to The Under Secretary for Mines.

Sir,

Council Chambers, Lismore, 12 December, 1884.

Referring to your letter of the 14th November, 1884 (4,357 Roads), addressed to S. W. Gray, Esq., M.P., in referenc to the claim made by this Council to have Molesworth-street opened to its proper width, which it has never been, owing to an error in the original survey, I now enclose survey and report by Mr. Licensed-Surveyor Arnheim in support of the position taken up by the Council, which, I trust, will finally settle the question of the liability of the Government to resume the land necessary for forming the said street to its proper width.

To any one on the spot the evidence is so complete that to question it, no one having the use of his senses would entertain for a moment so self evident an absurdity, and to which self evident, evidence, has already been added the sworn testimony of two old residents who knew the land before it was surveyed, and have resided in the district ever since.

And these can be supplemented by at least six others, if necessary, of equally competent persons.

Surely all this ought to be sufficient to settle the matter.

I have, &amp;c.,

JAMES BARRIE,

Mayor.

Acknowledge and forward to the Surveyor-General.—G.E.H. (for Under Secretary), B.C., 15/12/84. Acknowledged. The Surveyor-General.—T.C.B. (for the Under Secretary), B.C., 16/12/84. For Surveyor-General's Report see other side.—A.J.S.

Although it is difficult to believe that the original survey of the town of Lismore could be so inaccurate, I regret that it seems from the testimony now given that the position taken by this officer, based upon the original surveys, can no longer be maintained. I am scarcely prepared to recommend resumption or the widening of the road, and meeting claims for compensation.—P. F. ADAMS, 22/12/84. Under Secretary for Mines.

Submitted.—H.W., 30/12/84.

Will the Surveyor-General be good enough, having regard to the present and possible future importance of Lismore, say what course ought to be taken, and the probable cost of complying with the request of the Council.—J. P. ABBOTT, 31/12/84.

Will the Surveyor-General please expedite his report upon this matter.—H.W., B.C., 24/12/84. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 2/1/85.

[Enclosure.]

Sir,

Lismore, 1 December, 1884.

In accordance with instructions from the Municipal Council of Lismore, I have the honor to inform you that I made the requisite survey necessary to determine the position of Wilson's Creek, between Woodlark and Orion Streets, showing its encroachment on Molesworth-street, in the town of Lismore, and herewith transmit sketch showing the same.

Wilson's Creek between these streets has well defined banks, and any change that has taken place since the original survey of town of Lismore, in 1856, can only be of minor importance. There are evidences of land slips, but they only affect the position of the creek in detail.

In evidence that there can be no possibility of the creek, in 1856, being in the position as shown on the plan of original survey of town of Lismore, I determined the position of several very old dead trees on the opposite bank, which at that time must have existed.

I have, &amp;c.,

C. T. V. ARNHEIM,

Licensed Surveyor.

## No. 39.

## Memo. from The Surveyor-General to The Under Secretary for Mines.

Deviation of Molesworth-street, Lismore.

18 February, 1885.

WITH respect to the minute of the Secretary for Mines on S.G.O. 83-4<sup>1</sup>/<sub>2</sub> herein, it might be thought desirable to invite the Borough Council of Lismore to obtain from the several owners of land the terms upon which they would allow a deviation of Molesworth-street to be taken through their properties in accordance with the accompanying tracing, with a view to consider whether the cost should be incurred by the Crown, either wholly or in part, and if in part to what extent the Borough Council might be required to contribute.

The Borough Council ask to have the deviation made 66 feet wide, but to do so would inflict much injury on the owners of the lands, and the District Surveyor reports that a less width would be sufficient. (*Vide* tracing herewith.)

P. F. ADAMS.

Submitted.—G.E.H. (for Under Secretary), 23/2/85.  
The Mayor Lismore, with tracing, informed, 25/2/85.

Approved.—J. P. ABBOTT, 25/2/85.

## No. 40.

## The Under Secretary for Mines to The Mayor of Lismore.

Sir,

Department of Mines, Sydney, 25 February, 1885.

I have the honor to forward you the accompanying tracing, and invite you to obtain from the several owners of land the terms upon which they would allow a deviation of Molesworth-street to be taken through their properties in accordance with such tracing with a view to consider whether the cost should be incurred by the Crown either wholly or in part, and if in part to what extent the Borough Council might be required to contribute.

I am to add that to have the deviation made 66 feet wide would inflict much injury on the owners of the lands, and the District Surveyor reports that a less width would be sufficient.

I have, &amp;c.,

HARRIE WOOD,

Under Secretary.

No. 41.

## No. 41.

## The Mayor of Lismore to The Under Secretary for Mines.

Sir,

Council Chambers, Lismore, 29 May, 1885.

I have the honor, in reply to your letter of February 25th (No. 85-623, Roads), and forwarding tracing *re* resumption of land in Molesworth-street, Lismore, to state that the whole question was referred to the Improvement Committee of this Council for report. The following is a copy of the report as adopted by the Council, viz. :—

"That application be made to the Government to resume without delay an area required for a street one chain wide in accordance with surveyor's report. The amount of compensation could not be obtained by your Committee through the absence of some of the owners of the land about to be resumed."

I am further to add, for the information of the Minister, that there is no prospect of the Council being able to effect any satisfactory arrangement with the owners of property for its resumption, as every possible means has been exhausted since the receipt of your letter to accomplish this object. The Council, after very full inquiry and deliberation, leave the whole matter in the hands of the Government, with the urgent request that immediate steps be taken for the resumption of such portion of land as the officers employed have reported to be necessary for the purpose of giving reasonable means of communication in that portion of the town.

I have, &amp;c.,

JAMES BARRIE,  
Mayor.

Acknowledge.—G.E.H. (for Under Secretary), 5/6/85. Acknowledged, 5/6/85. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 6/6/85.

The Borough Council of Lismore in this letter declare their inability to effect any arrangement with the owners of land, to allow of the widening of Molesworth-street, and from their representation it does not appear that any other person would be successful. The question of widening Molesworth-street appears, as before stated, to be a Municipal matter, and as the Council has a knowledge of the ownership of ratable property in the Borough, it seems to be desirable that it should, if desiring assistance of the Crown in the matter under reference, make a definite proposition as to the course to be adopted, and a statement of the cost of effecting it. In view of all the circumstances of the case as previously reported, interference of the Crown cannot be recommended, unless a definite proposal and the cost of effecting it is submitted for consideration, as it is thought very undesirable that the Crown should, as desired now by the Council, accept the sole responsibility of widening the street, by taking land from allotments that might be supposed to have been already injured by being provided with a street of insufficient width, that is if the statements made are correct.—A. J. STOPPS (for Surveyor-General), 16/7/85. Submitted.—G.E.H. (for the Under Secretary), 20/7/85. Approved. Let the Council know.—J. P. ABBOTT, 21/7/85. The Mayor of Lismore informed, 22/7/85. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 12/11/85.

## No. 42.

## T. T. Ewing, Esq., M.P., to The Under Secretary for Mines.

Sir,

Parliament, 12 December, 1885.

I have the honor to transmit herewith tracing showing necessary improvements in Molesworth-street, Lismore. Tracing  
herewith.

The merits of the case are already understood by your Department.

I am informed by Council Surveyor that £600 will be the amount required to complete purchase.

I have, &amp;c.,

THOS. EWING.

Acknowledge.—G.E.H., 18/12/85. T. T. Ewing, M.P. Acknowledged, 21/12/85. The Surveyor-General.—G.E.H. (*pro* Under Secretary), B.C., 18/12/85.

It was decided by the Minister on the 21st July, 1885, that a definite proposal as to the widening of Molesworth-street, and the cost of effecting it be submitted by the Borough Council of Lismore before consideration of the Crown should be given in the matter. The letter of Mr. Ewing, as Member of Parliament for the Richmond, does not represent the Borough Council, and is a mere statement that £600 would be required, with no definite proposal as to who is to be compensated and to what amounts, and for what land severally.

It is recommended that there be no departure from previous decision of 21st July, 1885.—A. J. STOPPS (for Surveyor-General), 12/1/86. Submitted. H.W., 13/1/86.

The Borough Council of Lismore may again be invited to submit a definite proposal as to the widening Molesworth-street. Particulars of cost and names of owners of land to be compensated.—R.M.V., 14/1/86. Letter to be sent to Mr. Ewing, M.P. Thos. T. Ewing, M.P., informed, 16/1/86.

## No. 43.

## T. T. Ewing, Esq., M.P., to The Secretary for Public Works.

Resumption in Molesworth-street, Lismore.

Sir,

Parliament House, Sydney, 19 December, 1885.

I desire that this letter be placed with case, noted above, now being considered, and duly noticed.

Yours, &amp;c.,

THOS. EWING.

Acknowledge, 22/12/85. This is a matter, I think, which requires to be dealt with by the Mines Department, to which I accordingly forward it.—W.J.L., 22/12/85. The Under Secretary for Mines.—J.R., B.C., 23/12/85. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 30/12/85.

[Enclosure.]

Dear Mr. Ewing,

Lismore, 14 December, 1885.

In forwarding you a tracing of land requiring to be resumed for Molesworth-street, I omitted to send you a resolution passed at last meeting of Council, which reads, *re* Dr. Parker's letter:—"Your Committee beg to recommend that a fresh application be made to Government to resume sufficient land in Molesworth-street North (east side) as would permit to form a street one chain wide, the basis of compensation to be the amount asked by Dr. Parker, which appears to your Committee reasonable."

This, I presume, will be all you require.

I am, &c.,  
JAMES MOORE,  
M. Engineer.

T. T. Ewing, Esq., M.L.A.

No. 44.

The Under Secretary for Mines to T. T. Ewing, Esq., M.P.

Sir,

Department of Mines, Sydney, 16 January, 1886.

With reference to your letter of the 12th ultimo, respecting the resumption of certain land for the formation of Molesworth-street, Lismore, I am directed by the Secretary for Mines to inform you that the Borough Council of Lismore has been invited to submit a definite proposal as to the widening of Molesworth-street and the cost of effecting it, together with the names of the owners of the land to be compensated. Further action in the matter is stayed until such information has been received.

I have, &c.,  
HARRIE WOOD,  
Under Secretary.

No. 45.

The Under Secretary for Mines to T. T. Ewing, Esq., M.P.

Sir,

Department of Mines, Sydney, 23 February, 1886.

Referring to my letter of the 16th ultimo (in reply to your letter of the 12th December last), inviting the Borough Council of Lismore to submit a definite proposal as to the widening of Molesworth-street, with particulars of cost and names of owners of land to be compensated, I have the honor to inform you that no reply has been received thereto.

I have, &c.,  
HARRIE WOOD,  
Under Secretary.

No. 46.

The Mayor of Lismore to The Under Secretary for Mines.

Sir,

Council Chambers, Lismore, 9 April, 1886.

85-623 Roads.

85-3,747 Roads.

85-3,841 Roads.

In reply to your communication of the 25th February, 1885 (85-625 Roads) addressed to the Mayor of Lismore, and of 16th January and 23rd February, 1886, addressed to Thos. T. Ewing, Esq., M.L.A., I beg to state that the following are the owners of the land proposed to be resumed, and the amounts they are willing to accept for said:—

1. Edmund Coleman	...	...	...	...	£132
2. A. F. Parker	...	...	...	...	132
3. John Currie	...	...	...	...	330
4. Commercial Bank	...	...	...	...	100

I have, &c.,  
LOUIS BERNSTEEN,  
Mayor.

No. 47.

T. T. Ewing, Esq., and P. Hogan, Esq., Ms.P., to The Secretary for Mines.

Sir,

12 April, 1886.

We have the honor herewith to enclose information respecting resumption in Molesworth-street, Lismore, and hope you will see fit to give the matter your consideration.

We have, &c.,  
THOS. EWING.  
P. HOGAN.

Acknowledge, 17/4/86.  
General.—H.W., B.C., 17/4/86.

T. Ewing and P. Hogan, Ms.P. acknowledged, 19/4/86. Surveyor-

[Enclosures.]

Dear Sir,

Esmond House, Point Piper Road, Woollahra, Sydney, 3 November, 1885.

In reference to the resumption of land 1 chain broad of lot 1 section 4 of the township of Lismore, according to the sketch forwarded by you to me 20th September.

I beg to inform you that the price for the portion required would be at the rate of £2 per foot, Zadoc-street frontage.

I am, &c.,  
ARTHUR F. PARKER.

St. Hillier Pearce, Esq., Council Clerk.

Re Resumption of Bank Land.

Commercial Banking Company of Sydney, Lismore, 11 March, 1886.

Gentlemen,

Reverting to yours of 1st September last my Board desire me to inform you they are prepared to accept £100 (say one hundred pounds) for the 11 perches you require, provided you will undertake to put the bridge over Brown's Creek in perfect order after making the necessary alterations to the road in front of our allotment.

Yours, &c.,  
E. B. BACKHOUSE,  
Manager.  
Sir,

The Municipal Council, Lismore.

Sir,

Lismore, 25 September, 1885.

In reply to yours of 1st instant I beg to state that, as far as I am concerned, the price I put upon land opposite slips in Molesworth-street is ten pounds (£10) per foot of the frontage in Zadoc-street. This is what I told the district surveyor some two years back. Swamps have been selling since drought set in, in Lismore, at from £5 to £10 per foot, and other portions up to £20 per foot.

The eyes and lungs of Lismore ought to be worth £10 per foot. I would respectfully beg to state that I look upon it as a waste of public money, any resumption of land at place proposed, until such time as the Council devise some means to prevent any future landslips.

To the Council Clerk, Borough of Lismore.

I am, &amp;c.,

JOHN CURRIE.

Gentlemen,

Lismore, 3 September, 1885.

Yours (1st instant) to hand re amount required for land in Molesworth-street to enable the Government to open said street. In reply I am prepared to give the frontage marked red on plan herewith at the rate of £1 per foot; or, if I might be allowed to suggest, I would give more land for a less sum on your leaving me the frontage marked red, and take a chain higher up marked blue, this would take nearly  $\frac{1}{2}$  an acre of land, for which I would take £200; or I would take the frontage in exchange for the chain marked blue.

Yours, &amp;c.,

His Worshipful the Mayor and Aldermen of the Municipal Council of Lismore.

EDMUND COLEMAN.

## No. 48.

The Under Secretary for Mines to T. T. Ewing, Esq., and P. Hogan, Esq., Ms.P.

Gentlemen,

Department of Mines, Sydney, 19 April, 1886.

I have the honor to acknowledge the receipt of your letter of the 12th instant, forwarding a letter from the Municipal Council of Lismore, giving the names of the owners of the land proposed to be resumed for Molesworth-street, and the amounts they are willing to accept, and to inform you that the matter shall receive immediate attention.

I have, &amp;c.,

HARRIE WOOD,

Under Secretary.

## No. 49.

## Office Memorandum.

86-1263, 83-159—Molesworth-street, Lismore, to Surveyor-General, 27/4/86.

Will the Surveyor-General please return the papers in this case.—E.V. (for the Under Secretary), B.C., 5/5/86.

There is no definite proposal in the letter of the Mayor of Lismore, the only inference to be drawn from it is that the Crown is expected to bear all the expense of widening Molesworth-street. It has not yet been determined that the Crown shall incur any cost or responsibility in the matter. The enclosed letter is a mere statement of the sums said to be required by reputed landowners in compensation for loss of land, but there is no undertaking on their part to accept the sums quoted, neither is it stated to what extent the street shall be widened, nor how much land each person is willing to give up for the purpose named, and no opinion can therefore be formed as to the reasonableness or otherwise of the demands. It has previously been stated that the widening of Molesworth-street appears to be solely a municipal matter.—A. J. STORRS (for Surveyor-General), 6/5/86.

The Mayor of Lismore has now supplied the information asked for; perhaps the papers should be again referred to the Surveyor-General for report, as to the reasonableness or otherwise of the claims. Mr. Ewing, M.P., is very anxious that this matter should be dealt with speedily.—G.E.H. (for Under Secretary), 17/5/86.

The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 20/5/86. Approved.—J.F., 20/5/86. The Minister for Mines wishes these papers to be returned to him with as little delay as possible, as he is very anxious to deal with the case.—G.E.H. (for Under Secretary), 20/5/86.

Mr. District-Surveyor Donaldson is requested to report as soon as possible on the reasonableness or otherwise of the demands made by the several landowners in view of the suggested widening of the present Molesworth-street. A tracing is with Mr. Coleman's application.—A. J. STORRS (for Surveyor-General), 21/5/86. Mr. District-Surveyor Donaldson, Grafton.

Nature of instructions, Roads No. 104, received in Grafton District Survey Office, 25/5/86. Replied to by 86-72.—P. R. DONALDSON, District Surveyor.

## No. 50.

Mr. District-Surveyor Donaldson to The Surveyor-General.

Sir,

District Survey Office, Grafton, 31 May, 1886.

With reference to your instructions of 21st May, 1886, N. 86,104 to report as soon as possible on the reasonableness or otherwise of the demands made by the several land owners in view of the suggested widening of the present Molesworth-street, Lismore, I have the honor to inform you that I consider the demands of Messrs. Coleman, Parker, and the Commercial Bank as reasonable, but that the sum asked by John Currie, which is £10 per foot or £330, is excessive. I am of opinion that £150 would be a fair price for the land to be taken from him (one hundred and fifty pounds).

I have, &amp;c.,

P. R. DONALDSON,  
District Surveyor.Roads 83- $\frac{1}{2}$ , and all papers herewith.

Within

Within is a statement showing the dimensions and areas of land required from each owner for the widening of Molesworth-street. The District Surveyor reports that the claims of Mr. Coleman, Dr. Parker, and the Commercial Bank, are reasonable. The lands are not of equal intrinsic value and those of the Commercial Bank and of Mr. Currie might be of greater proportionate value than Dr. Parker's land, but estimated on the same basis, viz., £660 per acre, it would be worth £71. Mr. Currie's claim, however, is £330, which the District Surveyor considers excessive, he being of opinion that £150 would be a fair price for the land. It has not been determined yet that the Crown will meet these claims or any proportion of them.—A. J. STOPPS (for Surveyor-General), 7/6/86.

[Enclosure.]

Memo. in reference to claims for compensation for land proposed to be resumed for widening Molesworth-street in the Town of Lismore.

ASSUMING the price asked by A. F. Parker (which equals £660 per acre when the land has two frontages), the sum to which each claimant would be entitled would be, omitting fractions:—

Commercial Bank,	13 × 218 = 11 perches	at £660 per acre =	£45; no loss of frontage.
J. Currie,	33 × 158 = 17½	„ „	= £71; loss of 33 ft. frontage.
A. F. Parker,	66 × 132 = 32	„ „	= £132; loss of 66 ft. frontage.
E. Coleman,	53 × 172 = 33½	„ „	= £137; no loss of frontage.

It does not appear that Currie's land is more valuable than Parker's, as both allotments are opposite to one another in Zadoc-street, and having both double frontages.

The demands actually made are:—

Commercial Bank,		=	£100 (as against £45 per above valuation.)
J. Currie, £10 per ft., Zadoc-street,		=	£330 ( „ £71 „ )
A. F. Parker, £2 per ft., „		=	£132 ( „ £132 „ )
E. Coleman, £1 per ft., Molesworth-street,		=	£172 ( „ £137 „ )

NOTE.—All dimensions are approximate, fractions having been omitted. Some of the dimensions are means between two numbers.

No. 51.

Mr. J. Currie to The Secretary for Mines.

Re resumption of land for widening Molesworth-street, Lismore.

Sir,

Lismore, Richmond River, 1 June, 1886.

I again take the liberty of addressing the Department *re* resumption of land in Molesworth-street, I do so in good faith, as I am interested in property where landslip took place and roadway wanted. The work is purely a municipal one, no doubt in that. If public money is used to resume land, it will be a sheer waste of public money unless conditions laid upon the Council to have a retaining wall so as to prevent future slips.

This is a river bank road. If the old wet seasons come back again, which no doubt they will, and heavy traffic, *i.e.*, on this road, only a question of time until another slip will take place, and the Government will be called upon to resume more land. Besides a low level bridge across Brown's Creek next to useless, as with any ordinary freshet in the river the connection between both sides of the town is cut off. With such a bridge, and the facts stated above *re* retaining wall, resuming of very little use unless conditions made to remedy above. We have a most unworkable Council, of course that is the fault of those who give them the position. A cutting, or rather a gravel pit, going on for the last five years in Zadoc-street, right opposite Court-house; stuff carted away to fill up the low lying parts of the town, that at a very moderate sum, would have made a good road where slip took place without making a demand upon the public treasure.

I have, &c.,

JOHN CURRIE.

Acknowledge, 7/6/86. Acknowledged, 7/6/86. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 7/6/86. Submitted. See the Surveyor-General's Minute on 86-1,823.—H.W., 15/6/86.

In view of Mr. Currie's representations respecting the washing away of the street, the Commissioner of Roads may be asked for a report as to the advisability of laying out a street in the position proposed.—J.B., 22/6/86.

The Under Secretary for Public Works.—G.E.H. (for Under Secretary), B.C., 24/6/86. Roads.—J.R., B.C., 25/6/86.

No. 52.

Mr. District-Surveyor Donaldson to The Surveyor-General.

Widening Molesworth-street, Lismore.

I HAVE carefully considered this question with the Assistant Engineer for Roads, Mr. Statham, who has embodied our views in the memorandum herewith of this date.

I doubt whether the interests involved, that is, the affording direct access from Molesworth-street (the business part) to section No. 3, and the western half of section 4, are sufficient to justify the expenditure which will be necessary, viz., about £1,254, for the resumption of land, and £1,000 for the erection of bridge, &c., and I think the Municipal Council will hesitate to expend the latter sum, there being the alternative but circuitous route open, *via* Keen-street.

P. R. DONALDSON,

District Surveyor.

16th September, 1886.

It will be seen from the report of the Commissioner and Engineer of Roads, obtained at the request of the Secretary for Mines (see his Minute of June 22nd, 1886, on papers 83-1,582, S.-G.O.), that he is of opinion that Molesworth-street should not be widened in the position proposed; that to do so would ultimately cost several thousands of pounds, and he suggests a possible alternative of widening a lane, a way from the river bank, and the seeking of the opinions of the District Surveyor and the District Engineer on the

the subject. The reports of these two officers have accordingly been obtained by the Surveyor-General, by which it appears that they do not approve of either of the previously suggested ways of affording access, but are more favourable to a third, which they describe, and also express their doubts that the interests involved would justify the expenditure that would be required to effect it, viz., £2,254, that is to say, £1,254 for land, and £1,000 for a bridge, and think that the Municipal Council will hesitate to expend the latter sum. It is pointed out that access is open by way of Keon-street, and the circumstances of the case do not appear to warrant of necessity, any participation in the expense by the Crown.—A. J. STOPPS (for Surveyor-General), 15 December, 1886.

Submitted for approval.—H.W., 17/12/86. Approved.—J.F., 20/12/86. T. T. Ewing, M.P., and P. Hogan, M.P., informed 22 December, 1886. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 22/12/86.

[Enclosures.]

Minute Paper.

Purchase of land to widen Molesworth-street, Lismore.

Sydney, 28 June, 1886.

THROUGH not in any way dealt with previously by this Department, I have made myself acquainted with the case as far as the papers admit.

I am disposed to concur with the supposition in the Minute of the Surveyor-General, dated 12th February, 1884, that the river has changed, as suggested very recently if not absolutely since the original survey, the differences between the tracing from lithographs of years 1856 and 1883, quite bear this out, though denied by the declarations which in one instance, if taken literally, prove too much as queries in pencil as to the every day inspections. However, though the Minute of the Surveyor-General of 22nd December, 1884, admits that the original survey may have been incorrect, and that the Government should assist,\* there can be no doubt that such a change in course of river is going on here, and it is only a question of time how long the river will take to eat away the additional width now proposed, no matter what the protection given may be. The High-street embankment at West Maitland is an instance of what such protection may cost to construct and maintain.

In reply to the question of the Minister for Mines, I am of opinion that it is not desirable to lay out a street in the position proposed, along the river bank, without further inquiry. It would cost the Government £550 for land and the municipality quite £1,000 for road-making and bridge, independent of the indefinite sum for protection of bank, so that the cost would be probably £4,000, with an additional outlay every flood. I would venture to suggest, before deciding on encountering such difficulties, it would be better to reconsider the question of widening the lane, which, as Mr. Donaldson says, is higher than Molesworth-street, and therefore more valuable; but as the additional width could all be taken on the west side, the improved change of front would greatly compensate for the more valuable land taken. It would be no great disadvantage to the church to be near the street, and, compared with the other evils, the removal of the Government stable is but a trifling matter.

The continuation of widened lane, by resumption of lots 15 and 14, section 5, would also probably improve the position for bridge over Brown's Creek, and open a really good permanent thoroughfare from Orion to Woodlark-street. I would therefore suggest that Mr. Donaldson be asked to confer with Mr. Statham, the Assistant Engineer for Roads at Grafton, on this, and that they be authorized to ask the officers of their respective departments at Lismore for further reports on any detail they require.

If the Government do make a change, and the really permanent improvement can be done at a cost at all within reason, I think it much better to do it than have to carry on an expensive and never ending contest with the river, during which interests may grow up which would prohibit the change now proposed, if ultimately found desirable.

WILLIAM C. BENNETT.

\* MEMORANDUM by Mr. Stopps:—This seems to be a mistake. The Surveyor-General said he was not prepared to recommend resumption of land, and the consequent expense involved in satisfying claims for compensation.

The Under Secretary for Mines.—J.R., B.C., 1/7/86. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 3/7/86. Forwarded to Mr. District Surveyor Donaldson, with view to carrying out the recommendation of the Commissioner for Main Roads.—P.T.A., 5 September. Replied to by, 86-124.—P. R. DONALDSON, District Surveyor.

Purchase of Land to widen Molesworth-street, Lismore.

I HAVE had the opportunity to obtain some personal acquaintance with this question which was mentioned to me by Mr. Williamson, Road Superintendent, when I last visited Lismore, and he pointed out the localities.

There does not appear to have been any recent erosion of the river bank, nor does there seem to be any probability that such is likely to take place in future. The slips are due rather to concentration of drainage, in consequence of tracks which have been cut at various times for access to the wharf. This has gone on till little, if any, of the original road remains at south-east corner of Zadoc-street, and traffic is now on sufferance across the corner of lot 18.

The bridge across Brown's Creek is an old low-level structure of rough construction and very narrow. The erection of a suitable bridge, raised to the level of Molesworth-street and of proper width, would cost fully £1,000, including the necessary embankments and road approaches.

The whole of the properties north of Brown's Creek are very awkwardly situated as regards access.

To erect a longer and wider bridge on the site of the existing one is scarcely to be recommended. The site is a very bad one. I agree in principle with the views of the Commissioner, but there are difficulties in the way of carrying out his suggestions which, I fear, cannot be got over. In the first place, the lane through section 4 is built on up to the frontage, some of the buildings being large and expensive, so that the proposed widening would involve a heavy expense. Again, the cutting in Zadoc-street would be intersected, and that is 10 or 12 feet deep. Then, to resume lots 14 or 15 is out of the question, as the Court-house, a large new building, stands on them. Again, there is no practicable way of getting through to Woodlark-street. That street is the principal business centre, and the frontage is worth at least £20 per foot, irrespective of the consideration that it is all built upon, and that a row of two-storey new brick shops stand in the way where it would be necessary to open the road through.

The only practicable alternative between the Commissioner's proposal and that of widening Molesworth-street is shown on tracing, and is to resume lot 17 of section 5. This lot is 66 feet wide, which would be sufficient. It would also be necessary to resume portion of lot 19 and a piece on south side of Brown's Creek. I have ascertained that lot 17 is valued for assessment at £500, and that is probably worth £700. The other resumptions, being for the most part low-lying land would be less valuable and could probably be obtained for £250.

There would then remain question of access to the northern portions of section 4, as to which I agree with Mr. Donaldson that the best way is to widen that portion of Molesworth-street through lots 1, 2, and 3, as tinted red on tracing, involving claims for compensation amounting to £304.

The whole, it would thus appear, represents £1,254 for compensation, and, irrespective of maintenance, £1,000 for works. It is questionable whether the interests involved warrant such an expenditure.

E. J. STATHAM,  
14/9/86.

To the Surveyor-General, with 86-124.—P. R. DONALDSON, District Surveyor, 16/9/86.

## No. 53.

The Under Secretary for Mines to T. T. Ewing, Esq., and P. Hogan, Esq., Ms.P.

Gentlemen,

Department of Mines, Sydney, 22 December, 1886.

With reference to the matter of Molesworth-street, Lismore, I am directed by the Secretary for Mines to inform you that from reports obtained from the Commissioner and Engineer for Roads, the District Surveyor, and the District Engineer, it appears that direct access from Molesworth-street (the business part) to section No. 3, and the western half of section 4 is the most favourable, but it is doubtful whether the interests involved would justify the expenditure that would be required to effect it, viz., £2,254, that is to say £1,254 for land, and £1,000 for a bridge, which latter sum it is thought the Municipal Council will hesitate to expend.

I am to add that access is open by way of Keen-street, and the circumstances of the case do not appear to warrant of necessity any participation in the expense by the Crown.

I have, &c.,  
HARRIE WOOD,  
Under Secretary.

Returned herewith are original papers left by the Mayor of Lismore.

## No. 54.

Thos. T. Ewing, Esq., M.P., to The Under Secretary for Mines.

Sir,

Parliament House, 13 January, 1887.

I have the honor to inform you with reference to letter herewith returned that it should be unnecessary to again explain this case. Briefly it is this: The Government sold land in Molesworth-street, Lismore, showing a frontage to this street which also gave access to allotments to the north.

The street is now proved never to have existed.

The Government, therefore, has sold under a design now acknowledged to be erroneous, sold frontages to a road 1½ chains wide not in existence, and sold other allotments to which street (shown in design, never existing on ground) was the easiest and best means of access.

I think I am justified in saying that both Mr. Abbott and Mr. Fletcher, when Ministers for Mines, saw the position at a glance and accepted as inevitable the position in which the Government had been placed, and the matter resolved itself into a question as to how the Government could best extricate itself from the position by providing a road.

The Municipal authorities and private owners have been under the impression for the past year or two that the details were being arranged, and have patiently awaited a termination.

I return the enclosed again for your perusal, before informing the inhabitants, knowing that when proceedings at law are commenced the Government will find itself in a position impossible to defend, and be exposed to the ridicule of endeavouring to gain a case which no ordinary man would even dream of testing at law.

I have, &c.,  
THOS. EWING.

Acknowledge.—H.W., 18/1/87. Acknowledged The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 18/1/87. There appears to be nothing further for the Surveyor-General to add to his previous report on this matter, or to cause any departure from previous decision.—A. J. Stopps (*pro*. Surveyor-General), 4th February, '87. Submitted.—In view of the reports herein the previous decision may stand.—H.W., 9/2/87. Approved.—F.A., 10/2/87. T. T. Ewing informed, 12 February, 1887. The Surveyor-General.—G.E.H. (for Under Secretary), B.C., 15/2/87.

## No. 55.

The Under Secretary for Mines to T. T. Ewing, Esq., M.P.

Sir,

Department of Mines, Sydney, 12 February, 1887.

With reference to your letter of the 13th ultimo, respecting the matter of Molesworth-street, Lismore, I am directed by the Secretary for Mines to inform you that, in view of the reports in the case, it is not the intention to depart from the previous decision.

I have, &c.,  
HARRIE WOOD,  
Under Secretary.

## No. 56.

T. T. Ewing, Esq., M.P., to The Under Secretary for Mines.

Sir,

Parliament House, Sydney, 19 March, 1887.

I have the honor to request that this letter may be placed with others in connection with resumption in Molesworth-street, Lismore, respecting which I will shortly call to see the Minister.

I have, &c.,  
THOS. EWING.

Acknowledge.—G.E.H. (for Under Secretary), 21/3/87. Acknowledged, 21/3/87. The Surveyor-General for return of papers to Mines.—G.E.H. (for Under Secretary), B.C., 21/3/87. Papers herewith returned to Mines Department as requested.—A. J. Stopps (for Surveyor-General), 28/3/87.

[Enclosure.]

[Enclosure.]

Sir,

Lismore, 17 January, 1886.

Having recently purchased the house and ground, once the property of John Currie, of Lismore, and formerly the residence of Dr. Parker; and having heard that the local Municipal Council endeavoured, through your aid, to induce the present Government to resume a portion of said land for the improvement of Molesworth-street; and might have succeeded were it not for the opposition of the late owner, I do myself the honor to acquaint you that I, as present owner, will not only not object, but will willingly agree to, or fall in with, whatever proposition has been so submitted to this Government, or which may yet be so submitted to any future Government for such purpose.

I have, &amp;c.,

C. COGHLAN,

Clerk of Petty Sessions.

T. T. Ewing, Esq., M.L.A., Sydney.

No. 57.

The Mayor of Lismore to The Secretary for Mines.

Sir,

Council Chambers, Lismore, 26 July, 1887.

I have the honor, by request of the Council, to forward the enclosed petition of the residents of Lismore, *re* resumption of land for a street.

This matter was so long and often under the consideration of the Department, that I trust a speedy and favourable decision will be arrived at.

I have, &amp;c.,

LOUIS BERNSTEEN,

Mayor.

Forward to the Department of Lands and inform.—G.E.H. (for Under Secretary), 17/8/87. Informed, 17/8/87. The Under Secretary Department of Lands.—G.E.H. (for Under Secretary), B.C., 19/8/87.

No. 58.

Petition.

[Presented by Thos. Ewing and F. G. Crouch, 12th August, 1887.]

To His Worshipful the Mayor and Aldermen of the Municipal Borough of Lismore,—

We, the undersigned ratepayers in the Municipal Borough of Lismore,

HUMBLY SHOWETH,—

That some little time ago the Honorable the Minister for Mines had approved of certain resumption of land in Molesworth-street North, with a view of opening up the traffic of the said street, that the said land, up to the present, has not been resumed, that the delay is a great hindrance to the general traffic of the town.

Your Petitioners understand that the obstacle in the way at the time, was the exorbitant price asked by Mr. Currie for his land at the corner of Zadoc and Molesworth Streets. Your Petitioners wish to point out that this obstacle has been removed, in as much as the land then owned by Mr. Currie, is now the property of Mr. Coghlan, and we feel sure the present owner would be willing to take a fair price for his land, if resumed.

Your Petitioners trust that your Honorable Council will take this matter in hands again, and we feel sure your efforts will be crowned with success, and your Petitioners, as in duty bound, will ever pray.

Peter Dawson, Freehold; John Maher, Ratepayer; Mathew Ruan, Freehold; and 129 other signatures.

No. 59.

Petition.

[Presented by Thomas Ewing and F. G. Crouch, 18 August, 1887.]

To The Honorable the Minister for Mines, Sydney.

The humble Petition of the undersigned Residents of Lismore

SHOWETH,—

That the roadway on the northern side of Brown's Creek, in Molesworth-street, is, on account of its abutment to Wilson's Creek and the steep nature of its banks, unsuitable for traffic, and also because of the continued erosion of the banks of that creek any resumption previously denied of land there for the purpose of widening that street would be of little practical use.

That, in considering the resumption of land in order to give the residents of that part of Lismore commonly known as Newtown access to the southern and business part of the town, the Government should consider the practicability of resuming the allotment of land adjoining the eastern side of Lismore Court-house, extending from Zadoc-street to Brown's Creek, and a strip of land from Brown's Creek to Woodlark-street, as shown in the sketch sent herewith, for the following reasons:—

Firstly: It would afford people a means of access, in time of flood, from the town to the high ground on which the Court-house is built.

Secondly: It would form a continuation of Coleman's-lane.

Thirdly: It would afford the residents access to the Court-house when both bridges over Brown's Creek in Molesworth-street and Keen-street are covered with flood-waters.

Fourthly: The price for the resumption of land at this place would be cheaper than that asked for the frontages in Molesworth-street.

Fifthly: It would be of far greater convenience generally to the residents of Lismore.

That a report be asked for from some responsible person as to the suitability of the place indicated in the sketch for the purposes of a roadway.

And

And your Petitioners therefore pray that you will cause such inquiries to be made as to the suitability of this land for a roadway, the price required by the owners of the land proposed to be resumed, and on such other matters as the Honorable the Minister may deem necessary. And your Petitioners, as in duty bound, will ever pray, &c.

LOUIS BERNSTEEN, Mayor of Lismore, M.D.  
J. E. GLASGOW, J.P., Timber Merchant.  
GEORGE LARKIN, J.P., Storekeeper, Lismore.  
And 61 other signatures.

Forward to Lands Department and inform.—G.E.H. (for Under Secretary), 22/8/87. Messrs. Ewing and Crouch, Ms.P., informed, 22/8/87. Refer to Mr. Donaldson for future report.

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No. 60.

A. F. Parker, Esq., M.D., to The Secretary for Mines.

Sir,

Lismore, 7 October, 1887.

A Petition, signed by many ratepayers of the municipality of Lismore, praying that certain portions of land in Molesworth-street of that town might be resumed was forwarded to your Department July 26, 1887. Could you inform me whether any reply has been given to the letter forwarded by the Mayor with the Petition, and whether your Department recommended that the land should be resumed or not?

I have, &c.,

ARTHUR F. PARKER, M.D.

This, I think, refers to land required for street. Refer to Lands Department, and inform.—G.E.H. (for Under Secretary), 12/10/87. A. F. Parker, 12/10/87. The Under Secretary for Lands.—G.E.H. (for Under Secretary), B.C., 20/10/87.

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No. 61.

A. F. Parker, M.D., Esq., to The Secretary for Lands.

Sir,

Lismore, 7 October, 1887.

A Petition signed by many of the ratepayers of the municipality of Lismore was forwarded to the Mayor and Council of that town praying that certain lands in Molesworth-street might be resumed so as to form a passable road.

This Petition was sent, July 26, 1887, on by the Mayor to the Department for Mines, and since then, I believe, nothing has been heard of it. As I am one of the most interested parties, holding a portion of the land it is prayed may be resumed, I should be glad if you could inform me whether it is the intention of the Department to recommend the resumption or not.

I have, &c.,

ARTHUR F. PARKER, M.D.

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No. 62.

Thos. T. Ewing, Esq., and F. G. Crouch, Esq., Ms.P., to The Under Secretary for Mines.

Sir,

Parliament House, Sydney, 12 October, 1887.

We hope you will kindly look into this matter. The correspondence has been very lengthy.

We have, &c.,

THOS. EWING.

F. G. CROUCH.

Forward to Lands Department and inform.—G.E.H. (for Under Secretary), 13/10/87. Messrs. Ewing and Crouch, Ms.P., informed, 15/10/87. The Under Secretary, Department of Lands.—G.E.H., (for Under Secretary), B.C., 14/10/87.

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[Enclosure.]

Sir,

Lismore, 7 October, 1887.

About seven months ago I took the liberty of writing to you in reference to the question of the resumption of certain land in Lismore, for the improvement of Molesworth-street; and you were good enough to acknowledge the receipt and promised to inquire about it. Since then, about the prorogation of Parliament, a numerously signed petition for the second time from the ratepayers, urging the necessity for said resumption, was forwarded through the Municipal Council, but nothing has been heard of it. Dr. Parker and Mr. Coleman have requested me to bring the matter under your notice, and request you to be so good as to inquire whether anything has been, or is likely to be, done. My fence is in a very dilapidated condition—portions being on the street—but I cannot replace it until this question of resumption be settled one way or the other. Both the Council and ratepayers have been in favour of resumption for years, and would have been successful were it not.

T. T. Ewing, Esq., M.L.A., Sydney.

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No. 63.

A. F. Parker, Esq., M.D., to The Under Secretary for Lands.

Sir,

Lismore, 28 October, 1887.

On the 7th instant, I addressed a letter to you asking certain information relative to a Petition that was forwarded by the Mayor of Lismore to the Under Secretary for Mines.

Since then I have received a communication from the Under Secretary for Mines informing me that the Petition of the residents of Lismore for the resumption of certain land in Molesworth-street had been forwarded to you. Having had no reply from you, I should be obliged if you would now give me the desired information, viz., whether it is your intention to recommend this resumption or not.

You

You can understand that I am particularly interested in this matter, as it is impossible for me to build on the allotment of land belonging to me until I know whether a road is going to be made through it or not.

I have, &c.,

ARTHUR F. PARKER, M.D.

It is recommended that Dr. Parker be informed that it is not intended to comply with the request of Petitioners to widen part of Molesworth-street in the town of Lismore.—A. J. Stopps (for Surveyor General).

See 83- $\frac{1}{2}$ <sup>2</sup> for approval. A. F. Parker, M.D., informed.—H.L.T., 8/11/87.

#### No. 64.

#### The Acting Surveyor-General to The Under Secretary for Lands.

Proposed Resumption of Land to provide a Street in lieu of widening part of Molesworth-street, Town of Lismore.

THE petition (paper No. 46) is a renewal of an application for the widening of part of Molesworth-street. The whole question has been fully reported upon and considered, and the application has several times been refused. See Mr. Abigail's decision (paper 42), Mr. Fletcher's decision (paper 41), and Mr. Abbott's decision (paper 11).

The petition registered 47 points out that Molesworth-street at the point in question is unsuitable for traffic from the steepness of the ground, and because of the continued erosion of the river bank, and suggests the resumption of land elsewhere (as shown on sketch). This possible course has been previously under consideration as an alternative to widening Molesworth-street, and is embraced in the Ministerial decisions that the Crown declines to accept any responsibility in providing improved access in this case (beyond mere survey), leaving the Municipal Council of Lismore to deal with the matter as strictly a municipal one.

Departure from previous decisions cannot be recommended.

E. TWYNAM.

See also paper 51.—A.J.S. Submitted.—S.F., 5/11/87. I cannot sanction a departure from or reversal of previous Ministerial decisions on this case.—T.G., 7/11/87. T. T. Ewing, M.P., and F. G. Crouch, M.P., informed.—H.L.T., 8/11/87.

#### No. 65.

#### The Under Secretary for Lands to A. F. Parker, Esq., M.D.

Sir,

Department of Lands, Sydney, 8 November, 1887.

With reference to your letter of the 28th ultimo, respecting a petition of the residents of Lismore for the resumption of certain land in Molesworth-street, I am directed by the Secretary for Lands to inform you that it is not intended to comply with the request of the petitioners to widen the street in question.

I have, &c.,

STEPHEN FREEMAN

(For the Under Secretary).

#### No. 66.

#### The Under Secretary for Lands to T. T. Ewing, Esq., and F. G. Crouch, Esq., Ms.P.

Gentlemen,

Department of Lands, Sydney, 8 November, 1887.

With reference to the petition of certain residents of Lismore (presented by you) for the resumption of land to provide a street in lieu of widening part of Molesworth-street, Lismore, I am directed to inform you that the Secretary for Lands cannot sanction a departure from, or reversal of, previous Ministerial decisions in this case.

I have &c.,

STEPHEN FREEMAN

(For the Under Secretary).

#### No. 67.

#### T. T. Ewing, Esq., M.P., to The Under Secretary for Lands.

Sir,

Parliament House, Sydney, 12 November, 1887.

I have the honor to inform you that I desire to see Secretary for Lands in this matter.

I should be glad if you could have a *précis* of case submitted to him.

I will call when you inform me, papers are in a position for his consideration.

Yours, &c.,

THOS. EWING.

It is thought that the Surveyor-General's reports upon papers Nos. 11, 23, 25, 39, and 41, afford the information required for the understanding of the case, unless a personal explanation of it might be considered to be more satisfactory.—E. TWYNAM, 18/11/87.

The Under Secretary.—S.F., 19/11/87. Inform Mr. Ewing, M.P., I will see him on Wednesday at 2 p.m.—T.G., 21/11/87. Mr. Ewing, M.P. informed, 21/11/87.

Mr. Ewing, M.P., saw me on day arranged, and pointed out that the difficulty is caused in this case by an error in the original survey of the town as far as it concerned the portion of Molesworth-street, and not by the erosion of the river bank. He points out that trees, a growth of great age, are now on the edge of the river bank, and within the boundaries of the allotments, and that the site of the street is actually in part in the course of the river. This statement should be thoroughly tested, and when result is known the case may then be resubmitted.—T.G., 26/11/87.

## No. 68.

The Under Secretary for Lands to T. T. Ewing, Esq., M.P.

Sir,

Department of Lands, Sydney, 21 November, 1887.

With reference to your letter of the 12th instant, requesting an interview with the Secretary for Lands, respecting the desire of certain residents of Lismore, that land be resumed to provide a street in lieu of widening part of Molesworth-street, Lismore, I have the honor to inform you that Mr. Secretary Garrett will see you on Wednesday next, at 2 p.m.

I have, &amp;c.,

STEPHEN FREEMAN  
(For the Under Secretary).

## No. 69.

The Acting Surveyor-General to The Under Secretary for Lands.

Proposed widening of Molesworth-street (at Zadoc-street), Lismore.

Surveyor-General's Office, Sydney, 6 December, 1887.

THIS part of Molesworth-street is shown to be impracticable for traffic, being partly in the North Richmond River and partly on the river bank, and it is subject to the eroding action of the river. (*Vide* sketches 83 <sup>180</sup> <sub>10 and 21</sub>.)

The allotments fronting this part of Molesworth-street were purchased as marked on the ground, and probably at that time the land was supposed to have a special value in view of frontage to navigable water.

As shown by the local Roads Engineer, the action of wheeled traffic along this part of the street has contributed greatly to the destruction of the surface, and instead of the widening of the street, as suggested, along the entire frontage, he advises a diversion through alienated land (section 5) up to Zadoc-street, and thence northward resumption of land for widening. The incidental expenditure is estimated as follows, viz. :—Compensation for land to be resumed, £1,254; bridge over Brown's Creek, approaches, and other works, £1,000.

The Chief Engineer points out that the site is not suitable for a road, also that after construction further outlay to an indefinite extent will probably be requisite for protection of the river bank and road, and he cites, as an instance, High-street embankment at West Maitland as a case presenting similar conditions.

The argument advanced by Mr. Ewing, M.P., and others, is that because this part of Molesworth-street was projected perhaps injudiciously, and possibly partly within or too near the river frontage, therefore the Government is responsible for its present impracticable state, and is bound to improve it. This view of the case altogether ignores certain facts, viz., that parties purchased allotments as defined on the ground and with the knowledge of their position; also that at time of sale the land may have been supposed to have special value, on account of its proximity to water frontage; and also that such water frontage has been utilized to advantage by crection of a wharf; and further that the aid of the Government is now sought on the plea that Molesworth-street is an important thoroughfare. It appears to me that the improvement of this street is a matter so deeply affecting the value of the allotments abutting on it that it is somewhat a matter of surprise that the proprietors do not offer to contribute largely to the work; and moreover the municipal rating on the enhanced value of business places might in a considerable measure provide interest on the outlay.

I would beg to submit that the only ground advanced, viz., injudicious projection of the street too near the river is not of such weight as to constitute an exception to the recognized practice of the Government, viz., that the maintenance of streets within an incorporated area is a duty devolving upon the Council, to which an annual subsidy is paid by the State, thus to relieve the Government from further demand in this respect.

Apparently the only exceptional circumstance in this case is the comparatively large expenditure for the work which would naturally be regarded as of some magnitude in a small municipal district (the population being about 6,000).

It would not be judicious to treat this case as one of expenditure in the guise of compensation for error in design of the town, as it might incur numerous similar claims on grounds more or less doubtful, which it would be most difficult to rebut.

Moreover, it is to be borne in mind that there are alternative proposals for opening another street in lieu of Molesworth-street, which, if properly supported by the inhabitants concerned and those who would be benefited thereby, would doubtless have been entered upon by the Council by this time.

Under all the circumstances it is submitted that the previous decision (supported by three Ministers) be not departed from, viz., that this is purely a municipal matter, and one of a character which the Government at present is not bound to support or assist, especially in view of impending legislation.

E. TWYNAM.

Submitted that Mr. Ewing, M.P., be informed in terms of this report, or that a copy be sent to Mr. Ewing, with an intimation that Mr. Secretary Garrett concurs in the views expressed therein.—S.F., 17th December, 1887.

Inform.—T.G., 20/2/87. T. T. Ewing, M.P., with copy of report, 22/12/87.

## No. 70.

The Under Secretary for Lands to T. T. Ewing, Esq., M.P.

Sir,

Department of Lands, Sydney, 23 December, 1887.

I am directed to forward the accompanying copy of Mr. Acting Surveyor-General Twynam's report on the proposed widening of Molesworth-street (at Zadoc-street), Lismore, and to inform you that Mr. Secretary Garrett concurs in the views expressed therein.

I have, &amp;c.,

STEPHEN FREEMAN  
(For the Under Secretary).

[Enclosure.]

## [Enclosure.]

Proposed widening of Molesworth-street (at Zadoc-street), Lismore.

Sydney, 6th December, 1837.

THIS part of Molesworth-street is shown to be impracticable for traffic, being partly in the North Richmond River, and partly on the river bank, and it is subject to the eroding action of the river (*vide* sketches 83 <sup>159</sup> <sub>16 and 21</sub>).

The allotments fronting this part of Molesworth-street were purchased as marked on the ground, and probably at that time the land was supposed to have a special value in view of frontage to navigable water.

As shown by the Local Roads Engineer the action of wheeled traffic along this part of the street has contributed greatly to the destruction of the surface, and instead of the widening of the street as suggested, along the entire frontage, he advises a diversion through alienated land (section 5) up to Zadoc-street, and thence northward resumption of land for widening.

The incidental expenditure is estimated as follows, viz:— Compensation for land to be resumed, £1,254; bridge over Brown's Creek, approaches, and other works, £1,000.

The Chief Engineer points out that the site generally is not suitable for a road, also that after construction further outlay to an indefinite extent will probably be requisite for protection of the river bank and road, and he cites, as an instance, High-street embankment at West Maitland as a case presenting similar conditions.

The arguments advanced by Mr. Ewing, M.P., and others is that because this part of Molesworth-street was projected, perhaps injudiciously, and possibly partly within or too near the river frontage, therefore the Government is responsible for its present impracticable state, and is bound to improve it. This view of the case altogether ignores certain facts, viz., that parties purchased allotments as defined on the ground, and with the knowledge of their position; also at time of sale the land may have been supposed to have special value on account of its proximity to water frontage; and also that such water frontage has been utilized to advantage by erection of a wharf; and further that the aid of the Government is now sought on the plea that Molesworth-street is an important thoroughfare.

It appears to me that the improvement of this street is a matter so deeply affecting the value of the allotments abutting on it, that it is somewhat a matter of surprise that the proprietors do not offer to contribute largely to the work, and moreover the Municipal rating on the enhanced value on business places might in a considerable measure provide interest on the outlay. I would beg to submit that the only ground advanced, viz., injudicious projection of the street too near the river, is not of such weight as to constitute an exception to the recognized practice of the Government, viz., that the maintenance of streets within an incorporated area, is a duty devolving upon the Council, to which an annual subsidy is paid by the State thus to relieve the Government from further demand in this respect.

Apparently the only exceptional circumstance in this case is the comparatively large expenditure for the work which would naturally be regarded as of some magnitude in a small municipal district (the population being about 6,000.)

It would not be judicious to treat this case as one of expenditure in the guise of compensation for error in design of the town, as it might incur numerous similar claims on grounds more or less doubtful, which it would be most difficult to rebut.

Moreover, it is to be borne in mind that there are alternative proposals for opening another street in lieu of Molesworth-street, which, if properly supported by the inhabitants concerned, and those who would be benefited thereby, would doubtless have been entered upon by the Council by this time.

Under all the circumstances it is submitted that the previous decision (supported by three Ministers) be not departed from, viz., that this is purely a municipal matter, and one of a character which the Government at present is not bound to support or assist, especially in view of impending legislation.

E. TWYNNAM,  
Surveyor-General's Office.

The Under Secretary for Lands.

## No. 71.

T. T. Ewing, Esq., M.P., to The Secretary for Lands.

Resumption Molesworth-street, Lismore.

Sir,

Parliament House, 3 January, 1838.

In my interview with you it appeared that the point really to be decided in above case was simply—

1. Was Department in error in relative positions of Richmond River and Molesworth-street, in early surveys.
2. (And incidentally upon that) had early plans of town of Lismore under which land was sold course of river shown wrongly?

I think I am right in believing that you concede the Government is bound by same responsibilities as obtain between individuals, and that if Department had been in error it should be remedied. I am aware that as is the case with all river and creek banks, there is always slight erosions and makings up going on, but these usual changes cannot affect this case, it being not a matter of a few feet, but of chains.

I enclose seven declarations from old residents, all respectable men, and can obtain the same statement from every old resident. But the vegetation on other side of river—may be, hundreds of years old—proves so conclusively that river course could not have been there thirty or forty years ago, that it has always appeared incomprehensible that Department could have made such a contention.

In order to place the matter at once and for all beyond doubt, I shall be glad if you would kindly request your district surveyor to reply to the following questions. Mr. Donaldson's large experience in these districts is well known to you.

After the matter of the justice is conceded, will be sufficient time to consider the remedy.

I trust you may be able to obtain a speedy reply.

I have, &c.,  
THOS. EWING.

## Questions.

- (1.) Was an error made by Mr. Surveyor Peppercorn in placing Molesworth-street in position with relation to Richmond River as shown by early maps of town of Lismore?
- (2.) Were early maps in error?
- (3.) Is it a fact that river was shown with reference to some allotments some (300) three hundred feet out of its course—(notably, North Lismore)?
- (4.) Is it a fact that some of the divisional lines between allotments in North Lismore (directly opposite) come some 4 chains (264 feet about) beyond where bank of river was shown in early survey?
- (5.) Is it a fact, where course of river is thus shown, timber, at least 100 years old, growing on firm alluvial flat, is in existence?
- (6.) Is it possible since occupation of Colony by whites, Richmond River course can have been as shown?

[Enclosures.]

## [Enclosures.]

I, EDMUND ROSS, of Ballina, do solemnly and sincerely declare that I remember the survey of the town of Lismore, as made by Mr. Peppercorn, particularly sections 4 and 5 on each side of Zadoc-street, Wilson's Creek, and I distinctly remember that the said Wilson's Creek has not changed its course since the said survey was made by Mr. Peppercorn. And I make this solemn declaration, conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed, in the ninth year of the reign of Her present Majesty, intituled, "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits."

Made and signed before me at Lismore, }  
this 7th day of November, 1888. }

ALEXR. J. SIMPSON, J.P.

EDMUND ROSS, J.P.

I, WILLIAM SMITH, of Lismore, do solemnly and sincerely declare that I remember the survey of Lismore since the year 1857, particularly sections 4 and 5, surveyed by Peppercorn on each side of Zadoc-street, Wilson's Creek, and distinctly remember that the said creek has not changed its course since that survey was made. And I make this solemn declaration, conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled, "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits."

Made and signed before me, at Lismore, }  
thit 23rd day of October, 1888. }

C. COGHLAN, a Commissioner for Affidavits.

WILLIAM SMITH.

I, ARCHIBALD CURRIE, of North Lismore, do solemnly and sincerely declare that I remember the survey of the town of Lismore, made by Mr. Peppercorn in 1855 and 56, and particularly sections 4 and 5, on each side of Zadoc-street, Wilson's Creek; and distinctly remember that the said creek has not changed its course since the said survey was made. And I make this solemn declaration, conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled, "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits."

Made and signed before me, at Lismore, }  
this 24th day of October, 1888. }

JAMES BARRIE, J.P.

ARCHIBALD CURRIE.

I, JOHN PEATE, of North Lismore, do solemnly and sincerely declare that I remember the survey of the town of Lismore, made by Mr. Peppercorn, and particularly the sections 4 and 5, on each side of Zadoc-street, Wilson's Creek; and distinctly remember that the said creek has not changed its course since the said survey was made. I remember the place referred to for over forty years. And I make this solemn declaration, conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled, "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits."

Made and signed before me, at Lismore, }  
this 30th day of October, 1888. }

C. COGHLAN, a Commissioner for Affidavits.

JOHN PEATE.

I, EDWARD HOWELL, of North Lismore, do solemnly and sincerely declare that I remember the survey of the town of Lismore, made by Mr. Peppercorn, and particularly the sections 4 and 5, on each side of Zadoc-street, Wilson's Creek; and distinctly remember that the said creek has not changed its course since the said survey was made, nor for last forty years. And I make this solemn declaration, conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled, "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits."

Made and signed before me, at Lismore, }  
this 30th day of October, 1888. }

C. COGHLAN, a Commissioner for Affidavits.

E. HOWELL.

I, C. W. GRIFFIN, of Lismore, do solemnly and sincerely declare that I know Molesworth-street, Lismore, at the junction of Zadoc-street, and sections 4 and 5 on each side of the latter street since January, 1858, and I am certain that there is no alteration in the course of the stream of Wilson's Creek during that period at that place. And I make this solemn declaration conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits."

Made and signed before me, at Lismore, }  
this 3rd day of November, 1888. }

C. COGHLAN, a Commissioner for Affidavits.

C. W. GRIFFIN.

I, EDMUND COLEMAN, of Lismore, do solemnly and sincerely declare that I remember the survey of the town of Lismore as made by Mr. Peppercorn, particularly sections 4 and 5 on each side of Zadoc-street, Wilson's Creek, and I distinctly remember that the said Wilson's Creek has not changed its course since the said survey was made. And I make this solemn declaration conscientiously believing the same to be true, and in virtue of the provisions of an Act made and passed in the ninth year of the reign of Her present Majesty, intituled "An Act for the more effectual abolition of oaths and affirmations taken and made in various departments of the Government of New South Wales, and to substitute declarations in lieu thereof, and for the suppression of voluntary and extra-judicial oaths and affidavits."

Made and signed before me, at Lismore, }  
this 6th day of November, 1888. }

EDMUND ROSS, J.P.

EDMUND COLEMAN.

## No. 72.

The Council Clerk, Lismore, to The Secretary for Mines.

Sir,

Council Chambers, Lismore, 21 September, 1888.

By direction of the Borough Council of Lismore, I have the honor to transmit the following resolution, viz. :—"That owing to the increased traffic in that portion of Molesworth between Orion and Woodlark Streets, this Council take immediate action to communicate with the proper authorities to have the necessary land resumed so as to make that portion of the street the full width, viz., 99 feet." I am further

further directed to call your attention to your letter No. 86-1263 (83- $\frac{1}{2}$  P.) roads in which you stated this matter would receive immediate attention. The owners of the land proposed to be resumed are all willing to sell at a reasonable price, and the Council hope that the Government will favourably consider their request, as the resumption asked for is of vital importance to the welfare of the district.

I am, &c.,  
C. A. BARHAM,  
Council Clerk.

This is a matter for the Lands Department, 25/9/88. The Under Secretary for Lands.—G.E.H.  
(for Under Secretary), B.C., 25/9/88.

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No. 73.

The Surveyor-General to The Under Secretary for Lands.

Proposed widening of Molesworth-street, Lismore, sought by Borough Council of Lismore.

4 October, 1888.

THE object sought in the Council's letter has been repeatedly urged by the Borough Council of Lismore, by petition of residents, and by representations of Mr. Ewing, M.P., and the facts have been fully reported upon and submitted to several Ministers, who have agreed in the opinion that the object sought is one for municipal action, and not one which the Crown is bound to support or to assist in, especially in view of impending legislation.

A. J. STOPPS  
(For Surveyor-General).

Submitted that the Council Clerk be informed in terms of this minute, and that the determination already arrived at will not be disturbed.—S.F., 9/10/88. C.O. Submission approved.—J.N.B., 10/10/88. Council Clerk, Lismore, informed.—H.L.T., 12/10/88.

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No. 74.

T. T. Ewing, Esq., M.P., to The Under Secretary for Lands.

Sir, Parliament House, 9 October, 1888.

I should like an interview with you respecting resumption, Molesworth-street. The case was a Mines, and is pretty voluminous. I will call in a day or two, and hope you will have the papers.

Yours, &c.,  
THOS. EWING.

Mr. Brett,—Previous papers are now in Correspondence Branch for letter to be written to Borough Council, declining to reopen the question; please see if the letter can be written to-day, in order that the papers may be sent to the Assistant Under Secretary as soon as possible.—A.J.S., 12/10/88.

Mr. Stopps,—The papers, with letter for signature were left by Mr. Thompson with the Assistant Under Secretary this morning.—W.B., 12/10/88. Mr. Ewing to call.—S.F., 24/10/88.

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No. 75.

T. T. Ewing, Esq., M.P., to The Secretary for Lands.

Sir, Parliament House, 11 October, 1888.

I intended sending you the information in my possession, respecting Molesworth-street, Lismore; but it is voluminous, and I do not think it right to expect you to go through it. If you can give me a quarter of an hour about next Wednesday, I can explain matters, and accept your verdict.

I hope you will suspend judgment till then. I undertake to prove the Department is in error.

Yours, &c.,  
THOS. EWING.

Mr. Stopps,—Is this a roads case?—C.O., 12/10/88. Plan herewith, viz., Cat. J. 1, 2,263. Submitted.—G.E.H. (for U.S.), 17/9/84. Approved.—J. P. ABBOTT, 18/9/84. Minute, 19th September, 1884.

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No. 76.

The Under Secretary for Lands to The Council Clerk, Lismore.

Sir, Department of Lands, Sydney, 12 October, 1888.

With reference to your letter of the 21st ultimo, transmitting a copy of a resolution of your Council in regard to the widening of Molesworth-street, Lismore, I am directed by the Secretary for Lands to inform you that upon the petition of residents and the representations of Mr. Ewing, M.P., the facts have been fully reported upon and submitted to several Ministers, who have agreed in the opinion that the object sought is one for municipal action, and not one which the Crown is bound to support or to assist in, especially in view of impending legislation, and that the determination already arrived at will not be disturbed.

I have, &c.,

(For the Under Secretary).

## No. 77.

The Council Clerk, Lismore, to The Secretary for Lands.

Sir,

Council Chambers, Lismore, 23 November, 1888.

By direction of the Borough Council of Lismore, I have the honor to again bring under your notice the resumption of the northern end of Molesworth-street with the Borough.

You have had this matter a very long time under consideration, and in view of the very great importance of the work required to be done, and the fact that people have to trespass on private property (which the owners threaten to close) to avoid this dangerous portion of road, and that the Council are anxious to make this part fit for traffic, request that you will take such action in the matter to get the said portion of road resumed at an early date.

I have, &amp;c.,

C. A. BARHAM,

Council Clerk.

Inform that the Lands Department deal with such cases, and send this to Lands Department.—F.A., 27/11/88. Council Clerk informed, 30/11/88. The Under Secretary for Lands.—G.E.H. (for Under Secretary), B.C., 1/12/88. Let this await return of papers from Under Secretary.—A.J.S.

## No. 78.

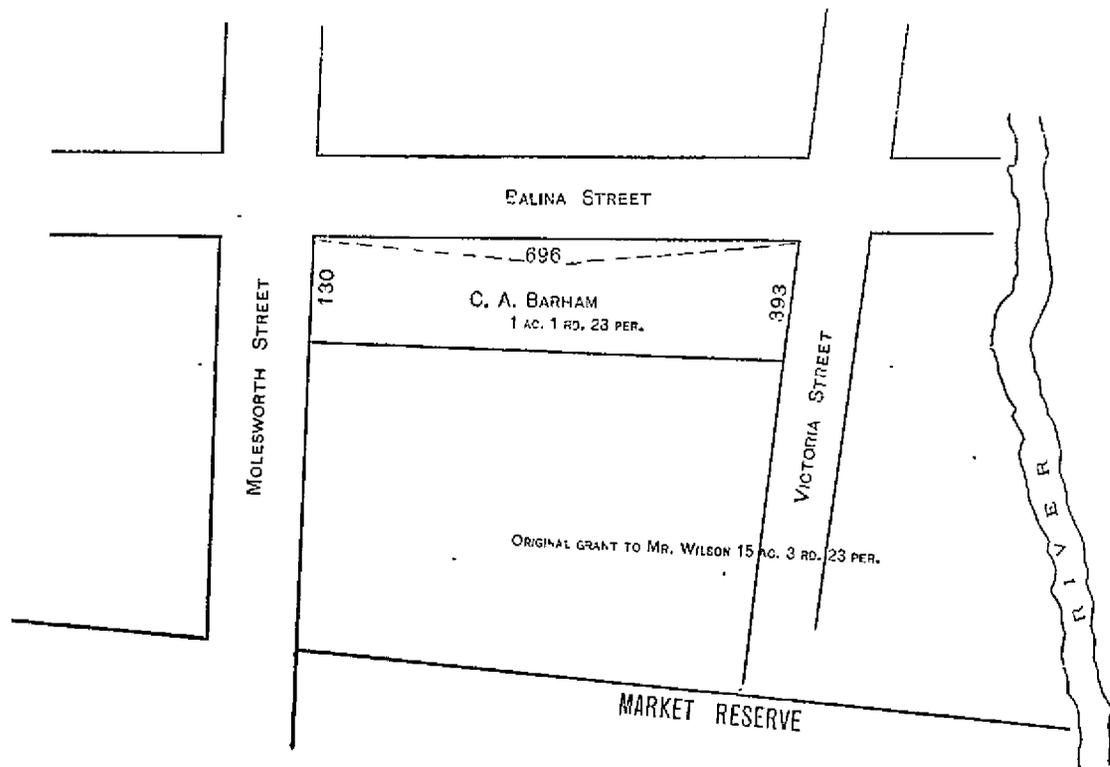
Mr. C. A. Barham to The Secretary for Lands.

Sir,

Lismore, 11 January, 1889.

In the matter of the confirmation of streets in the Municipality of Lismore, and in accordance with the notice in the *Government Gazette*, of the 4th ultimo, I herewith respectfully beg to claim compensation for loss and damages of the undermentioned land through which there was no right of making roads reserved in the original grant made by the Crown.

The land is a subdivision of a grant made to William Wilson on 25th January, 1859, and contained 15 acres 3 roods and 23 perches, and situated in the county of Rous, parish of Lismore, and village of Lismore: Commencing on the north-west side of Molesworth-street at the southern corner of the Market Reserve; and bounded thence on the north-east by a line, and dividing it from that reserve north-westerly at right angles to Molesworth-street, 9 chains 10 links to the Richmond River; on the north-west by that river downward to Ballina-street; on the south by that street easterly 13 chains and 50 links to Molesworth-street; and on the south-east by 11 chains and 40 links of the north-west side of Molesworth-street, north-easterly to the point of commencement. The following is a rough plan of the portion of the subdivision which is my property, and on which I think I am entitled to compensation.



The land taken from me in the alignment is the whole of my Ballina-street frontage to a depth of about 2 feet. The frontage is 696 links long, and fenced with a two-railed fence, and a portion laid out into a garden. If I am entitled to compensation I will leave the amount entirely in the hands of whom you may appoint to inquire into the matter.

I have, &amp;c.,

C. A. BARHAM.

The building line of Ballina-street as surveyed follows the correct position of the boundary of the grant referred to, and does not encroach on private land, but if Mr. Barham's fence is outside that boundary or building line it is an encroachment on the road, and should be placed back to correct position. It is recommended that Mr. Barham be so informed.—A. J. Storrs (for Surveyor-General), 22nd January, 1889.

For approval.—S.F., 24/11/89.

Approved.—W.G.L., 25/1/89.

C. A. Barham informed,

5/2/89.

No. 79.

## No. 79.

The Under Secretary for Lands to Mr. C. A. Barham.

Sir,

Department of Lands, Sydney, 5 February, 1889.

With reference to your letter of the 11th ultimo, respecting the matter of confirmation of streets in the municipality of Lismore, and claiming compensation by way of damages, and for loss of certain land in connection therewith, I have the honor to inform you that the building line of Ballinastreet, as surveyed, follows the correct position of the boundary of the grant referred to, and does not encroach on private land; but if your fence is outside that boundary or building line it is an encroachment on the road, and should be placed back to the correct position.

Sub-division of  
grant issued to  
William Wilson  
on January,  
1889.

I have, &amp;c.,

F. H. WILSON

(For the Under Secretary).

## No. 80.

The Acting Surveyor-General to The Under Secretary for Lands.

Molesworth-street—Town of Lismore.

1 March, 1889.

PART of Molesworth-street, near Zadoc-street, in the town of Lismore, is impracticable for traffic, and for several years past the Municipal Council have urged upon the Government the resumption of alienated land in order to construct a safe and permanent road; the expenditure to be incurred in resumption of land and necessary works would be very large; it is estimated at about £2,250.

The matter has met with careful consideration, and the action desired by the Council has been refused by four Ministers successively on the grounds that it is of the character which brings it within the functions of Municipal Government, and that beyond facilitating proceedings by survey, &c., the Government was not bound to assist.

This view of the case is contested by Mr. Ewing, M.P., on behalf of the Council, who alleges that the difficulty has arisen through original faulty design of the town, in that Molesworth-street may not have been of the width represented, viz., 99 feet, but may have been partly in the river, and, therefore, not available as a street; and he now propounds a series of questions which he desires shall be submitted for reply to the District Surveyor, in the belief that such replies will support his contention. I have to state that full particulars have been obtained touching this matter; every point has been considered, and I think that further reference to the District Surveyor is unnecessary, and might be even embarrassing if he were required to answer certain questions put in such form as to suit one side of the case, and every one of which admits of argument.

Touching Mr. Ewing's special argument, I may be permitted to make a short rejoinder in pointing out that no matter what was the former limit of the river relatively to Molesworth-street, part of that street opposite section 5 is only about 4 feet above ordinary water level, and, together with the bridge thereto, leading over Brown's Creek, is liable to inundation, and, consequently the conditions are very unfavourable for construction of a road, and so far support the opinions of the Local Road Officers and their estimates of probable expenditure. Under these circumstances I submit that Mr. Ewing's contention has met with due consideration, and that the case is fully and fairly set forth in my previous report (83-159); therefore, I would beg to advise that there be no departure from the decision previously arrived at. I think that in reply Mr. Ewing might be informed that due weight has been given to his contention as to the probable relative positions of Molesworth-street and the river in the original alignment of the town; but there is evidence of traffic over Molesworth-street for many years, in fact, until obstruction from natural causes, and it would appear to have been the duty of the Council to execute from time to time such repairs or works as may have been necessary to maintain thoroughfare; consequently, it is held that the matter is one for municipal action, and not of the character demanding special interference or support on the part of the Government.

E. TWYNAM.

Submitted.—F.H.W., 4/3/89.

No. 81.  
Synopsis.

Synopsis of correspondence received and action taken relative to Molesworth-street, Lismore. (Roads 83,159.)

*Paper No. 9.*—A letter from the Borough Council of Lismore states that from the unskilful manner Molesworth-street was laid out, inasmuch as no way of access has been left to section No. 4 by that street, to the great injury of those who inadvertently bought land and built houses and business premises on the said section, fronting the said street, they request the Crown to acquire land from the neighbouring private properties for the purpose of providing a street.

*Paper No. 6.*—Mr. John Currie, an old resident of Lismore, in a letter to the Department, objects to the expenditure of public moneys for the purpose, and states that landslips have occurred; and, as this is a river bank road if the Government goes to the expense now of resuming land and the Council allows heavy traffic along the road, without making some provision in the shape of a retaining-wall to protect the river bank, it is only a matter of time when the Government will again be called on to resume more land. The Council, he further states, should have had the road at landslip repaired long ago, and that a case is pending in the Supreme Court against the Borough Council for neglect.

*Paper No. 10.*—From the District Surveyor's report it appears that a road along Molesworth-street had been in use to a wharf on Molesworth-street, the terminus of the ocean-going steamers until a landslip occurred (about 1880), to make it useless.

*Paper No. 11.*—The Department took the view that, as official plans showed the river to have been easterly of its present course, that a change of position must have occurred. Recent landslips and the condition of the river banks strengthened this opinion, and the decision arrived at was, that to make a practicable thoroughfare of Molesworth-street was a municipal matter, to be carried out by the Borough Council, and declined to accept the responsibility.

Paper

*Paper No. 12.*—Mr. Currie writes in similar terms to his first letter.

*Paper No. 20.*—Borough Council of Lismore renews applications and furnishes declarations of old residents that the river has not shifted its course during their time of residence at Lismore.

*Paper No. 23.*—Minute of Surveyor-General, stating that departmental action had been based on the assumption that the course of the river had shifted, and pointing out the danger of accepting the responsibility, even should it be proved that the original design and surveys were erroneous.

*Paper No. 25.*—Borough Council renews application, and furnishes a plan of survey made by a licensed surveyor employed by themselves, showing the river at the place in question. By this plan dead trees are indicated in positions where the river was shown to be on the official plans and design of village of Lismore, the object being to prove that the trees must have existed thirty years ago, and as they could not grow in the river the official survey and maps are consequently inaccurate.

*Paper No. 25.*—Upon this testimony the late Surveyor-General expresses the regret that the position taken up by the Department, based on original surveys cannot be maintained, although it is difficult (he states) to believe that the official surveys could have been so inaccurate; but at the same time he cannot recommend resumption of land to widen the street if that course would involve the Crown in the settlement of claims for compensation.

*Paper No. 25.*—Mr. Secretary Abbott requested the Surveyor-General to ascertain what the costs would be of complying with the Borough Council's request.

*Paper No. 26.*—On a minute of the Surveyor-General's, Mr. Secretary Abbott approved of the Borough Council being invited to ascertain from the various landowners the terms on which they would allow a deviation of Molesworth-street to be opened through their properties, the information to be furnished with the view to consider whether the cost should be incurred by the Crown, either wholly or in part; and if in part, to what extent the Borough Council might be required to contribute.

*Paper No. 27.*—The Borough Council express themselves unable to affect any satisfactory arrangements, and leave the matter in the hands of the Government.

*Paper No. 27.*—Mr. Secretary Abbott declines to accept the responsibility, and will sanction nothing further being done unless a definite proposal be made by the Borough Council, together with an estimate of costs and arrangements for carrying out any proposed course.

*Paper No. 32.*—In reply to communication as above the Mayor states the sums of money the several persons will accept, but he makes no definite proposal; but on the suggestion of the Under Secretary for Mines, the District Surveyor is asked to report whether the items are reasonable amounts or not. The report is obtained and submitted by Surveyor-General, who points out that the Crown has not undertaken to meet the claims, or any part of them.

*Paper No. 38.*—Mr. John Currie again writes that to resume land for Molesworth-street would be a sheer waste of public money, unless a retaining wall were constructed to prevent future landslips, for should wet seasons recur, as no doubt they will, and there be heavy traffic on the road, other landslips will occur, and further resumption of private estate will be necessary. Upon this statement of Mr. Currie's the Minister for Mines directed that the Commissioner and Engineer of Roads should be asked to cause inspection of the land to be made, and a report to be furnished.

The Commissioner's report should be read. He is of opinion that the river has shifted and is still shifting its place, notwithstanding the declarations to the contrary, and he does not recommend that any attempt be made to open a street near the river, as it would always be liable to erosion by the waters of the river, and would entail endless expense on repairs, and he instances the case of the embankment, High-street, Maitland, and suggests that the District Engineer, Mr. Statham, and the District Surveyor, Mr. Donaldson, should visit the ground, consult together, and report.

*Paper No. 40.*—This suggestion was acted upon, and the opinions of the two inspecting officers are embraced in the report of the Assistant Engineer, Mr. Statham. The Assistant Engineer is of opinion that the landslips which have occurred are attributable less to erosion of the river bank than to the concentration of drainage along tracks which have been cut at various times for access to the wharf. This has been going on for some time, till little or any of the original road remains at south-east corner of Zadoc-street.

*Paper No. 40.*—On this report the Surveyor-General submits a minute to the effect that the inspecting officers do not approve of either of the previously suggested ways of affording access, but are more favourable to a third, which they describe, and they also express their doubts that the interests involved would justify the expenditure that would be required to effect it, viz., £2,254, that is to say, £1,254 for purchase of land, £1,000 for a bridge, and think that the Municipal Council will hesitate to expend the latter sum. The Surveyor-General also points out that access is open by way of Keen-street, and the circumstances of the case do not warrant of necessity any participation in the expense of providing a new street by the Crown. This minute met with the approval of the Secretary for Mines, and the Borough Council was informed of the decision.

*Papers Nos. 46, 47, and 52.*—Further renewals of application were made, and an alternative course suggested; but applicants and petitioners were informed that the Crown declines to accept the responsibility of providing improved access in this case.

*Paper No. 54.*—Further agitation of the matter by Mr. T. T. Ewing, M.P., elicited a report from the Acting Surveyor-General, and the submission that the previous decisions supported by three Ministers be not departed from was concurred in by Mr. Secretary Garrett. Mr. Ewing, M.P., was informed accordingly.

*Paper No. 56.*—Further renewal of the matter by the Borough Council was received, and the decision arrived at by previous Ministers was upheld by Mr. Secretary Brunker.

*Paper No. 68.*—The last communication is from Mr. Ewing, M.P., who requests that certain questions, which he gives, should be referred to the District Surveyor, for him to furnish replies to them. The subject of this letter, and the case generally, is dealt with by the Acting Surveyor-General in his report of the 1st instant.

A. J. STOPPS.

16th March, 1886.

33

No. 82.

T. T. Ewing, Esq., M.P., to The Secretary for Lands.

Sir,

Parliament House, 6 April, 1889.

Some time ago I had the honor to inform you that I asked you to procure me certain information from District Surveyor, Grafton, with reference to Molesworth-street, Lismore.

I believe that you are desirous of having fullest information before deciding the case, and am sure it must be in the interest of a correct decision that the opinion of your local officer should be obtained. I cannot imagine why it is thought necessary not to have the opinion in a definite way of the only officer who has enough information to give authoritative advice. If my questions do not cover the whole ground, it is quite within province of District Surveyor to fully report. I hope you will give instructions that answers should be obtained.

Yours, &amp;c.,

THOS. EWING.

Urgent. Papers, please.—S.F., 8/4/89. Mr. Stopps.

No. 83.

Memo. by The Under Secretary for Lands.

Molesworth-street, Lismore.

THE questions formulated by Mr. Ewing, M.P., are of an *ex parte* or one-sided character, and cannot apparently be replied to satisfactorily or conclusively by anyone. I see no reason, however, for refusing to send them to the District Surveyor, as Mr. Donaldson can only state what he knows, and the Department has no object in keeping back any knowledge within its power.

The Government has invariably declined to accept any responsibility in the matter of Molesworth-street, and this reference will not necessarily weaken the position.

S. F., 8/4/89.

Approved.—J.N.B., 10/5/89. The questions that Mr. Ewing, M.P., is desirous should be answered by Mr. Donaldson, are contained in Mr. Ewing's letter registered No. 68 herewith, of the series 83—<sup>15</sup>/<sub>10</sub> Roads.—E.T. The District Surveyor at Grafton.—A. J. STOPPS (for Surveyor-General), 11/5/89. Nature of Instructions, 53. Received in District Survey Office, Grafton, 16/5/89. Replied to by 89-13.—P. R. DONALDSON, District Surveyor.

No. 84.

Mr. District-Surveyor Donaldson to The Surveyor-General.

Sir,

District Survey Office, Grafton, 12 June, 1889.

In accordance with instructions of 14th May, 1889, No. 53, I have the honor to furnish replies to the several questions which Mr. Ewing, M.P., is desirous of having answered by me with reference to the Molesworth-street Lismore case.

1. Was an error made by Mr. Surveyor Peppercorn in placing Molesworth-street in position with relation to Richmond River, as shown by early maps of town of Lismore?

I am of opinion an error was made.

2. Were early maps in error?

I think so.

3. Is it a fact that the river was shown with reference to some allotments, some 300 feet out of its course, notably North Lismore?

I think the river was shown considerably out of its course, but cannot say to what extent.

4. Is it a fact that some of the divisional lines between allotments in North Lismore, directly opposite, come some 4 chains (264 feet about) beyond where bank of river was shown on early surveys?

Some of the divisional lines between allotments at North Lismore now extend a considerable distance beyond where the bank of the river was shown by early surveys; but, in the absence of any measurements, I am not prepared to say how much.

5. Is it a fact that where course of river is thus shown, timber at least 100 years old, growing on firm alluvial flat, is in existence?

Well-grown timber is in existence in or near where course of river is shown. I am not prepared to say 100 years old, although it is possible some of the trees are that age.

6. Is it possible, since occupation of Colony by whites, Richmond River course can have altered as shown?

In view of alterations which do take place in rivers, I am not prepared to say that it is not possible, although I do not think it is probable.

I have, &amp;c.,

P. R. DONALDSON,

District Surveyor.

Roads, 83—<sup>15</sup>/<sub>10</sub>, and all papers herewith. The replies of the District Surveyor at Grafton to questions propounded by Mr. Ewing, M.P., respecting Molesworth-street, Lismore, are submitted.—A. J. STOPPS, 21/6/89. Mr. Ewing, M.P., may perhaps be furnished with a copy of this report.—S.F., 23/6/89. Yes. I see no objection.—J.N.B., 1/7/89. Copy herewith.—F.S., 3/7/89. T. T. Ewing, M.P., with copy of report.—H.L.T., 9/7/89.

## No. 85.

The Under Secretary for Lands to T. T. Ewing, Esq., M.P.

Sir,

Department of Lands, Sydney, 9 July, 1889.

With reference to your letter of the 6th April last, asking that a full report be obtained from the District Surveyor respecting Molesworth-street, Lismore, I am directed by the Secretary for Lands to forward you a copy of Mr. District-Surveyor Donaldson's report upon the subject

I have, &amp;c.,

H. CURRY

(For the Under Secretary).

## No. 86.

T. T. Ewing, Esq., M.P., to The Secretary for Lands.

Sir,

Parliament House, Sydney, 13 July, 1889.

Will you kindly inform me when it will be convenient to see me respecting Molesworth-street, Lismore?

You will observe that District Surveyor agrees that Department was in error.

Yours, &amp;c.,

THOS. EWING.

Mr. Ewing, M.P., seeks an interview with the Minister *re* Molesworth-street, Lismore. Submitted.—A. J. STOPPS, 24/7/89. Mr. Ewing, M.P., has seen the Minister on this matter.—F.H.W., 26/7/89. Mr. Stopps. Records. Resubmitted for further consideration in view of promise to Mr. Ewing, M.P.—W.H., 14/1/90.

## No. 87.

T. T. Ewing, Esq., M.P., to The Secretary for Lands.

*Re* Molesworth-street, Lismore.

Sir,

Parliament House, 23 May, 1890.

All I desire in this case is that your Local Land Board would inquire into the position of Richmond River at date of survey.

I am sure there can be no objection to this point being settled, and feel confident you will realize the reasonableness of the request.

Yours, &amp;c.,

THOS. EWING.

Land Board will be in Lismore almost at once.

Mr. Ewing's request cannot be complied with.—J.N.B., 23/5/90. Inform.—H.L.T. T. T. Ewing, M.P., informed, 29/5/90. Copy of all papers in the case asked for. See minute 90-6,450.—A.J.S.

## No. 88.

The Under Secretary for Lands to T. T. Ewing, Esq., M.P.

Sir,

Department of Lands, Sydney, 29 May, 1890.

In reply to your letter of the 23rd instant, applying for an inquiry by the Local Land Board, into the position of the Richmond River at the date of survey of Molesworth-street, Lismore, I am directed by the Secretary for Lands to inform you that your request cannot be complied with.

I have, &amp;c.,

WM. HOUSTON,

Under Secretary

(per F.H.W.)

## No. 89.

A. F. Parker, Esq., M.D., to the Under Secretary for Lands.

Sir,

Lismore, 12 June, 1890.

I have the honor to inform you that having leased a portion of my property in Molesworth-street, Lismore, for a period of three years. I am compelled to withdraw any offer that may have been made as regards compensation for the proposed resumption of a portion of the said property, for the purpose of widening the street.

I might add that it is not my intention or desire to put any obstacle in the way of the proposed resumption, but that this is simply to protect myself from any legal difficulty that might arise from having leased a certain portion of the property in question.

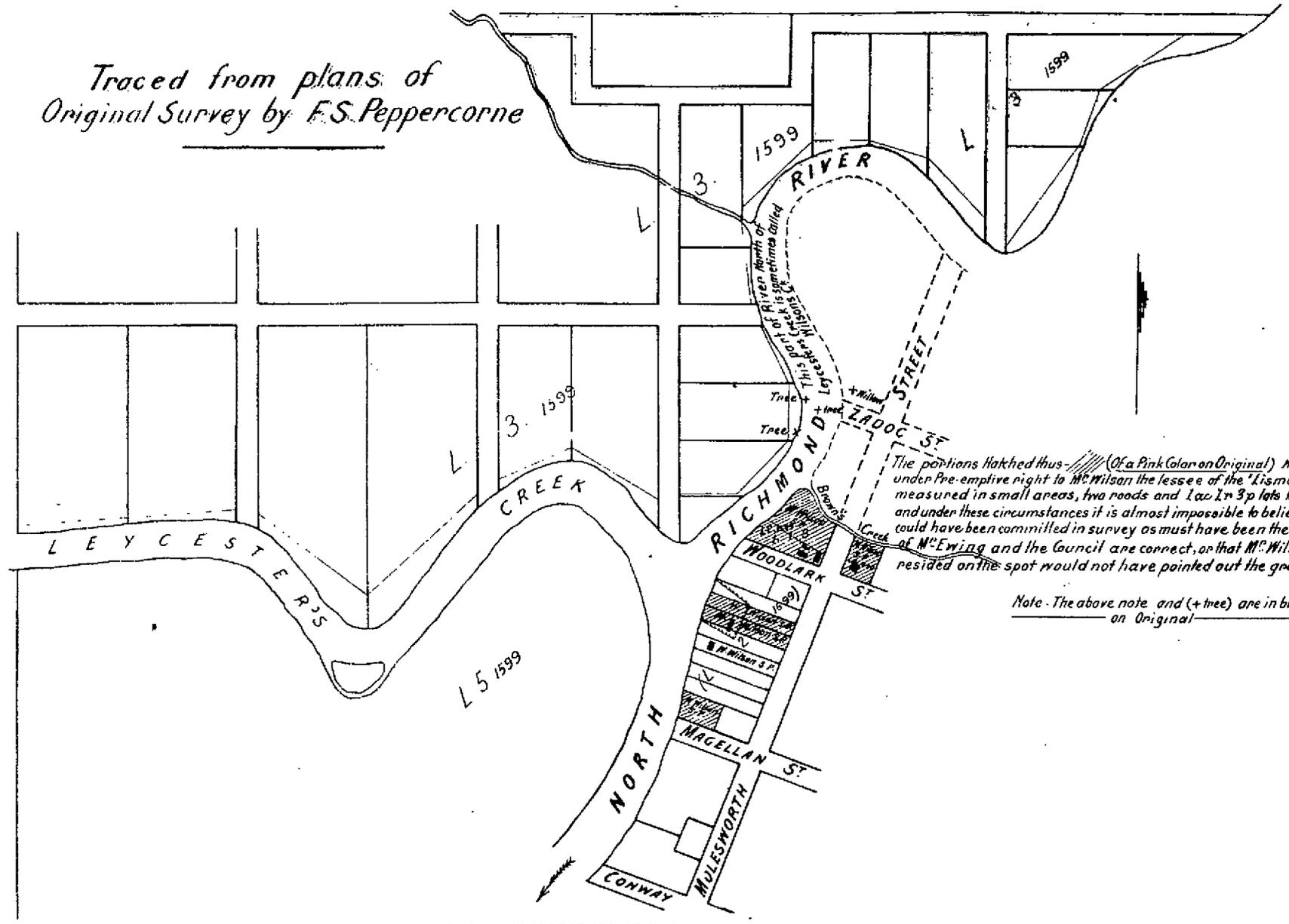
I have, &amp;c.,

ARTHUR F. PARKER, M.D.

[Twelve plans.]

*Traced from plans of  
Original Survey by F.S. Peppercorne*

*Enclosure to No. 80.*



*The portions hatched thus (Of a Pink Color on Original) were sold in 1858 under Pre-emptive right to Mr. Wilson the lessee of the "Lismore Run" they were measured in small areas, two roods and 1 ac 1 r 3 p lots to cover valuable improvements, and under these circumstances it is almost impossible to believe that so great a blunder could have been committed in survey as must have been the case if the representations of Mr. Ewing and the Council are correct, or that Mr. Wilson the purchaser who resided on the spot would not have pointed out the gross inaccuracy if it had existed*

*Note - The above note and (+tree) are in blue on Original*

*(Sig. 468-)*

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

No. 1

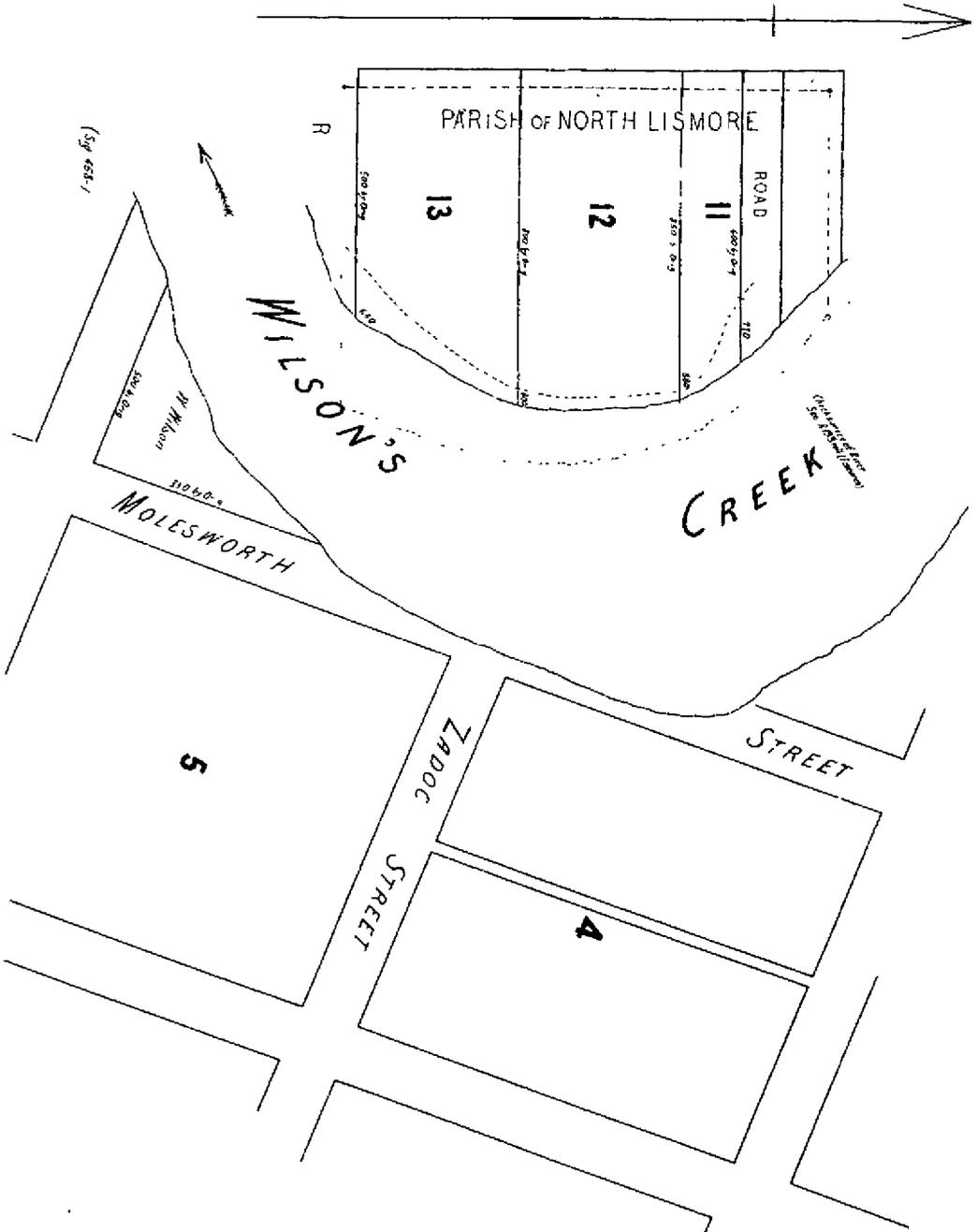
*{ Prep<sup>d</sup> by J. Elden  
Exam<sup>d</sup> by G.S. 1/7/50 }*

Co of Rous  
Town of Lismore

No 2

Enclosure No 80

Note  
The hair-line writing and fine broken lines  
are in perspective on Original



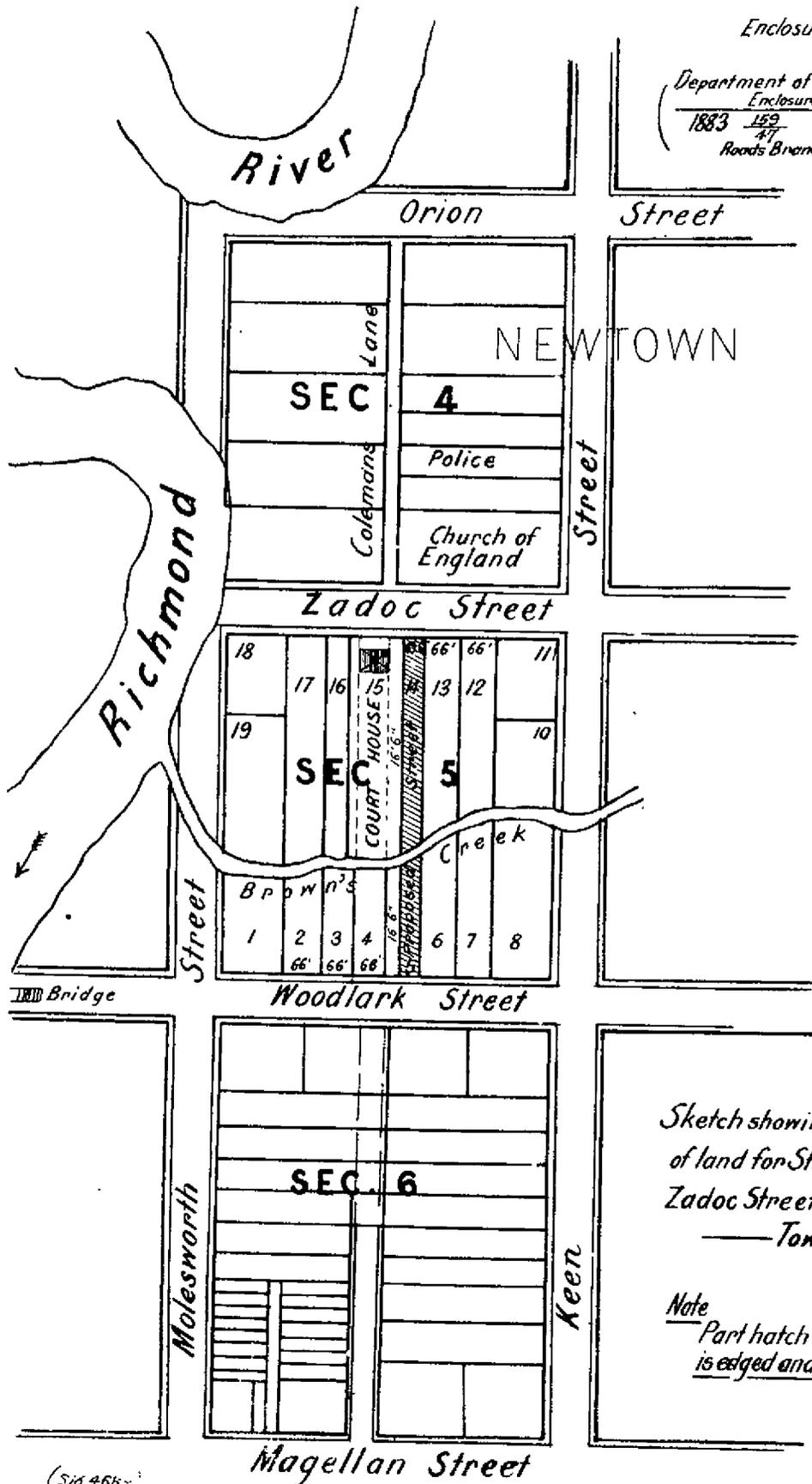
1/10/80  
1/10/80  
1/10/80

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,  
DUNEDIN, N.Z.

Nº3

Enclosure to Nº 59.

Department of Lands  
Enclosure  
1883 159  
47  
Roads Branch



Sketch showing proposed resumption  
of land for Street from Woodlark to  
Zadoc Street through Section 5  
— Town of Lismore —

Note  
Part hatched on this copy this  
is edged and colored red on original

(Sig 468-)

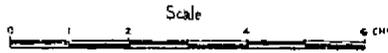
Surveyor General's Office  
 2-9-86  
 1883 152  
 40  
 Roads Branch

Nº4

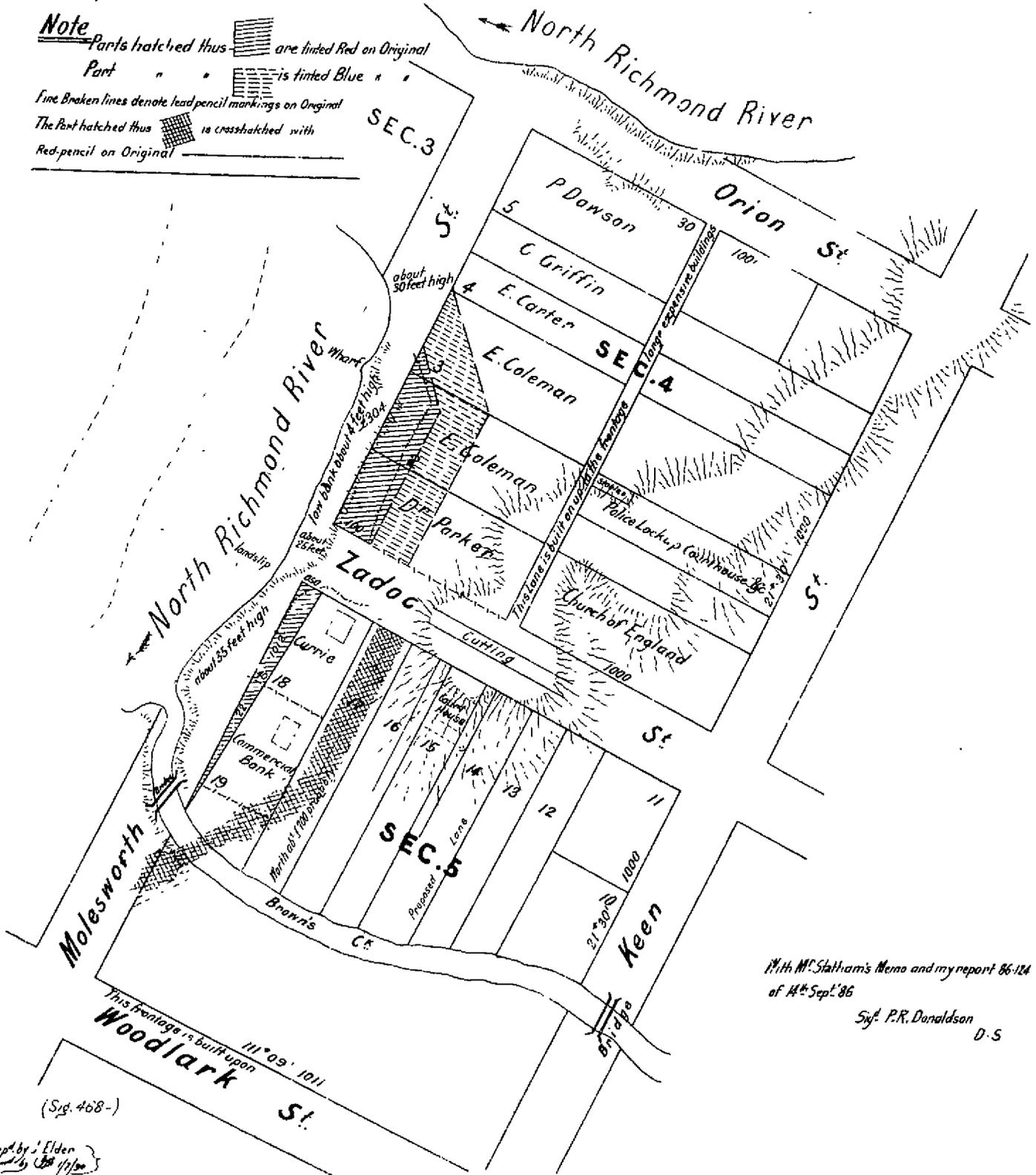
# Sketch

Shewing proposed resumption of land Sections 4 & 5 Town of Lismore  
 to widen  
 Molesworth Street  
 Co. of Rous

Enclosure to Nº 52



**Note**  
 Parts hatched thus  are tinted Red on Original  
 Part " "  is tinted Blue " "  
 Fine Broken lines denote lead pencil markings on Original  
 The Part hatched thus  is crosshatched with  
 Red-pencil on Original



With Mr. Statham's Memo and my report 86-124  
 of 14<sup>th</sup> Sept. 86

Sy. P.R. Donaldson  
 D-5

(Sg. 468-)

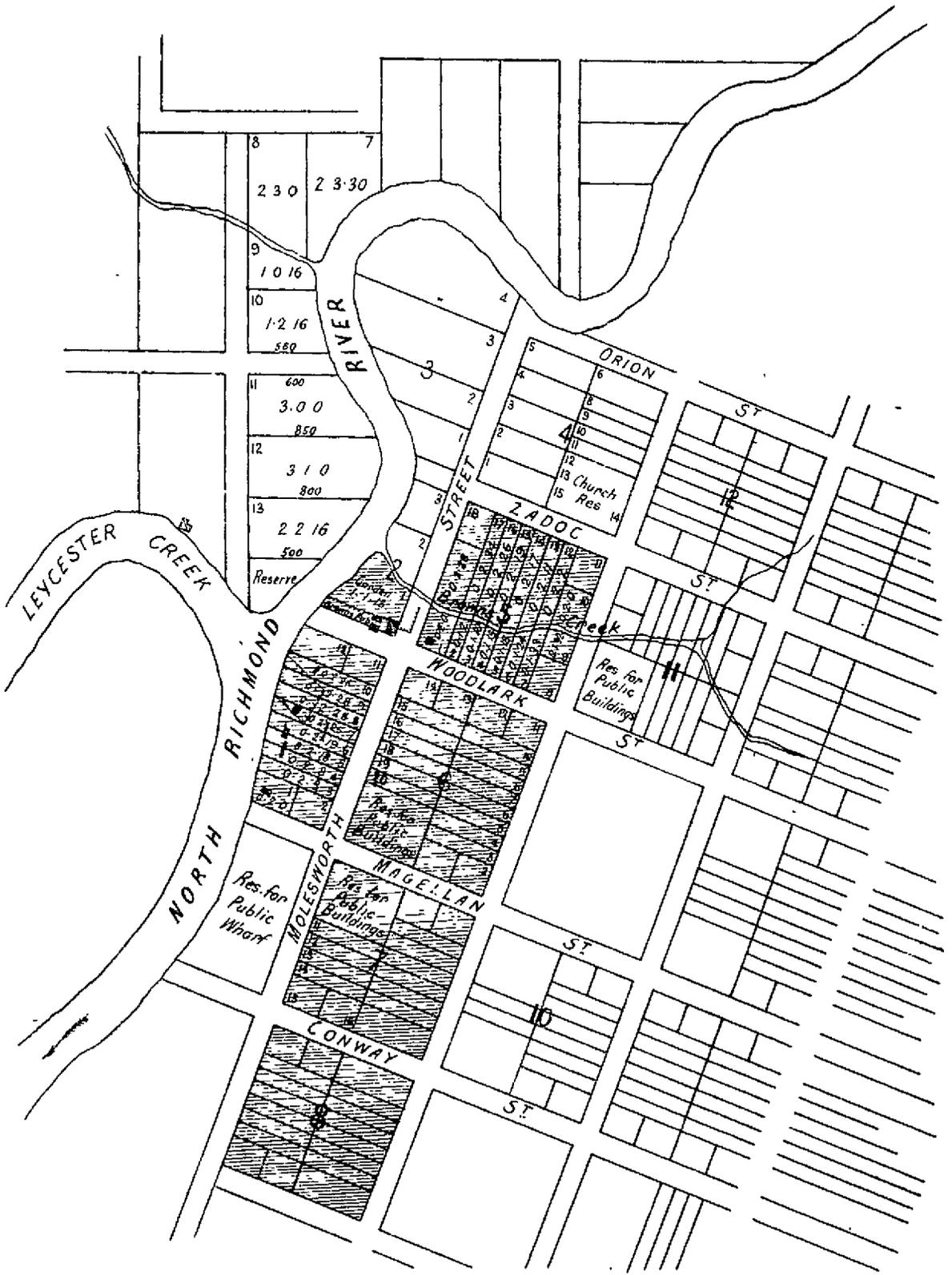
{ Prop'd by J. Eldon  
 Exam'd by J. S. 1/1/86 }

TRACING  
of  
Part of the lithograph of the Village of Lismore

Surveyor General's Office

Sydney December 1856

Allotments measured for Sale Colored red - Red on Original hatched thus  on this Copy



(518 468-)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,  
SYDNEY, NEW SOUTH WALES.

{  
1856/1857  
E.A. 27/12/40  
}

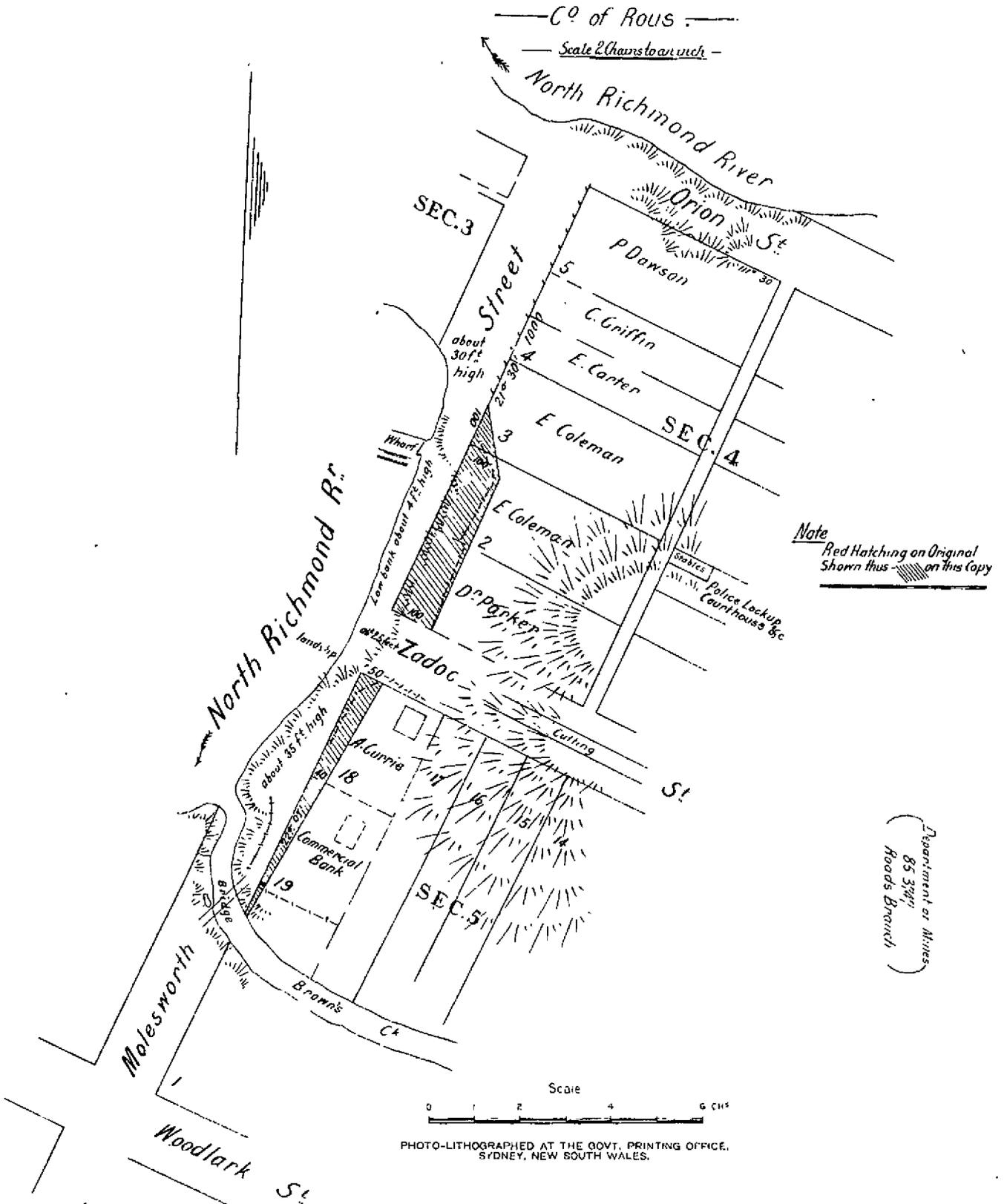
Surrey's General Office  
 29 12 85  
 1883 159  
 78  
 Roads Branch

N<sup>o</sup> 6

# Sketch

Enclosure to A<sup>10</sup> 42

Shewing Proposed Resumption of Land Sections 4 & 5 Town of Lismore  
 to widen  
 Molesworth Street



(Sigs 468-)

Printed by  
 G. & J. B. Hill

Surrey's Generals Office  
18 12 84  
1883 159  
24  
Roads Branch

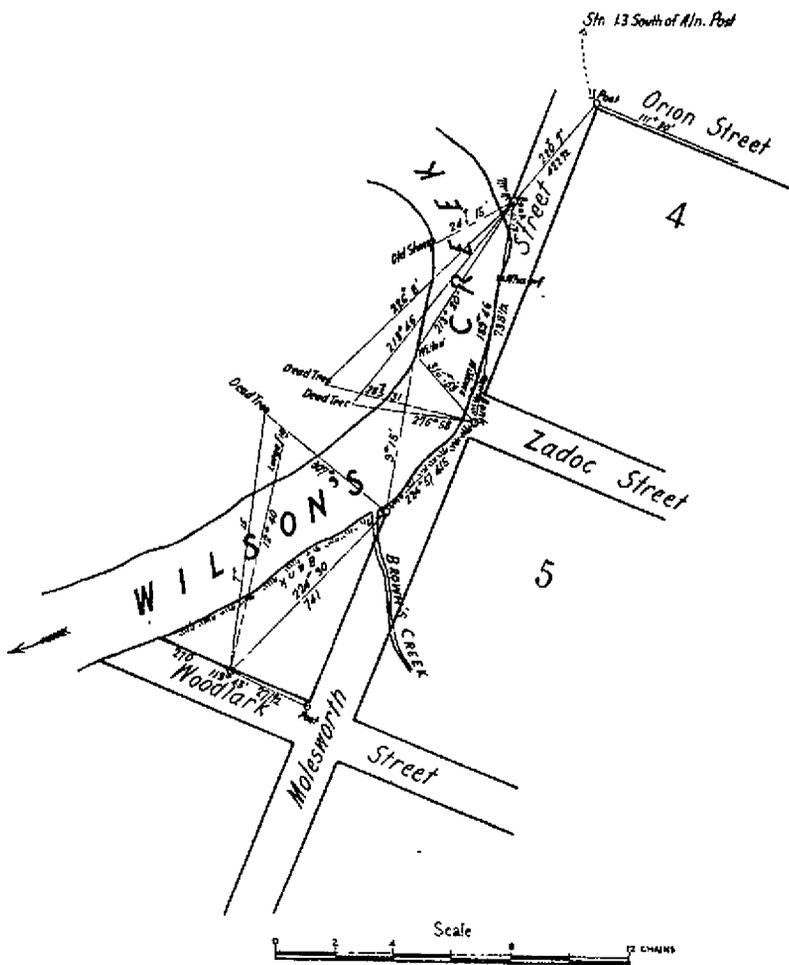
N<sup>o</sup> 7.

Enclosure to N<sup>o</sup> 38

# Sketch

showing position of Wilson's Creek between Woodlark and Orion Streets

## TOWN OF LISMORE



(Sigs 188-)

PHOTO-LITHOGRAPHED AT THE GOV'T. PRINTING OFFICE.  
SYDNEY, NEW SOUTH WALES.

Prepd by J. Elder  
Exam'd by G. H. G. G.

(Sig<sup>d</sup>) C. T. Arnheim L.S.

83  $\frac{159}{26}$

Nº 7

# Sketch

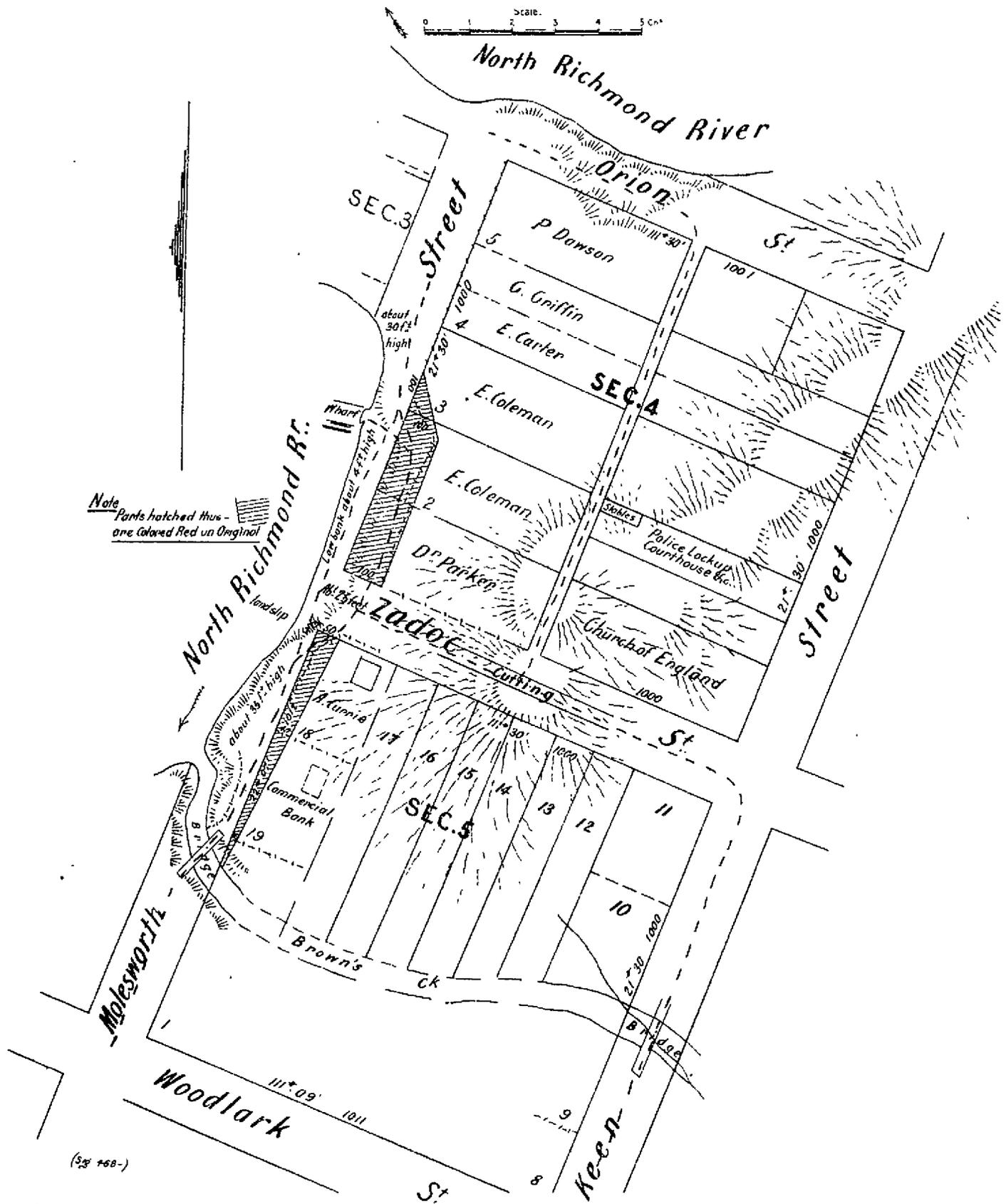
Enclosure to Nº 40

Shewing Proposed Resumption of Sections 4 & 5 Town of Lismore to widen

Molesworth Street

C<sup>o</sup>. of Rous.

Scale. 0 1 2 3 4 5 Cms



Note  
Parts hatched thus -  
are Colored Red in Original

(328 168-)

Prep<sup>d</sup> by J. Eldon  
Exam<sup>d</sup> by W. B. 1/1/90

# TRACING

— of part of —

Plan shewing Streets in the Town of Lismore

— Parish of Lismore C<sup>o</sup> of Ross —

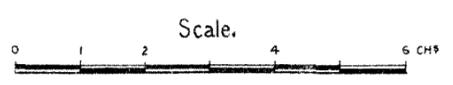
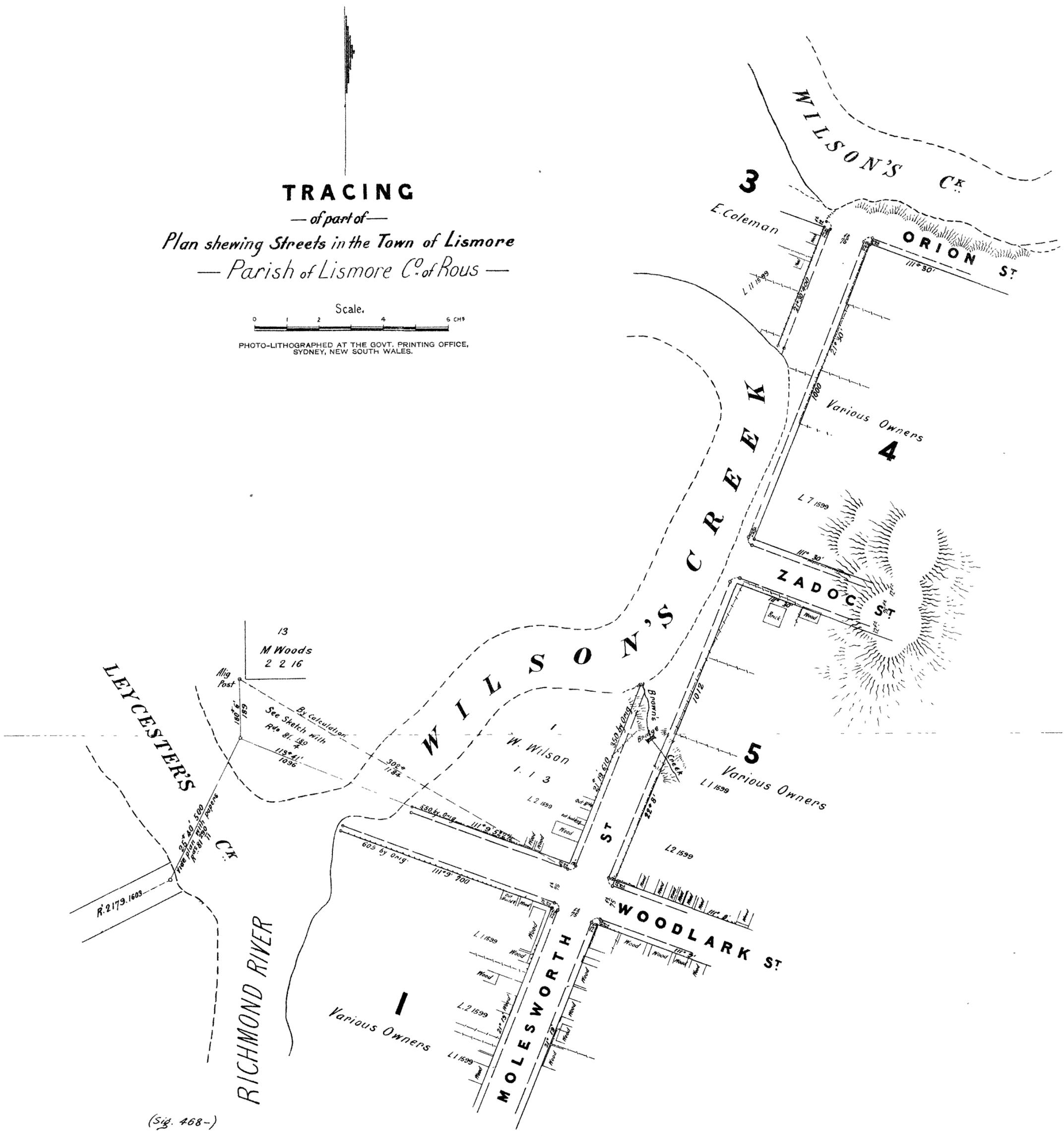


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.



(Sig. 468-)

Surveyor General's Office  
 8-2-84  
 1883 189  
 10  
 Roads Branch

Nº 9

SKETCH

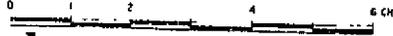
Enclosure to Nº 19

Shewing proposed Resumption of land Sections 4 & 5 Town of Lismore to widen

Malesworth Street

C<sup>o</sup> of Rous

Scale



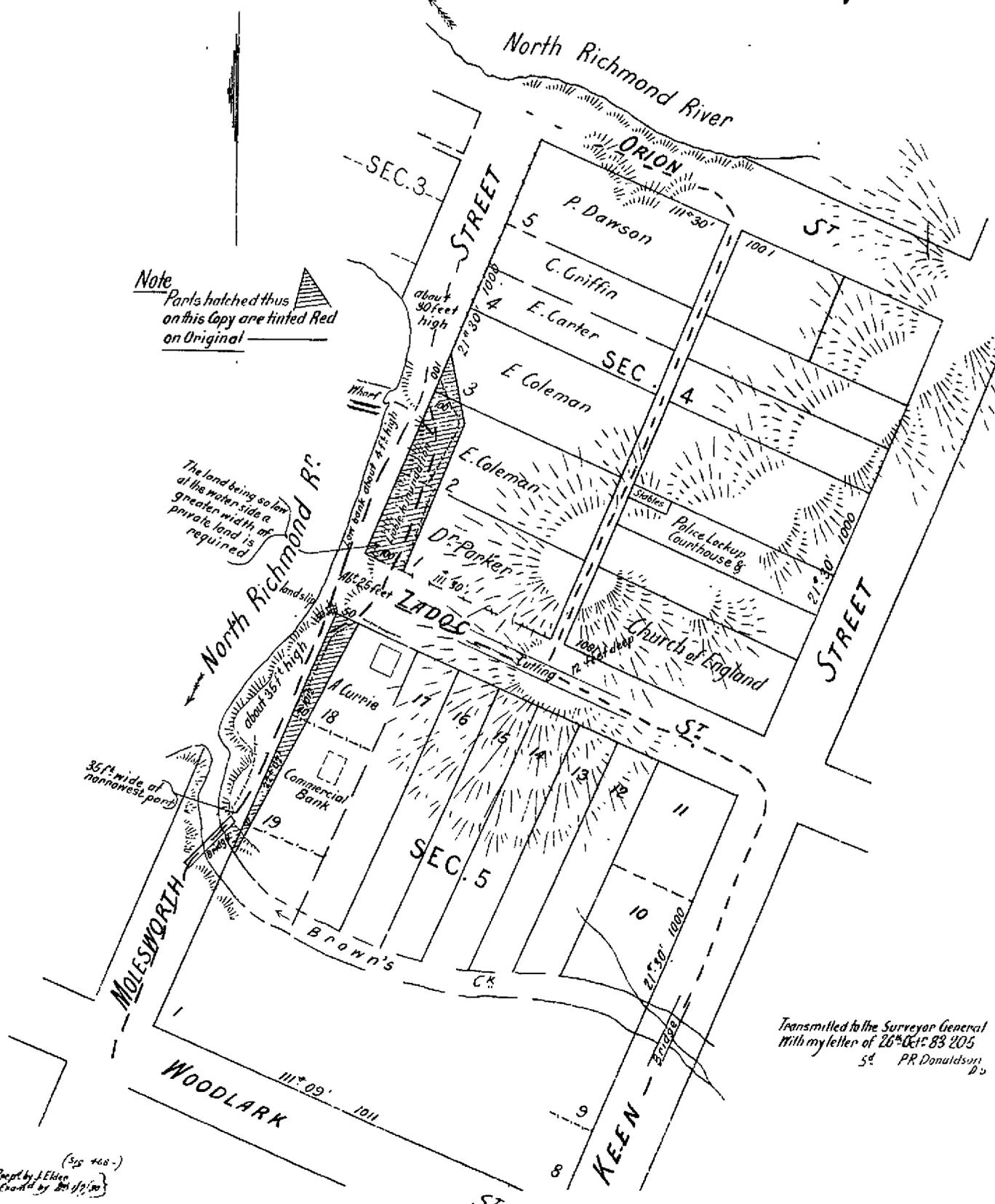
Note  
 Parts hatched thus   
 on this copy are tinted Red  
 on Original

The land being so low  
 at the water side a  
 greater width of  
 private land is  
 required

35 ft wide of  
 narrowest part

Transmitted to the Surveyor General  
 with my letter of 26<sup>th</sup> Oct. 83 205  
 S<sup>d</sup> P. R. Donaldson

(325 460 -)  
 Prepared by J. Elson  
 Checked by J. J. J. J.





THIRD EDITION

# M A P

OF THE

## TOWN OF LISMORE

AND SUBURBAN LANDS

PARISHES OF LISMORE, NORTH LISMORE & SOUTH LISMORE

COUNTY OF ROUS

Land District of Lismore

N S W 1889

DIAGRAM

Showing subdivision of part of the 6 original parcels in Division of Public Reserve in further illustration of the 25<sup>th</sup> Sept 1886 Act & Chapter 79 1886

Scale of Chains

18 William Murray 40 ac

42 ac

44 ac

46 ac

48 ac

50 ac

52 ac

54 ac

56 ac

58 ac

60 ac

62 ac

64 ac

66 ac

68 ac

70 ac

72 ac

74 ac

76 ac

78 ac

80 ac

82 ac

84 ac

86 ac

88 ac

90 ac

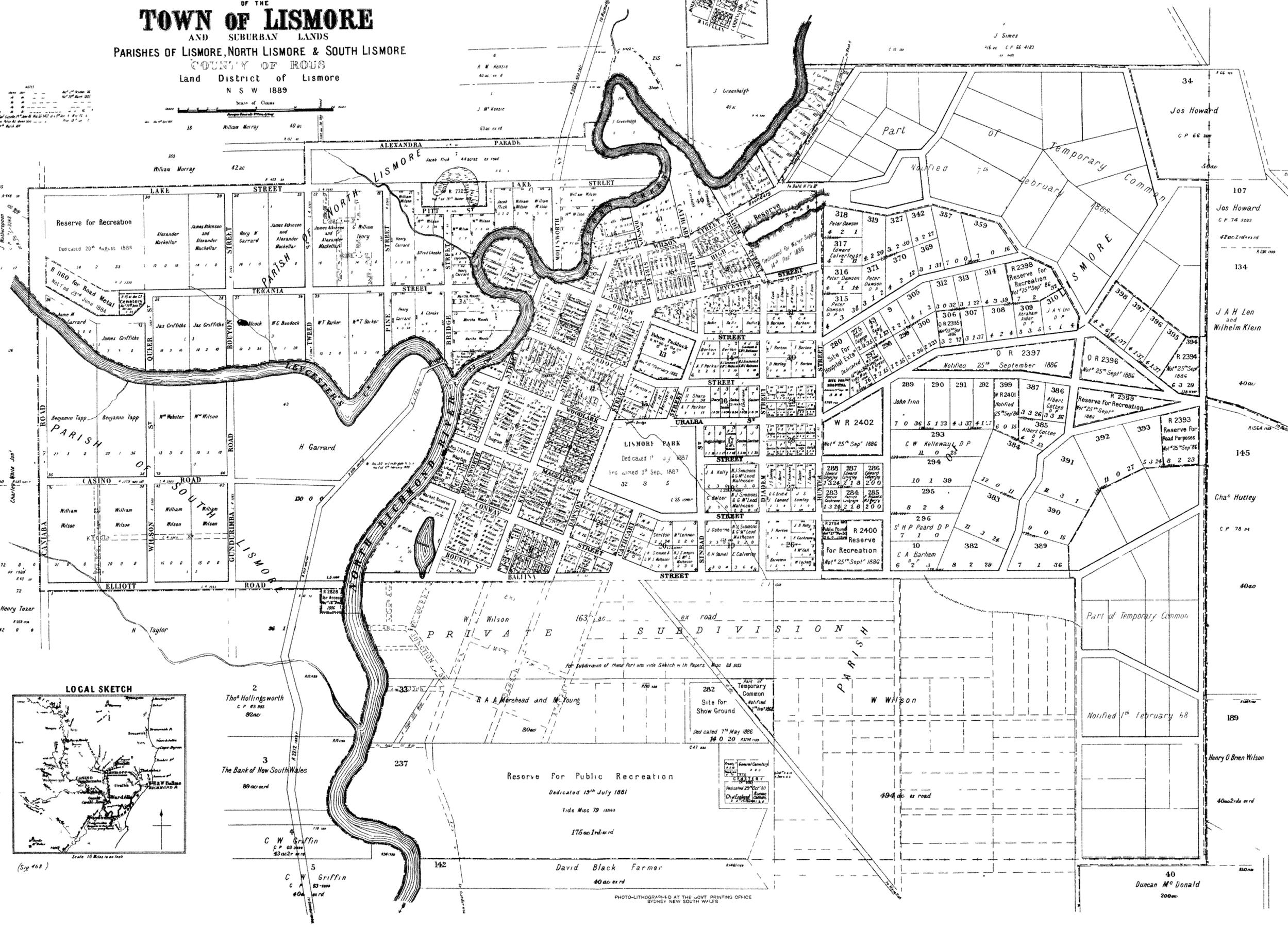
92 ac

94 ac

96 ac

98 ac

100 ac



1890.

## NEW SOUTH WALES.

## LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.

(RESUMPTION OF ROAD APPROACH TO TARREGANDA BRIDGE, PARISH OF BEGA.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit. } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
Honourable Privy Council, Knight  
(L.S.) Grand Cross of the Most Distinguished  
CARRINGTON, Order of Saint Michael and Saint  
Governor. George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the construction of a Bridge over the Bega River, at Tarreganda, in the said Colony, for and towards the completion of which said works public funds are available, and whereas the land hereinafter described is required for the eastern approach to the said works: Now, I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do by this notification, published in the Gazette and in a newspaper, that is to say, in the "Bega Gazette," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purpose hereinafter mentioned, that is to say, for and in connection with the eastern approach to the above Bridge, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said land shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estates, interests, contracts, charges, rates, rights-of-way, or other encumbrances whatsoever; and to the intent, further, that the legal estate therein, together with all powers incident thereto, or conferred by the said Act, shall be vested in the said Minister

as a trustee, with the powers stated in the said last-mentioned Act. And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land being part of the Eastwood Estate, situated in the parish of Bega, county of Auckland, and Colony of New South Wales, containing 4 acres and 10 perches: Commencing at a point on the north boundary of portion 40, where the south side of a road one chain wide intersects the eastern side of another fenced road 75 links wide, leading from Bega to Nelson; and bounded thence on the north by the south side of the said road one chain wide, bearing north 88 degrees 30 minutes east 30 links; thence on part of the east by a line bearing south 27 degrees 50 minutes west 285 links; thence again on part of the east by a curve of 950 links radius, distant 520 links; thence again on part of the east by a line bearing south 7 degrees 20 minutes east 760 links; thence on the south-east by a curve of 1,050 links radius, distant 1,114 links; thence on the south by a line bearing south 57 degrees 30 minutes west 1,780 links to a fence on the left bank of the Bega River; thence on part of the west by that fence being a line bearing north 33 degrees 40 minutes west 100 links; thence on the north by a line bearing north 57 degrees 30 minutes east 1,780 links; thence on the north-west by a curve of 950 links radius, distant 1,000 links; thence on part of the west by a line bearing north 7 degrees 20 minutes west 760 links; thence again on part of the west by a curve of 1,050 links radius, distant 280 links to the east side of the aforesaid road 75 links wide; thence on the remainder of the west by the east side of that road bearing north 27 degrees 50 minutes east 610 links, to the point of commencement; and which parcel of land is said to be in the possession of Henry Wren.

In witness whereof I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this second day of June, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND FOR THE PURPOSE OF IMPROVING THE PARRAMATTA ROAD, PARISH OF PETERSHAM.)

Presented to Parliament, pursuant to Act 51 Vic. No. 37.

## NOTIFICATION OF RESUMPTION OF LAND UNDER THE "PUBLIC WORKS ACT OF 1888."

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
(L.S.) } Council, Knight Grand Cross of the  
CARRINGTON, } Most Distinguished Order of Saint  
Governor. } Michael and Saint George, Governor and  
Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS the Minister for Public Works of the Colony of New South Wales is desirous of erecting a Retaining Wall on the land described in the Schedule at the foot hereof, for the purpose of improving the Parramatta Road, at the University Cutting; and it is estimated that the cost of carrying out the said works will not exceed the sum of twenty thousand pounds: And whereas the land described in the said Schedule is the land required for carrying out the said works: Now, therefore, I, CHARLES ROBERT, BARON CARRINGTON, the Governor aforesaid, with the advice of the Executive Council, in pursuance of the provisions of the "Public Works Act of 1888," do hereby direct that the said works shall be carried out under the "Public Works Act of 1888," by the Minister for Public Works aforesaid, who, in respect of the said works, I hereby declare shall be deemed to be the Constructing Authority: And in further pursuance of the powers on this behalf given to or vested in me by the said Act, I do by this notification, published in the Gazette and in a newspaper, that is to say, the "Sydney Morning Herald," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described in the Schedule at the foot hereof, has been resumed for the purpose hereinafter mentioned, that is to say, for the purpose of constructing and erecting thereon a retaining wall and other works and conveniences, to the intent that upon the publication of this notification in the Gazette, the land hereinafter described shall forthwith be vested in the Minister for Public Works, as the Constructing Authority, on behalf of Her Majesty for the purposes of the said Act, for an estate in fee simple in possession, freed and discharged from all trusts, obligations, estates, interests, contracts, charges, rates, rights-of-way, or other encumbrances whatsoever; and to the intent that the legal estate therein, together with all powers

incident thereto or conferred by the said Act, shall be vested in the said Minister for Public Works as such Constructing Authority as a trustee: And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

## SCHEDULE.

All that piece or parcel of land situate in the parish of Petersham, county of Cumberland, Colony of New South Wales, being portion of suburban allotments 21, 22, and 23 of the original subdivision of the Grose Farm: Commencing at the south-east corner of allotment 23; and bounded thence on part of the south by the southern boundary of such allotment 23, being a line bearing westerly along the north alignment of the Parramatta Road 72 feet more or less to the south-west corner of that portion, now the property of the said Sebastian Fehrenbach; thence on the remainder of the south by the southern boundaries of allotments 22 and 21, now the properties of the said Sarah Wenden and the said William Kerridge, being a line bearing westerly along the north alignment of the Parramatta Road 119 feet more or less to the south-west corner of portion 21; on the west by the western boundary of the said allotment 21 bearing northerly 14 feet 6 inches; thence on part of the north by a line bearing easterly and parallel to the southern boundary of allotments 21 and 22, 45 feet; thence south-easterly 11 feet to meet a line parallel to and 8 feet 6 inches distant northerly from the southern boundary of allotments 21 and 22; thence on the remainder of the north by a line parallel to the southern boundary of allotments 21, 22, and 23 aforesaid, being a line bearing easterly to the eastern boundary of allotment 23; thence on the east by the eastern boundary of said allotment 23 bearing southerly, 9 feet to the point of commencement, and which parcel of land is said to be in the possession of W. Kerridge, Sarah Wenden, and S. Fehrenbach.

In witness whereof, I have hereunto set my hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this twenty-ninth day of August, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND FOR THE CONSTRUCTION OF AN APPROACH ROAD TO MEADOW BANK RAILWAY PLATFORM.)

Presented to Parliament, pursuant to Act 51 Vic. No. 37.

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
Council, Knight Grand Cross of the  
(L.S.) Most Distinguished Order of Saint  
CARRINGTON, Michael and Saint George, Governor and  
Governor. Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS it is expedient that the Public Work hereinafter mentioned shall be constructed, that is to say, an Approach Road to Meadow Bank Railway Platform, the estimated cost of which Public Work will not exceed twenty thousand pounds: And whereas it is expedient that the said Public Work shall be carried out under the provisions of the "Public Works Act of 1888": Now, therefore, I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, and under and by virtue of the powers and authority vested in me by the said Act, hereby direct that the said Public Work shall be carried out under the provisions of the said Act, and that the carrying out of the same shall devolve upon the Minister for Public Works, who shall in that behalf be deemed the Constructing Authority: And I hereby further direct that the land described in the Schedule hereto, being in my opinion required for the purpose of the aforesaid Public Work, shall be acquired for the said purpose, under the provisions of the said Act.

## SCHEDULE.

All that piece or parcel of land situate near Ryde, in the parish of Hunter's Hill, county of Cumberland, and Colony of New South Wales, containing 1 acre and 1 perch: Commencing at the south-west corner, and being also part of Anne Thorn's grant of 20 acres, and on the eastern side of a subdivision road 50 feet wide; and bounded thence on the south-west by a line bearing south 61 degrees 40 minutes east 664 feet to the south side of Nancarrow's Road, 66 feet wide; thence on the south-east by a line bearing north 30 degrees 15 minutes east 66 feet to the north side of Nancarrow's Road; thence on the north-east by a line bearing north 61 degrees 40 minutes west 664 feet to the first-mentioned road 50 feet wide; thence on the north-west by that road bearing south 30 degrees 20 minutes west 66 feet, to the point of commencement,—and which parcel of land is said to be in the possession of Robert Shepherd.

Given under my Hand and Seal of the said Colony, at Government House, Sydney, this thirteenth day of October, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

NEW SOUTH WALES.

---

PARLIAMENTARY STANDING COMMITTEE ON  
PUBLIC WORKS.

---

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE, APPENDICES, AND PLANS,

RELATING TO THE

PROPOSED BRIDGE

TO CONNECT

BULLOCK ISLAND WITH THE MAINLAND AT  
NEWCASTLE.

---

Presented to Parliament in accordance with the provisions of the Public Works Act,  
51 Vic. No. 37, section 8.

---

SYDNEY: CHARLES POTTER, GOVERNMENT PRINTER.

1890.



## MEMBERS OF THE COMMITTEE.

## LEGISLATIVE COUNCIL.

The Honorable JOHN LACKEY, Vice-Chairman.  
 The Honorable ANDREW GARRAN.  
 The Honorable FREDERICK THOMAS HUMPHERY.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 The Honorable GEORGE HENRY COX.

## LEGISLATIVE ASSEMBLY.

JOSEPH PALMER ABBOTT, Esquire, Chairman.  
 JACOB GARRARD, Esquire.  
 HENRY COPPLAND, Esquire.  
 JAMES EBENEZER TONKIN, Esquire.  
 WILLIAM SPRINGTHORPE DOWEL, Esquire.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.  
 CHARLES ALFRED LEE, Esquire.

## MEMBERS OF THE SECTIONAL COMMITTEE.

The Honorable ANDREW GARRAN, Chairman.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.

## GENERAL INDEX.

Report by the Committee.  
 Minutes of Evidence taken by the Committee.  
 Appendix to Evidence taken by the Committee.  
 Report by the Sectional Committee.  
 Minutes of Evidence taken by the Sectional Committee.  
 Plans.

## LIST OF WITNESSES.

[Examined before the Committee.]

	PAGE.
Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges .....	1-3, 4-7
Hugh M'Lachlan, Esq., Secretary to the Railway Commissioners .....	3
Hon. James Nixon Brunker, M.P., Minister for Lands .....	7-11
Alexander Brown, Esq., M.P. ....	11-15
James Fletcher, Esq., M.P. ....	15-18

[Examined before the Sectional Committee.]

Colin Christie, Esq., Mayor of Newcastle .....	19-21
James Morison, Esq., Mayor of Carrington .....	21-23
James Myers, Esq., Mayor of Wickham .....	28-30
Thomas Bibby, Esq., Timber Merchant, Wickham .....	30-31
Henry Joseph Brown, Esq., Solicitor, Newcastle.....	31-34
James Curley, Esq., M.P. ....	34-35
Alexander Sheddon, Esq., Newcastle .....	36-37
James Frank Ellis, Esq., Timber Merchant, Newcastle .....	36-37
George William Webb, Esq., Newcastle .....	36-37
Mr. Joseph Henry Collier, Land Agent, Newcastle.....	37-38

## APPENDIX.

Procès of Papers relating to the proposed Bridge .....	A
Minute by the Commissioner and Engineer-in-Chief for Roads and Bridges .....	B
Resolutions passed at a Public Meeting in Newcastle .....	C

## PLANS.

Plan I.—Sketch plan.  
 Plan II.—Newcastle Harbour, showing proposed Works.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

BRIDGE TO CONNECT BULLOCK ISLAND WITH THE MAINLAND AT NEWCASTLE.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, appointed during the first Session of the present Parliament, under the Public Works Act of 1888, 51 Vic. No. 37, and the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, to whom was referred the duty of considering and reporting upon the expediency of "erecting a bridge to connect Bullock Island with the mainland at Newcastle," have, after due inquiry, resolved that it is not expedient the proposed bridge should be erected, and in accordance with the provision of sub-section IV, of clause 13, of the Public Works Act, report their resolution to the Legislative Assembly :—

1. The proposed bridge appears from the evidence to have been recommended by the late Commissioner and Engineer-in-Chief for Roads and Bridges, as a work which would fit in with the reclamation of a part of Newcastle Harbour, between the mainland of Newcastle at Honeysuckle Point and Bullock Island, and with the dredging of a new channel there, which reclamation and dredging form portions of certain works for the improvement of Newcastle Harbour that have been under the consideration of the Public Works Committee, and are about to be carried out by the Harbours and Rivers Department. The bridge was intended to be one of iron having two spans with lattice girders about 100 feet, one on each side, and showing two openings of 65 feet each, with a swing span in the centre giving two swing openings, the deck to be of iron, with tarred metal on the top.

Description of the proposed bridge.

2. At the present time Bullock Island is connected with the mainland at Newcastle by a wooden bridge which has been erected for about twenty-five years, and is now very much out of repair, and unsafe. This bridge, which was built by private enterprise and afterwards purchased by the Harbours and Rivers Department, occupies a position to the east of the site of the proposed new bridge, and while the present bridge extends across a waterway which passes the southern end of Bullock Island and leads into Throsby's Creek, the proposed bridge would, if erected now, be built on dry land, the water channel which it is expected to cross being a matter of the future when the intended reclamation and dredging works shall have been completed.

Bridge at present in use.

3. The Department of Public Works proposes that the erection of the new iron bridge be deferred until the reclamation and dredging works have been carried out. The present Commissioner and Engineer-in-Chief for Roads and Bridges explains that it will probably be from five to ten years before the reclamation and dredging works are completed, and he contends that it is not necessary to erect the proposed bridge at the present time. Its erection, he states, would mean an annual expenditure of £2,000 for interest and cost of maintenance, whereas a temporary wooden bridge, sufficient to meet all requirements until the proper time arrives

Proposal to postpone the erection of the bridge.

arrives for the erection of the proposed iron bridge, might be built alongside the present one for about £3,000. A further reason put forward for the postponement of the erection of the iron bridge is a desire expressed by the Railway Commissioners that the bridge should be a high-level one, in order that, if they can obtain for railway purposes the land which it is intended to reclaim, the bridge may be high enough not to interfere with the movements of rolling-stock, this desire being accompanied by an offer to contribute £17,000, the amount estimated as the extra sum which would be required to make the bridge a high-level instead of, as at present intended, a low-level one. The new temporary wooden bridge would be built on the west side of the present structure, the old bridge being kept in use until the new one was completed.

Opinions of the people of Newcastle and Bullock Island.

4. The proposal to build a temporary wooden bridge, and to defer the erection of the permanent iron structure until after the completion of the reclamation and dredging works, does not find favour with the people of Newcastle and Bullock Island. They contend that the present traffic between Newcastle and Bullock Island, the importance of Bullock Island as the locality where most of the coal-shipping trade of the port of Newcastle is carried on, and the general claims which Newcastle has to be liberally treated in the matter of Government expenditure, are strong reasons why the iron bridge should be erected at once; and they further urge that the suggested postponement for a few years will probably prove a postponement indefinitely, and that in such case the bridge may never be erected.

The inquiry by the Committee.

5. The Committee have spared no effort to obtain a clear insight into the matter. The evidence obtained from the departmental officers was followed by the appointment of a Sectional Committee, who visited Newcastle, inspected the present bridge and the sites of the proposed bridges, and took evidence from a number of local witnesses. After the return of the Sectional Committee to Sydney, further evidence was taken from the Commissioner and Engineer-in-Chief for Roads and Bridges; and the Hon. J. N. Brunker, Minister for Lands, who is well acquainted with Newcastle and Bullock Island, and expressed a desire to be heard, and Mr. Alexander Brown and Mr. James Fletcher, two of the Members for Newcastle, were also examined.

Decision of the Committee.

6. The Committee, after carefully considering the whole of the evidence and the Report of the Sectional Committee, are of opinion that it is not expedient the bridge, as referred to them for inquiry, should be constructed; that, instead of this bridge, the more expensive high-level structure recommended by the Railway Commissioners should be erected as suggested by the present Engineer-in-Chief for Roads and Bridges; and that, pending the erection of this high-level bridge, a temporary wooden bridge, adjoining the present one, should be constructed, at a cost not exceeding £3,000. This temporary bridge will certainly be sufficient to meet the requirements of the traffic between Newcastle and Bullock Island for some years, and the high-level bridge, which it is proposed shall follow the completion of the reclamation works, can very well be postponed. To erect the high-level bridge now, would be to prematurely incur a heavy annual charge for interest and maintenance, and provide a structure beyond what is necessary to accommodate the present traffic, and which, until the intended harbour improvements in its vicinity are carried out, would, in a large measure, be useless. On Wednesday, 19th March, 1890, at a meeting of the Committee,—

Dr. Garran moved,—“That, in the opinion of the Committee, it is not expedient that the proposed Bridge to connect Bullock Island with the mainland at Newcastle, as referred to the Committee by the Legislative Assembly, be carried out, because the evidence shows that a bridge to cross the railway at a high level, at a cost of about £17,000 more, would be preferable.”

Mr. Lackey seconded the motion.

Mr. Dowel moved,—“That the motion be amended by the omission of the word ‘not,’ before the word ‘expedient.’”

The

The amendment was seconded by Mr. Hurley, and negatived, on the following division, upon the question "that the word proposed to be omitted stand part of the clause":—

Ayes, 10.	Noes, 2.
Mr. Abbott,	Mr. Dowel,
Mr. Lackey,	Mr. Hurley.
Dr. Garran,	
Mr. Humphery,	
Mr. Trickett,	
Mr. Cox,	
Mr. Garrard,	
Mr. Copeland,	
Mr. Tonkin,	
Mr. O'Sullivan.	

Mr. Trickett moved,—“That the motion be amended by the addition of the words ‘but that pending the erection of the permanent structure, so as to provide for the traffic, a temporary bridge adjoining the present dangerous one, should be erected at a cost not exceeding £3,000.’”

The amendment was seconded by Mr. O'Sullivan, and passed, and the motion, as amended, was then agreed to.

7. The Committee direct attention to the fact drawn out in evidence, and referred to in the Report of the Sectional Committee, that the proposed dredging above the bridge would be largely in the interest of the frontage-holders in Throsby's Creek, the value of whose holdings would be thereby increased threefold, and that the opinion was expressed by witnesses that it would be policy on the part of the Government to resume possession of this part of the foreshore prior to incurring the expenditure.

Suggested  
resumption of  
frontages to  
Throsby's  
Creek.

J. P. ABBOTT,  
Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Sydney, 29 April, 1890.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC  
WORKS.

MINUTES OF EVIDENCE.

BRIDGE TO CONNECT BULLOCK ISLAND WITH THE MAINLAND AT  
NEWCASTLE.

TUESDAY, 25 FEBRUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).

The Hon. JOHN LACKET.

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee proceeded to consider the proposed Bridge to connect Bullock Island with the Mainland at Newcastle.

Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges, sworn, and examined:—

1. *Mr. Humphery.*] What is your position in the Government service? Commissioner of Roads.
2. Have you any statement to make in connection with the proposed bridge at Bullock Island? It was proposed to construct a bridge at an estimated cost of £33,000. For reasons which will be explained hereafter, the department considers it premature to build that bridge at present, and it is proposed instead to erect a small bridge, at a cost of about £2,500, or £3,000 at the outside, to meet the present traffic. This is necessary because the old bridge is absolutely unsafe.
3. Where is the old bridge to which you refer? The old bridge is under the black strip on the map. The proposal in connection with the harbour improvements was to reclaim a piece of land, shown on the map, and to excavate a channel west of the new dock, with the view of making a channel to a future basin which may have to be made near the railway bridge. But it will be a very considerable time—I should say, putting it at a minimum, five years, but probably ten—before that reclamation will be completed, and to put a bridge up there, at a cost of £33,000, would mean an annual expenditure of £2,000 a year for interest and cost of maintenance. Therefore I think it is premature to erect the proposed bridge now, and would suggest that a bridge alongside the present one be built, at a cost of about £3,000.
4. When was the old bridge built? It must be twenty-five years old.
5. Do you know what it cost? It was built by private enterprise and was afterwards purchased by the Harbours and Rivers Department, in whose care it was for a great many years.
6. Do you know the price they paid for it? I think it was between £700 and £800.
7. And you think a bridge built at a cost of about £2,500, or £3,000 at the outside, will meet all the requirements for some years to come? Yes.
8. Will you state under what circumstances it was proposed to build a costly bridge such as that placed before the Committee for its consideration? This costly bridge will be necessary. It is only a question as to when it will be required. When the proposal was brought forward it was thought that the reclamation would be completed in a short time; but the Committee will see at once that the reclamation is a very extensive piece of work, and will occupy some years. Therefore, I think the proposal to build a bridge which would entail an annual expenditure of £2,000 a year is premature, when we can get a bridge to last for some years at a cost at the outside of £3,000.
9. Who recommended the construction of the bridge now before the Committee? It was recommended by my predecessor, Mr. Bennett.
10. Have you any papers in connection with Mr. Bennett's recommendation? Yes, but I have not brought them with me.
11. You say that the bridge originally proposed is unnecessary at the present time? Yes.
12. And is the bridge that you propose to substitute absolutely necessary? Yes, it is; the present bridge being unsafe.
13. *Dr. Garran.*] Will you kindly tell the Committee how many cranes there are on this wharf? Twelve.
14. When you build the large basin which you propose to construct how many cranes will you have all round? It is proposed to put seven there.
15. That will only occupy the eastern side of the basin? Yes.
16. Then you will have all the western side and the northern piece? Yes.
17. How many ships will you be able to accommodate in the basin? The proposal before the Committee with regard to these harbour improvements will accommodate nine vessels loading at the cranes.

R. Hickson,  
Esq.  
25 Feb., 1890.

- R. Hickson, Esq.  
25 Feb., 1890.
18. Then you will have all the rest for wharfage? Yes.
  19. You will have nearly double the wharfage accommodation that exists at present? Yes, when the basin is completed.
  20. If you double the existing accommodation by making the large basin you will not want the little basin at all? Yes.
  21. How many years do you think it will be before double the accommodation will be too little for the traffic? It is very hard to say. A great number of years.
  22. In addition to the shipping accommodation there will be wharfage accommodation along the south bank of the river all the way from Merrywether-street to the bridge? Yes.
  23. That will more than double the existing wharfage? Yes.
  24. But until the existing wharfage turns out to be too little you will not want any more wharfage? No; the Government will not want any more wharfage.
  25. So that this bridge really will not be wanted until you require to make this inner basin? It is not a question of making the inner basin. It is all private land, and we should, I think, give access to the wharf built by private enterprise.
  26. But this land is not available for wharfage purposes now, because you have your bridge, which prevents its being available? That is so.
  27. And until you move that bridge away these people cannot use the land for wharfage? No.
  28. Then they have not really got a wharfage frontage? No.
  29. You propose to create a new water frontage for them at the Government expense? Yes. We propose to give them access to their water frontage.
  30. To create, in fact, a new water frontage? Yes; practically to create a new water frontage.
  31. They could not get a single schooner up to the water frontage now? No; only a boat.
  32. If you were to build this bridge at the present time you would really be building it on dry land? Yes.
  33. And then you would make the scour afterwards underneath it? If we were to build the large bridge at a cost of £33,000 we would cut the channel and make the bridge at the same time.
  34. Still you would build it where there is dry land now? Yes.
  35. And where there would be no channel until you scooped out the basin? No.
  36. But for public purposes the basin will not be wanted until you have used up all the existing wharfage, and require more? No.
  37. That is to say you will have to more than double all the present wharfage requirements before the inner basin can be wanted? Yes.
  38. And then that inner basin will be all private water frontage? Yes.
  39. *Mr. Garrard.*] Is it a fact that during the last few years the whole of the coal-shipping appliances in connection with the A. A. Company's ships have been shifted from Newcastle to Bullock Island and Carrington? Yes.
  40. Making Carrington a busy place? Yes.
  41. And settlement is going on there very rapidly? It is.
  42. Is it true that the town was recently incorporated? Yes; I think a couple of years ago.
  43. And it is making very rapid progress? Yes.
  44. And there is a great deal of traffic over the present bridge which you say is dangerous? There is a good deal of traffic over the present bridge, and that structure is absolutely dangerous.
  45. I suppose, as additional facilities for the shipment of coal are given, a very much larger traffic may be anticipated? Yes.
  46. I presume the £33,000 bridge was designed to work in with the complete scheme of works carried out by the Harbours and Rivers Department? Yes.
  47. Do you know what portion of the works will be completed first by the Harbours and Rivers Department? The wharf on the inner side of Bullock Island.
  48. You know that from consultation with the present engineer of the Harbours and Rivers Department, and also because you were acting as engineer under that department? Yes. Before I left the department a commencement was made on the south wharf at Bullock Island, and one of the new sand pump dredges is excavating there now.
  49. Then knowing exactly how it is proposed to carry out the basin works you believe that the new bridge will not be required for at least five years? Yes.
  50. Where is the site of your proposed new wooden bridge? Alongside and to the west of the old one. The object of this is that we may have the use of the old bridge until the new one is completed, and when we come to build the more expensive bridge, as we shall no doubt do in time, this bridge will still afford means of getting across the river to Bullock Island.
  51. And your permanent bridge of the future will be even further west than the proposed temporary bridge? Yes.
  52. You will make use of your present roadway, I suppose, for your temporary bridge? Yes.
  53. Both sides? Yes.
  54. What is the width of the proposed temporary bridge? About 22 feet.
  55. Are there any footways besides, or is that all the carriage-way? It is only the carriage-way. It is not a very long bridge.
  56. Are you going to put a camel's back on it, the same as at present? I think it will be necessary to allow the lighters to go underneath.
  57. And you think that will last and serve all purposes for five years, when the larger structure will be taken in hand? I do. I think a very considerable saving will be effected by adopting that plan.
  58. Has your temporary project been put before the people of Newcastle and Carrington? I do not know.
  59. I do not suppose they will like it? I do not know; what they want is to get a proper bridge to enable them to get across the river.

John Alexander McDonald, Esq., M.I.C.E. and M.I.M.E., Engineer for Bridges, sworn, and examined:—

60. *Mr. O'Sullivan.*] You are the designer of the proposed bridge between Carrington and the mainland at Newcastle, are you not? Yes. No detailed drawings for it have been got out yet.
61. Then what stage has it reached? A survey has been made, but no detailed drawings have been got out yet.
62. Can you tell the Committee what character of bridge is proposed? When the Harbours and Rivers Department had their scheme before the Committee it was proposed that our department should erect an iron bridge with two openings of 65 feet each, and the estimated cost, without any detailed drawings or detailed quantities, was £33,000.
63. That estimated cost then is only approximate? Yes. It could not be guaranteed as being within 10 per cent. of the actual cost.
64. Then you have only proceeded as far as the preliminary stage in making a survey for the bridge? Yes. We have been waiting to see what action the Harbours and Rivers Department would take in reference to the reclamation, because the bridge as proposed would be on dry land.
65. Have you now received orders from the department to abandon this bridge? No. The matter has been left in the Commissioner's hands so far as to what should be done. I have no definite instructions from him what to do in the matter.
66. Would this bridge correspond with the iron bridge at Nowra over the Shoalhaven? No. There would be two spans with lattice girders about 100 feet, one on each side, a swing span in the centre giving two swing openings.
67. With a timber deck? No. It was proposed to have an iron deck, with tarred metal on top.
68. *Chairman.*] What proceedings were taken in your department with reference to the construction of this bridge before the matter was referred to Parliament? I had taken no proceedings at all myself.
69. I am asking you what steps were taken in your department? This work was referred to the Committee by Parliament on the 3rd October, 1889, at the instance of the Minister. I am asking you now what proceedings had been taken in your department in connection with this bridge, as to the preparation of plans and estimates of expenditure prior to the 1st October, 1889? None.
70. Had the matter been before you at all? I think not—before the 1st October.
71. Then, so far as you know, the matter was presented to Parliament without any consideration by the department at all? So far as I know, yes.
72. And the evidence which is given now as to the inadvisableness of building the bridge could have been obtained just as well before the work was referred to the Committee? Yes.
73. But it was not obtained, was it? No, it was not.

J. A.  
M'Donald,  
Esq.,  
M.I.C.E.,  
M.I.M.E.

25 Feb., 1890.

THURSDAY, 6 MARCH, 1890.

Present:—

The HONORABLE JOHN LACKBY (VICE-CHAIRMAN).

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPPLAND, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee further considered the proposed Bridge to connect Bullock Island with the Mainland at Newcastle.

Hugh McLachlan, Esq., Secretary to the Railway Commissioners, sworn, and examined:—

74. *Vice-Chairman.*] You are Secretary to the Railway Commissioners? Yes.
75. You are aware that it is proposed to construct a bridge at Bullock Island, and you have volunteered some evidence on the subject on behalf of the Commissioners? Yes.
76. *Mr. Garrard.*] The Railway Commissioners understand that the proposal now before the Committee is for a low-level bridge? Yes.
77. And in view of the possibility of their requiring to use the reclaimed land for railway purposes they would like to have a high-level bridge, to the cost of which they are willing to contribute £17,000? Yes.
78. And they recognise that it will be some time before this bridge will be required—in fact not until the reclamation is carried out? Yes.
79. *Dr. Garran.*] It is not absolutely certain that the Railway Commissioners will get this reclaimed land? Of course they will make that condition. They would not give £17,000 without getting the land.
80. The reclamation is to be made out of the land dredged from the proposed channel? Yes.
81. Therefore you cannot possibly use it until the mud has been dredged up? No.
82. The question for us to consider is whether, as it will probably be five years before that dredging is finished, we should not, for the immediate convenience of the Bullock Island people, renew the present dilapidated bridge *pro tem*? That is the idea of the Commissioners—that an inexpensive bridge might be erected to meet present requirements, in view of the larger scheme which will be necessary when the reclamation is carried out.
83. Then the Commissioners have nothing to say against a temporary bridge? Certainly not. They recognise that the convenience of the people must be met, and that it is absolutely necessary to renew the existing bridge for the present.
84. And it will be time five years hence to discuss the question of a permanent bridge? Five or six years. The Commissioners think it would be most unwise to make a low-level bridge, because the land would be cut off into two parts and it could not be worked for railway purposes.
85. And the opinion of the Commissioners is against a low-level bridge at the present time? Yes.

H. M. Lachlan,  
Esq.

6 March, 1890.

WEDNESDAY

WEDNESDAY 12 MARCH, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN.)

The Hon. JOHN LACKEY.

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee further considered the proposed Bridge to connect Bullock Island with the Mainland at Newcastle.

Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges, sworn, and further examined:—

- R. Hickson, Esq.  
12 Mar., 1890.
86. *Dr. Garran.*] With regard to your first estimate for a temporary bridge at Bullock Island, will £3,000 be a sufficient sum for the work? We can do it for that amount.
87. How soon can you get the bridge open for traffic from the time you get orders to begin the work? In six months.
88. Will the construction of that bridge interfere with the traffic over the existing bridge? No. I will make it so that it will not do so.
89. What is your opinion, after examining the old bridge, as to what it would cost to make that safe for three, or four, or five years? I think it would be just as cheap to put up a new one as to make this one safe. We would practically have to re-make it, and during the time we were doing so it would be very inconvenient for the traffic.
90. The proposal for a new bridge is not more expensive, and much more convenient to the public? Just so.
91. How long will it take to complete the reclamation on the shore line of Newcastle and to construct the proposed high-level bridge? The reclamation works I cannot answer for, as they are under another department; but the bridge ought to be erected in from eighteen months to two years.
92. You can go to work at once, I presume, without the approach, or the railway enclosure? Yes.
93. If you did that, would you make a channel over which the swing-bridge is to go before sinking your piers, or would you do it afterwards? If the bridge was to be built at once, I think I would commence sinking cylinders at once on the land.
94. And leave the excavation to be done afterwards? To be done by the Harbours and Rivers Department; our department would not do it in any case.
95. You could put your piles down so that they would not be interfered with by the excavations? Yes.
96. They could make the excavations without knocking the piles about? Yes.
97. You could build the bridge even if the other works were never carried out? Yes.
98. You could do your part of the work in two years? Yes.
99. Does that refer to the bridge as you have put it to the Committee, or to the bridge as the Commissioners have suggested? To the bridge which I put before the Committee.
100. With a high-level bridge it would take a little longer? Yes, a little. I suppose two and a half years would be the outside. I would point out a very great difficulty in making the bridge as suggested by the Commissioners. I do not see very well how it could be done until the reclamation has been carried out, except at a very considerable cost. If we had the reclamation done we should have the foundations, to a very great extent, in for the structure—it would be across the railway; but if we were to put these piers down now we should have to go right into the present channel and make them very much deeper.
101. These piers will all go into soft earth, you must go below that considerably to get solid ground? It would not be very soft, it would be sand. If you can keep sand from the action of water, and of the weather, it is a very good foundation. Most likely we shall place iron piers on concrete beds to carry the superstructure.
102. If you put down your piers after the reclamation is made you will not go so deep as you would go now? No.
103. It will be quicker and cheaper to make the bridge after reclamation than before? Yes.
104. On the whole you would prefer the reclamation to be made first? Yes, I would.
105. But you can do it without the reclamation? Of course we can.
106. You are aware that the Railway Commissioners have estimated that a high-level bridge will cost £17,000 more than the low-level bridge will? That was an estimate I gave Mr. Eddy in the course of conversation, but it was only an approximate estimate.
107. It is not one you would permanently abide by? No.
108. The extra expense would be caused by the greater height and large number of iron girders? The greater height and the greater length.
109. Do you see any difficulty in rising from the level of Hunter-street to the level of your bridge? No. We can do that. It would involve shifting the rails further north, on to the proposed reclamation.
110. Is this reclamation work done with borrowed money? Yes.
111. The country goes into debt to make this new land? Yes.
112. And when the Railway Commissioners get possession of that will they be charged with the cost of reclamation, or will they get it as a present? That I cannot say.
113. The intention is that they shall then sell the frontage they have in Hunter-street? That is the idea.
114. When they sell that land will the money be credited to their account, or to the Government account? To their account I presume.
115. If they get for nothing what the Harbours and Rivers Department have reclaimed, and then pocket the proceeds of the sale of this frontage they will do a very good thing? Yes; they get now for nothing all that the Harbours and Rivers Department reclaim. All their wharves are made for them and not charged to them.
116. The Railway Department gets all the revenue from them? Yes.
117. They pay no interest? No.

118. Every crane has been put up with borrowed money? Yes; and the Railway Department gets the revenue from the cranes.
119. And from the whole wharfage of Newcastle in the same way? Yes.
120. If the railway had been in the hands of a private company they would have had to do all that at their own expense? Yes.
121. As it is it is done for nothing by your department? Yes; as far as they are concerned.
122. So far as you are able to form an opinion, do you favour the construction of a high-level bridge over a low-level one? I think a high-level bridge would be the best. If the piece of reclamation was to be used as a railway yard, it would be necessary that the traffic should be carried overhead.
123. There will be seven or eight parallel sidings? At the least.
124. And any one of these being used would stop the traffic on the bridge? Yes.
125. Do you think it would be any serious inconvenience to the island to have that ascent and descent? Not unless there is a tramway made. When I was there there was some talk of a tramway being made. It would be difficult to get a tramway over the island bridge except it were a cable tram.
126. One or two of the witnesses there intimated that a high-level bridge might be inconvenient in the case of heavy girders wanting to be taken to the foundry on the island—would not that be quite avoided by taking them round by Wickham Bridge? They could get a level approach by going over that bridge.
127. You would not consider that to be a serious difficulty? Not at all.
128. You know the site of the Wickham Bridge—the one below the railway bridge? Yes.
129. The Mayor gave it as his opinion that that bridge could be shifted nearer to the railway bridge, with very great advantage—do you agree with that? I do not think there is any necessity for shifting it now. The time may come when it will be wanted for shipping purposes, and it could be shifted then.
130. You don't think there is any immediate demand for more wharves inside of Throsby's Creek. The evidence there went to the effect that when the excavations are all completed there will be something like three times the present accommodation? There are at present twelve hydraulic cranes. This Committee last year passed a proposal which was laid before them for seven more. There is room in that basin for about fourteen more.
131. Including the jetties? Yes.
132. I suppose you cannot predict when these thirty-four cranes will all be in full work? No; it will be a long time, I think.
133. And for public purposes shall we want any Crown wharf frontage above the bridge? Not until these thirty-four cranes are fully employed.
134. The deepening of the basin above the bridge will not be for a public purpose? No.
135. But for the advantage of holders of land on the Wickham shore? Yes.
136. As far as the Harbours and Rivers Department is concerned you have frontage enough at the present? Yes, and for a long time to come.
137. But the object of the swing is to get at this inner basin? Yes.
138. How much extra cost does the swing involve in the construction of the bridge? I cannot tell you exactly; but I should think it will not be less than £8,000 or £10,000.
139. It is only wanted for the purpose of improving private properties, and if it were not for those properties being improved you would be content with a fixed bridge? Yes.
140. *Chairman.*] On the other hand the bridge, when constructed, interferes with private property as it exists at present, doesn't it? They cannot get to it now.
141. *Mr. Hurley.*] What would be the cost of a temporary bridge? £3,000.
142. How long would it take to construct it? About six months.
143. And how long to construct an overhead bridge? Probably two years and a half.
144. At a cost of how much? About £50,000.
145. Towards which the Railway Commissioners propose to contribute £17,000? Yes.
146. Would not the present bridge accommodate foot passengers and light vehicular traffic until such time as a more permanent bridge could be erected? I do not think it would be advisable to leave the present bridge, it is positively unsafe now.
147. Would it be a source of danger to foot passengers? No.
148. Would it not be to the interest of the people on Bullock Island if they were to suspend heavy traffic over the bridge and divert it round by Wickham so that they might secure in time a more permanent structure? I do not think so. It would be a very great inconvenience to the people of Bullock Island to have to go round by that bridge.
149. Suppose the proposed temporary structure is erected, might it not postpone the construction of a more permanent one for a considerable time? I do not think that affects the question.
150. You know the Railway Commissioners have recognized the fact that a low-level crossing is a source of great danger to a large number of people? Yes.
151. You are also aware that the Commissioners propose in connection with the reclamation to straighten out their line between Wickham and the Newcastle terminus? It will be desirable to do so.
152. Therefore they are interested in the reclamation? Very much.
153. And they show their interest by contributing £17,000 towards the erection of a permanent bridge? Yes.
154. You are also aware that it is contemplated that there shall be a tramway between Bullock Island and Newcastle? I heard it mentioned for the first time in Newcastle the other day.
155. Would this temporary structure not carry a tramway? Oh, yes. It could be used for that purpose if the Commissioners decided to make a tramway.
156. You admit that they would be greatly inconvenienced in having a low-level crossing? Yes. A high-level crossing would be best undoubtedly. The present level crossing I understand is not such a great inconvenience for it only crosses two lines.
157. Would not the present hydraulic cranes and the works which are being pushed forward in connection with the inner basin accommodate the shipping, even if the trade were to increase 50 per cent.? It gives them seven more cranes than they have.
158. If the trade of the port were to increase 50 per cent. there would be no necessity to provide additional accommodation for ships to the west of the bridge? Not as far as the Government are concerned.
159. As far as you can see if the trade were to increase 50 per cent a swing bridge is not actually necessary? Not for the shipping.

E. Hickson,  
Esq.  
12 Mar., 1890.

- R. Hickson,  
Esq.  
12 Mar., 1890.
160. What is the distance from the extreme northerly end of Bullock Island to the main street of Newcastle? I think it is about 2 miles.
161. Seeing that the people have to travel 2 miles it would be advisable that they should be able to reach the city by tram? There are no people at the top end of the island, that is a reserve. If you mean from where the people live at present—that is only about one mile and a quarter.
162. You are aware that a great number of people have settled on Bullock Island during the last five years? Yes.
163. And that the price of land has advanced considerably since the population settled there? I believe so.
164. Have you not heard that there would be ready purchasers for any reclaimed land, or any land which the Government may put up for auction there? I have no doubt there would be.
165. That would necessarily increase the population? Yes.
166. It would be to their advantage to have a tram right into the city? I suppose it would.
167. In view of that contingency is it not advisable to erect a more permanent structure than the proposed bridge? I do not think so, if the temporary structure will meet the requirements of the place, or of the tramway, if it is made, for the simple reason that we should be expending £50,000 on a bridge which would not be required for a great number of years.
168. How long will the temporary bridge last? I should make it last about fifteen years.
169. At a cost of £3,000? Yes.
170. In point of fact you are opposed to the erection of the more permanent structure and in favour of the temporary structure? Yes.
171. What leads you to infer that the one is suitable and will provide all the necessary accommodation as against the other? They will both meet the accommodation, but one at a very much less cost than the other.
172. Would you be favourable to the construction of a tramway over this temporary structure? Yes; Perhaps the word "temporary" is a misnomer. It is a good substantial wooden bridge, practically the same as the bridges we are putting up all over the country.
173. What gave rise in the department to the idea of preparing plans for the more permanent structure? I can hardly answer that. It was all done before I took charge of the department.
174. I suppose you recognize the fact that the Commissioners are favourable to the erection of the more permanent structure? Not that I am aware of.
175. Does not the fact that they are willing to contribute £17,000 towards the cost of the work show that they must be favourable to a high-level crossing? I think the object of making the contribution, as far as I could make out from Mr. Eddy, is to get the land; they will not contribute that sum unless they get the land.
176. If they get this piece of land will they give £17,000 towards the erection of the temporary structure? No.
177. They would not contribute anything towards the temporary bridge? No.
178. Practically, they are giving £17,000 towards the construction of the more permanent structure? They are giving £17,000 for the piece of land that they hope to get. But if they do not get that land they will not give anything at all.
179. If it should be decided to put up a more permanent structure, would it not be to the advantage of the people on Bullock Island to suffer for two years the inconvenience of going round by Wickham, until the work is completed? I do not think so. I do not see what advantage these people could get from the more permanent structure over the temporary one. All they want to do, I presume, is to get across in the most convenient and shortest way to Newcastle. I do not see that it makes any difference to them whether it is a swing bridge or not. The only people that are affected by the question are the people further up Throsby's Creek.
180. But you know that Bullock Island is one of the chief outlets for the population of Newcastle? Yes.
- 181-2. And that they can secure leases or freeholds there to make homes for themselves? Yes.
183. In view of the prospective population of that island, should not a bridge be constructed which would last for all time? So long as they get a structure which will carry them over safely I do not see that it makes any difference to them whether it is a swing bridge or a closed bridge, whether it costs £3,000 or £50,000.
184. What induced your department to construct permanent iron bridges in other parts of the colony with less population and 50 per cent. less traffic? Because they could not be put up at a less cost.
185. Supposing you had constructed wooden bridges instead of iron bridges over the Gwydir, the Hunter, and other rivers, would you not have saved a considerable sum? Yes. In the light of subsequent events there is no doubt that we could have put up some of the iron bridges at a less cost.
186. You consider that a considerable saving could have been made if some of these iron bridges in the interior had been constructed of local timber? I could not speak in a general way without looking through each bridge. There may be some special reasons why iron bridges would be cheaper and more advisable than wooden ones.
187. *Mr. O'Sullivan.*] The people of Newcastle appear to dread that if they get a temporary bridge now they will not get a permanent bridge for many years; is there any ground for that apprehension? Not that I know of.
188. How long will it be before they start the erection of a permanent structure? I should say whenever the necessity demands it.
189. That may not be for years, if the basin they are now constructing suffices for the trade? It will not be for years, so far as the Government are concerned.
190. Do you not think the railway authorities will press for the reclamation of this land for their accommodation? If they get the land no doubt they will.
191. They appear to be in want of such a place for the trains? Yes. Their present intention is to get that accommodation out at Hamilton, but they would prefer to have it here, no doubt.
192. You would not start the construction of this permanent bridge until the reclamation is made? I do not think it would be advisable to do so until then.
193. I suppose that if the railway authorities press for the reclamation it will be carried out? I cannot say; that is a matter which rests with the Harbours and Rivers Department.
194. *Mr. Garrard.*] Is it true that the whole of the works at Newcastle, such as dredging, and the construction of wharves and cranes have all been paid for out of loan votes? No, the dredging is paid for out of revenue.
195. Excluding the dredging, all the improvements, such as wharves and cranes, have been provided out of loan funds? I think all, without any exception.

196. And when the works are completed they are handed over to the railway authorities? Yes, as regards wharves, cranes, and reclamations. R. Hickson,  
Esq.
197. Do you know if the railway authorities pay any interest on the cost of any of these works? I do not think it enters into their books at all. 12 Mar., 1890.
198. Do you not think it would be a fair thing to charge them with the interest in respect of these works? I suppose it would.
199. What has caused Bullock Island or Carrington to become an important place;—is it not the fact that it is the railway shipping place for coal? Yes, certainly.
200. Do you not think, therefore, that inasmuch as the traffic is created by the railways and for their own benefit, the whole cost of this proposed bridge should be borne by the railway authorities the same as they bear the cost of any overhead bridge over any portion of their lines? No, I do not.
201. Why? They do not benefit in any way by this proposed bridge.
202. The Railway Department does not benefit by the erection of any overhead bridge, but because the absence of a bridge interrupts the traffic they have to provide a bridge for the accommodation of the public. Is not this bridge in exactly that position? I do not think it is quite the same; that would only apply, I think, to that portion crossing their rails. They might say “after you cross our rails we do not care what you do;—you need not erect a bridge at all.”
203. You think that the £17,000 which they offer is intended to defray the cost of that portion which would cross their rails? That is what it is intended to do.
204. I think you expressed the opinion that they would not give even that sum unless they got a large piece of reclaimed land for their own purposes? In the conversation which I had with Mr. Eddy over this matter he said that they would be willing to bear the extra cost the department would be put to in carrying a high-level bridge across this portion of reclaimed ground, on condition, of course, that they got the reclaimed land, and to that I replied, “I cannot give you any promise.”
205. They have a large area of land at Hamilton which they propose to use for shops and shunting arrangements? I believe so.
206. If they got this reclaimed land they will not require to use the other land? I do not suppose they would to such an extent.
207. In other words they will be able to sell the land at Hamilton and put the proceeds of the sale to their credit? I cannot say; they might want both.
208. *Mr. Copland.*] This structure is spoken of as a “temporary” bridge; I suppose the idea is simply to construct a wooden bridge of a permanent character? A good substantial wooden bridge which will carry the traffic over the place until it is necessary to put up a larger structure.
209. It would have the same life as the ordinary wooden bridges put up throughout the country? Practically the same.
210. There is nothing temporary about it at all—the word is a misnomer? Yes. The bridge will be as safe and just as serviceable as an iron bridge would be.
211. Just as serviceable. Just as safe? Yes.
212. *Dr. Garran.*] It will have to be pulled up if a swing is to come into use? Yes; it would not be wanted then.
213. *Mr. Copland.*] You would only build an iron bridge when it became necessary? Yes.
214. *Mr. Hurley.*] The difference I take it between a temporary bridge and a high-level bridge would be that there would be no traffic over the railway lines with a high-level bridge? On the level, no.
215. But with the proposed temporary structure you would have to carry all your traffic over the railway lines? You would carry it over the present two lines.
216. Or over any increased number? They cannot increase the number until the reclamation is made.
217. If the reclamation is carried out there is a probability of more lines being laid there? No doubt.
218. Therefore, with a low-level temporary structure all the traffic would have to cross these lines? Yes; if they carried it right through the present workshops. The proposed approach to the new bridge would be in the centre of the reclamation; the present approach is right at one end of it. It is very questionable whether they will carry these lines right through into what is their present workshop, or whether they will make them dead ends. If they make them dead ends none of these lines will cross the proposed approach at all.

THURSDAY, 13 MARCH, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).

The Hon. JOHN LACKEY. The Hon. ANDREW GARRAN. The Hon. FREDERICK THOMAS HUMPHREY. The Hon. WILLIAM JOSEPH TRICKETT. The Hon. GEORGE HENRY COX.		JACOB GARRARD, Esq. HENRY COPPLAND, Esq. WILLIAM SPRINGTHORPE DOWEL, Esq. EDWARD WILLIAM O'SULLIVAN, Esq. JOHN HURLEY, Esq.
CHARLES ALFRED LEE, Esq.		

The Committee further considered the proposed bridge to connect Bullock Island with the Mainland at Newcastle.

Hon. James Nixon Brunker, M.P., Minister for Lands, sworn, and examined:—

219. *Dr. Garran.*] What is your position in the Government? I am Minister for Lands.
220. You have long been a resident in the Hunter River district? I am a native of the district.
221. You are thoroughly well acquainted with Bullock Island? Yes.
222. And with the existing communication and what is proposed? I do not know so very much about what is proposed, except that a bridge is proposed to be erected to connect the mainland with the island. Hon. J. N.  
Brunker,  
M.P.  
13 Mar., 1890.
223. You know that the present bridge is really unsafe? I could not say that from my personal knowledge, but I believe it has been said.
224. You know that the engineer has refused to allow loads of more than 3 tons to go over it? I was not aware of that. 225.

- Hon. J. N. Brunker, M.P.  
13 Mar., 1890.
225. We have it in evidence that that is the case, and that it will cost as much to make that bridge safe for the next two or three years as it would to construct a new bridge at a cost of £3,000. Under these circumstances do you think it better to tinker up the old bridge than make a stronger and safer one by the side of it? I think that would depend very much upon circumstances, and the conditions under which the Public Works Department intend to act with regard to the construction of a permanent bridge. I think the importance of the place demands that the facilities for traffic should be made as easy and as good as possible, and if it is their intention to build a bridge the sooner it is done the better.
226. You are of opinion that communication with the island ought to be maintained by the present road? Yes, for several reasons. The Government have a very large area of unalienated land there. This plan shows the portions of unalienated land. These lower portions when reclaimed would be equal in value to, if not greater in value than that of those which have been already alienated. Then on the opposite side—the Newcastle side—there is a very large area, a portion of which is now being reclaimed, belonging to the railways, which is also of considerable value. The values of all these lands will be very considerably increased by the construction of a permanent bridge which would have allowed full facilities for traffic, and the people wish means for getting to and fro, which they do not possess at present. I believe the present bridge for very many years has been an anomaly so far as the importance of the place is concerned.
227. A large part of the unalienated land is at present too low and swampy for occupation? There is a very large area which is unfit for occupation, but as the Government are continuously dredging the harbour, the silt might be utilized in reclaiming the land, the same as is done at Cook's River, where land is not nearly so valuable.
228. Would it not pay to reclaim this land with silt from the harbour? Yes.
229. It is the policy of the Government to reclaim the swampy portions, and bring them into the market, and so recoup themselves the cost of the reclamation? That is the intention.
230. The portion remaining unsold will represent a handsome surplus after paying the expenses of the reclamation? There is no doubt about it. Bullock Island, in some places, is worth from £2,500 to £4,000 an acre.
231. You will have practically to pile all the water margin round? I do not know whether that will be necessary—it has not been done at Cook's River.
232. Is there the same wash at Cook's River as at the Hunter River? The wash in that part of Throsby's Creek is not very great.
233. On the river side? That would be protected by the dyke.
234. It does not run to the full north end of the island? It runs very nearly to the end of the island.
235. Do you know, as Minister for Lands, whether any portion of that island is reserved? I see there is a small reserve of 15 acres.
236. That is the full amount you propose to reserve? That is the amount already reserved.
237. And taking that out you have enough land left to leave a handsome balance? A very large one, I should think.
238. So that the cost of the bridge could be paid for out of the proceeds? Yes, and leave a large margin besides.
239. No special account, I presume, is intended to be kept of the proceeds of the sale? I cannot say.
240. You are aware that on the Newcastle frontage it is proposed to make a large reclamation? That is being made.
241. Which the Railway Department desires to have for sidings when it is completed, and which would be on the east and west sides of the bridge road? Yes.
242. You are aware that at present the road is a level crossing? Yes.
243. Which is often inconvenient to the inhabitants, and often inconvenient to the Railway Department? There is considerable delay there at times.
244. If these sidings were put in the use of any one of them would block the crossing? Yes.
245. So that with seven lines of sidings the need of an overhead bridge becomes far greater than it is now? It would prevent considerable delay, and of course assist the Railway Department very much.
246. With seven parallel sidings would it not be very undesirable to have a level crossing? It would be unsafe.
247. Would it not be much to the advantage of Bullock Island and Newcastle that the bridge should go overhead? I do not know. I should like to know something more about the construction of the bridge, and what it is like, before I give a definite answer.
248. Would you go to the expense of constructing an iron bridge to cross all these sidings? I think we have sufficient engineering skill in the colony to devise a scheme for the construction of a bridge which would suit all kinds of traffic, and if they could construct a bridge which would prevent the inconvenience that would arise from interfering with the railway traffic, and also afford facilities for general traffic to the island, I think their advice might very well be accepted. They could give a much better opinion on that subject than I could.
249. Could any engineering skill make a level crossing across seven lines of rails without interfering with the road traffic or the railway traffic? A high-level bridge could be constructed, but it might interfere very materially with existing rights; not only so, but it might tend to impede rather than increase the traffic from one point to another.
250. In what way would it interfere with existing rights? It would depend where the landing would be on each side. On the north side it would not matter, because it is all Government land, but on the south side large existing rights are concerned.
251. The entrance to Bullock Island will be where it is now. On the other side it is proposed to shift a little more to the west, and come straight in line with Union-street. Would that be interfering with anybody's rights? I could not say without I saw a plan of the proposed bridge.
252. It is supposed to be much more convenient to Newcastle to erect it in a line with that street? It will be much better.
253. It would not interfere with anyone's rights? It would depend on where the landing was and on the gradient.
254. The gradient would have to be safe enough to carry you 15 feet clear over the head of the rails? That would be a very heavy lift.

Hon.  
J. N. Brunker,  
M.P.

18 Mar., 1890.

255. The evidence from Bullock Island was that for ordinary traffic they would rather submit to that gradient than suffer the delay which must necessarily take place if they have a level crossing, and that the inconvenience would only be when there was specially heavy iron goods, and which might be avoided by crossing Wickham bridge. Have you anything to say otherwise? No. The objection I would have to the high-level bridge is that it would prevent any heavy traffic at all.

256. Granting that occasionally very heavy loads would have to go round a mile, would that be less inconvenient than having to cross on the level? It would be safer. I do not think it would be less inconvenient.

257. If the people of Newcastle on the whole are more favourable to a high than a low-level crossing you would not wish it otherwise, would you? I should not be guided by the people of Newcastle in my opinion. I should be guided by the opinion of the engineer.

258. The engineer says that it would be practically impossible to take the traffic over that number of crossings? It would be no use building a bridge, then.

259. I am asking the questions because the engineer's decision is decidedly in favour of a high-level bridge, and the feeling both in Bullock Island and Newcastle acquiesces in that decision, notwithstanding the little gradient that will be involved. Under these circumstances do you not think that a high-level bridge is to be preferred to a low-level bridge? I think so, if the gradients are regulated to meet general requirements.

260. You have nothing to urge against that decision? I think a bridge is absolutely necessary and ought to be constructed at once, or as soon as possible, if they are to have one at all.

261. Do you see any objection, as the Minister of the department interested in the reclaimed land, to that land being vested in the Railway Commissioners?—Will the fact that the Railway Department owns the present frontage vest in them the land which is to be reclaimed? I do not know whether the Railway Department will have to adopt the same course as a private individual would, but if they did the application would be dealt with in the usual way by the Lands Department.

262. The work of reclamation is being done at the expense of the Harbours and Rivers Department, and if the Railway Commissioners take possession of this land, will they compensate that department for the expense, or will they simply take possession and say, "thank you"? That will be a matter between the Railway Commissioners and the Works Department—not the Lands Department.

263. The Railway Department will get the benefit of the expenditure of capital? All persons who get the right to reclaim have that benefit.

264. Do they not reclaim at their own expense? I suppose so.

265. The Railway Department is not reclaiming at its own expense? No; but that will be a matter for consideration between the Harbours and Rivers Department and the Railway Department.

266. Does it not affect the capital account of the Railway Department? I think it will increase it a good deal.

267. It would not increase it if they were charged nothing for it? No. If they get the Harbours and Rivers Department to make the reclamation and the land falls into their hands afterwards it would increase their capital very considerably, because the land would be very valuable.

268. Is not the Railway Department at the present time enjoying the benefit of the dyke and all the cranes which have been erected? Yes.

269. Where not the whole of those works constructed at the expense of other departments? No. A great deal was constructed at the cost of shipowners.

270. They have paid the interest on it, but they have not paid the capital? No, they bought the material with which the wharves were made.

271. Except that portion which they had to put out somewhere, the shipowners contributed nothing to the capital? No, but that was a very heavy charge on them.

272. They had to leave the ballast somewhere, and it was convenient for them to put it out at the dyke? Yes, but it was a considerable charge on them. These works were constructed at a small cost originally.

273. The Government has gone into debt for the dyke? Yes.

274. And the Railway Department is getting the revenue from that expenditure without having contributed any of its own capital towards it? I cannot say that, because they have constructed railways which lead to the dyke, and which afford facilities for shipping coal.

275. They have constructed a branch line to the island? They have made a branch line and several sidings.

276. Beyond constructing their own access they have not built the dyke itself? No.

277. Therefore to a large extent they are working on the capital of the Harbours and Rivers Department? Yes, as far as the dyke is concerned.

278. In connection with this new bridge it is proposed to have a swing and to deepen the channel to enable vessels to get to the inner basin. It is also proposed to erect additional cranes, and it is estimated that when the whole of these works are completed the accommodation for shipping will be three times as large as it is now;—do you think that such accommodation will last Newcastle for a considerable period? I should like to see where three times the accommodation is to come from.

279. It is proposed to increase the number of cranes from twelve to thirty-five, do you think that that accommodation will last Newcastle for some time? I think it will meet the demand for shipping facilities with the two miles of wharfage already available.

280. Do you think there is any immediate demand, on public grounds, for making the inner basin? I do not think there is, beyond deepening the channel for vessels of light draught.

281. You observe that it is intended to improve the wharfage on the west side of Bullock Island at the south-west point, but the evidence goes to show that we shall not want that for public purposes for a very long time to come? I do not think we will. I do not think that the channel ought to be stopped; these people ought not to be deprived of their water rights.

282. We are told that there is a frontage of 1,000 feet on the Wickham shore, the owners of which desire the inner basin to be excavated with the least possible delay in order that they may make timber wharves;—do you know anything of that? I do not. I think that in making this reclamation the channel might be so deepened as to give as much water as they require to carry on a business of that kind.

283. We are told that the original grants of these 1,000 feet of land on the Wickham shore were issued with a 100-foot reservation, and that some of these reservations have been cancelled and purchased? They have been purchased.

Hon.  
J.N. Brunker,  
M.P.  
13 Mar., 1890.

284. What proportion of the 1,000 feet has been purchased as a frontage right? I cannot tell you from memory. I know that a great many rescissions have been made. I do not see why the people who bought land in the locality should be treated differently from those who reside in other parts of the colony. If they are to contribute to the improvements that are to be made in the harbour I suppose it will be done by a rate the same as it is in other ports.
285. The improvements will be specifically for the benefit of the owners of the frontages? I think they would be for the public benefit.
286. More so to these persons than to any one else? Yes.
287. We are told by the Mayor of Wickham that it will increase the value of these frontages three-fold if the improvements are carried out? It will increase the value.
288. Do you think it will be a wise course to pursue? Yes; you cannot contribute to individual wealth without conferring general benefits.
289. If this dredging would turn land that is worth £15,000 into land that is worth £60,000, do not you think it would be worth while for the Government to buy it first and make the improvements afterwards? I would not like to be a party to the speculation.
290. Do you think it is necessary, for the purpose of making these people's water-frontages very valuable, to go immediately to the expense of that excavation? I think it will improve the whole locality very much. If the Government intend to deepen this channel so far, I do not see why it should not be done a little farther.
291. The demand for it is made on the part of the holders of the water-frontages. Do you think we should spend an extra £10,000 on a swing-bridge, and go to the expense of the excavation? I do not think the cost would be very great. It is simply a matter of dredging.
292. The Mayor of Wickham thought it would be an advantage to remove the Wickham Bridge altogether and place it by the side of the railway bridge, and extend the water-frontage on both sides. Do you agree with that? I do not think it is necessary.
293. *Mr. Trickett.*] Suppose a bridge that would answer the purposes of the traffic could be constructed for £3,000, would that be sufficient? If a bridge can be constructed that will meet the present requirements of the traffic the smaller cost the better.
294. If the engineer (Mr. Hickson) has stated on oath that a bridge as large as, or larger than the present bridge can be built for £3,000, would not that be sufficient for the present? My idea is that if a bridge is to be built it is a waste of money to erect a bridge for £3,000. I think the present structure might be made available for all purposes until a new bridge is completed.
295. Mr. Hickson has stated on oath that it would cost as much to repair the old bridge as to build a temporary bridge, the life of which would be fifteen years? My idea is that if they are to have a bridge they ought to have a permanent one erected at once. £1,000, I suppose, would make the present bridge suitable for all requirements until the new bridge is completed.
296. A costly bridge would take, I suppose, three years to construct, and in the meanwhile something must be done to keep up the present means of communication? I should imagine that the present bridge will do that, if repaired.
297. I understand your views are that a costly structure should be built to work in with the reclamation works? I say a structure should be erected equal to the importance of the place, and such as they ought to have.
298. That would be a bridge, I suppose, sufficient to meet all the traffic between the mainland and the island? Yes.
299. Have you considered this question of the bridge in connection with the reclamation works that are now actually going on there? Yes. I don't think the reclamation works should delay the construction of the bridge. I think Mr. Darley would agree with me on that point. I know he said some years ago that if they intended to erect a permanent bridge, or such a bridge as they should have, they might have temporary piers until this channel was cut, even in erecting a new bridge.
300. You clearly think that, if the bridge is to be a permanent structure, there should be a swing leading into Throsby's Creek? That would depend on its height to a very considerable extent. The channel should be cleared.
301. Would not improving the entrance to Throsby's Creek be largely for the benefit of private holders? It would be for the benefit of the country generally.
302. And for the benefit of these people in particular? Yes.
303. Do you not think that the outer basin below the bridge would give sufficient wharfage accommodation to Newcastle for many years to come? I think it will for some years at any rate. They have very large wharfage accommodation already—2 miles, I think. During last year the tonnage increased very considerably. The outwards showed an increase of something like half a million tons of coal.
304. I suppose you do not think it desirable to divert the traffic round by Wickham whilst the new bridge is being constructed? Certainly not.
305. So that if an expensive bridge is to be built, and it will occupy three years, you are of opinion that something must be done to keep up the present means of communication? I think the present traffic ought to be maintained.
306. *Mr. Hurley.*] You are aware that the Commissioners have promised a sum of £17,000 conditionally on the permanent and high-level structure being erected? I heard so.
307. Do you think the people should be subject to the inconvenience of having their traffic diverted *via* Wickham for two and a half years while a bridge is being erected? I should not like to be the Minister who suggested it.
308. Considering that they have temporary accommodation which would suffice probably for foot passengers and light traffic during the construction of a more permanent structure, do you not think they would be acting in the best interests of all concerned if they were to consent to be put to that inconvenience, so that they might secure the more permanent structure? I have said already my opinion is that the present structure could be utilized for all purposes until the main structure was completed. Knowing how these matters are generally carried on, I am clearly of opinion that if this new temporary bridge is erected, there is no probability of the other bridge being erected for very many years. It is absolutely necessary that it should be erected at once. Apart from that, I think it would be an unnecessary expenditure to erect a temporary bridge. I suppose that, in three months, the present bridge could be made just as strong as a new bridge.

309. Taking into consideration the probability of the number of railway lines being increased, and the consequent inconvenience to passengers going over a low-level crossing, you recommend that in the interests of the public safety a high-level bridge should be erected in preference to the proposed temporary bridge? I think it will be freer from danger.

310. Knowing the extent of the trade of Newcastle, and knowing that the proposed reclamation will give seven additional cranes, thereby increasing the wharfage crane accommodation 50 per cent., it is not likely that this inner basin will be required for the next ten or twenty years? Not to any great depth. While these improvements are being carried out, I think, as a point of economy, it will be better for the Government to deepen this channel. I think it will be just as well that it should be deepened to a certain point—that is to that point where they might obtain a water traffic. I think sufficient water traffic could be made from the end of the reclamation into the deep water of the harbour—it would be of great service and benefit to the public. Dr. Garran has suggested that there may be a large timber traffic above the railway crossing on to Bullock Island. There are other manufactures springing up about Tighe's Hill, and the whole of the traffic there might be carried by water. There is a large extent of land occupied by the Railway Department, by large soap and candle works, and by other manufactories.

311. You will admit that Bullock Island and Newcastle are well supplied with train accommodation at the present time? I think they have the best facilities for shipping coal that exist in any part of the world.

312. With seven additional cranes there will be ample accommodation, even if the trade were to increase 50 per cent.? Yes.

313. That amount of accommodation being given in the outer basin, probably the inner basin will not be required for ten or twenty years to come? They will not require the same facilities there.

314. That being so, they will not require a swing in that bridge, which, by the way, will cost £10,000 extra? The point to be considered is whether they should not look to the future, and whether, if eventually that channel has to be deepened, an opening should not be left in the bridge.

315. It is in anticipation of the wants of the future that you recommend a high-level bridge in preference to a temporary structure? I recommend a high-level bridge for the purpose of freeing the people from danger.

316. Have you considered the probability of the extreme end of Bullock Island being connected by tramway with Blane-street, in the city? No.

317. Would not a moment's consideration of that point convince you that a temporary bridge would not carry a tramway. Would it not be inconvenient in every sense to have a low-level crossing? Yes.

318. Therefore that fact alone almost necessitates the erection of a high-level bridge? If it is suggested to have a tramway there.

319. You know that during the last three years the population of Bullock Island has increased marvellously? I know I was offered land there over and over again for £8 an acre, and that I have sold the same land for £3,000 an acre.

320. So high values are placed on land there, and land is to be reclaimed there by the Government? Yes.

321. There is everything there to warrant the construction of a more costly structure? Yes.

322. *Mr. O'Sullivan.*] From your evidence I gather that you are in favour of the construction of a bridge at once, irrespective of the reclamation works and the channel to Wickham? I think it ought to be proceeded with.

323. *Chairman.*] Has not the growth of population on Bullock Island been extraordinary? Yes.

324. And the value of land has increased there very much? Yes. I was offered land there over and over again within the last thirty years for £8 an acre, and I sold the same land for over £3,000 an acre.

325. You think there is plenty of room there for further expansion? Yes.

326. And the effect of this reclamation will be to provide greater space, because a large area of the land is low-lying, and might be made available for building? Yes.

327. Will the proposed bridge give them better facilities than the existing bridge—is it a better site? The site is a very good one.

328. You are of opinion that the present population and the present value of the place would justify the erection of a permanent bridge in preference to a temporary structure? Unquestionably.

329. To say nothing of the prospective increase in population and in the value of property? Unquestionably.

TUESDAY, 18 MARCH, 1890.

Present:—

The HONORABLE ANDREW GARRAN (TEMPORARY CHAIRMAN).

The Hon. FREDERICK THOMAS HUMPHREY.

The Hon. WILLIAM JOSEPH TRICKETT.

The Hon. GEORGE HENRY COX.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

JAMES EBENEZER TONKIN, Esq.

WILLIAM SPRINGTHORPE DOWEL, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee further considered the proposed Bridge to connect Bullock Island with the mainland at Newcastle.

Alexander Brown, Esq., M.P., sworn, and examined:—

330. *Temporary Chairman.*] Are you one of the Members for Newcastle? I am.

331. Are you aware of the tenor of the evidence given at Newcastle on this proposal? I am.

332. Have you now any statement to make to the Committee in the matter? The first portion of my statement will be, as far as it can be, in direct contravention of the evidence of the Mayor of Newcastle, as voicing the wishes of the citizens of Newcastle. I say the citizens are unanimously of opinion that the bridge should be constructed; that the delay is unsatisfactory as far as they are concerned; that I see no reason, as a business-man, and as connected with the business operations of the city, why the work should not be proceeded with; that, if a temporary structure is necessary, the existing bridge can be repaired for something like £1,000, or for even less, so as to serve all the traffic; that the Government lands in the immediate vicinity are large and valuable; that the volume of traffic is very considerable between the two places,

A. Brown,  
Esq., M.P.

18 Mar., 1890.

Hon. J. N.  
Brunker,  
M.P.

18 Mar., 1890.

A. Brown,  
Esq., M.P.  
18 Mar., 1890.

places, and that a permanent structure must be erected there, and on the low-level principle. I do not believe that a high-level bridge can be constructed there, because the approaches absolutely prevent it. I believe that the approaches to the bridge can be better constructed now than they could after the dredging; that the dredging operations which must necessarily take place to provide wharf accommodation could be better done now than later on. It is very much easier to construct abutments and buttresses, and all that, on dry land than to sink cylinders. I believe in the interest of the city and of the traffic a bridge ought to be constructed.

333. Are you aware that some of your statements are in direct contravention of the evidence of the engineers? I am aware of that, and it does seem extraordinary to me that at this particular time—after the estimates for the construction of the bridge had been prepared, and the proposal has been submitted to Parliament and referred to this Committee for consideration—at almost the last stage, these reasons should be alleged by the Government officers. The knowledge which they possess was just as much in their possession a few months ago before the estimates were prepared as it is now, and it seems most extraordinary that the time of the public, of yourselves, and of the whole of us should be wasted in this manner. If it was not necessary to construct the bridge five months ago, these gentlemen knew it. Why was it submitted to Parliament, and why does it take the form it has taken? I say that the work is a necessary one, although my opinion may be in contravention of the engineers'. Of course it must be borne in mind that the present head of the Roads Department is not the gentleman who prepared the estimates for the bridge; but his predecessor thought that the bridge was necessary, or else the item would never have appeared in the estimates. My individual opinion is, that the cost of the bridge would be amply repaid by the increased value it would give to the lands in the immediate vicinity, the bulk of which belong to the Government. I have no hesitation in saying that if the port were under a Harbour Trust, and this matter came within the scope of our functions, we should not scruple about building the bridge, if the land to be reclaimed were part of the result.

334. Differing as you say you do from the engineers, do you think your opinion on an engineering point is more to be trusted than that of the engineers themselves? I cannot say that. I should be very sorry, as a civilian, to set my opinion up in opposition to the engineers; it would be unwise on my part to do so. I only say that the circumstances incidental to it are somewhat extraordinary.

335. You say the bridge could be better built now than after the proposed reclamation has been made, but the engineers say that it can be better built than now—is your opinion better than theirs? On that point I am prepared to put my opinion against theirs.

336. You are aware that the reclamation of Newcastle shore is much desired by the Railway Commissioners? Yes.

337. As a Newcastle man, you admit that they want more room for sidings? Yes.

338. And that it will be a great advantage to Newcastle if they can sell the frontages they now occupy to the main street, and push their works more to the north, so as to give a larger shop-frontage to the main street, and a larger revenue to the municipality? Yes.

339. Therefore you quite concur in that piece of reclaimed land being handed over to the Commissioners? It is partly reclaimed—water or not, it is the property of the Railway Commissioners.

340. The Minister for Lands says not? I am speaking of the piece which is partly reclaimed, alongside Honeysuckle Point.

341. If you turn to the map on the easel you will see the piece which it is proposed to reclaim is situated to the east and west of the bridge? Yes.

342. The bridge lines with the road—crosses it about in the middle? Yes.

343. The whole of that reclaimed portion it is intended to use for sidings and other purposes connected with the terminal station at Newcastle? Yes.

344. And as a business-man you know that if the line of sidings—which we are told will consist perhaps of seven or eight parallel rows of rails—were obstructed by the road crossing on the level, either the use of the sidings or the use of the road must frequently be stopped. The evidence at Bullock Island and the evidence at Newcastle was all against the interruption, and on both sides of the water all the evidence was in favour of a high-level bridge. I understand you to condemn a high-level bridge? I say for railway purposes it is impossible to construct a high-level bridge.

345. How do you mean "for railway purposes"? I say the abutments of the railway-bridge cannot possibly be in Hunter-street, it must be carried into another part of the city, because the configuration of the country will not allow it to be done.

346. They propose to make the new road in line with Union-street, and then rise at practical gradients, and cross on girders, and descend to the existing causeway to the island—is that impracticable? I do not think it is.

347. They are going to sell some allotments facing the street on the northern side, which will have a depth of perhaps 100 feet. The whole of that will be available for the rise from Hunter-street to the level part of the bridge, and the engineers say they can make a practical grade for traffic, starting from the level of Hunter-street, reaching the level over the line, and descending near to the causeway—are you prepared to set your opinion against theirs? No.

348. I understand you did? Not on that point. I was speaking on the supposition that it remains where it is.

349. You began by saying that it must be a level crossing? As it is now situated.

350. You are arguing against a plan which you are not acquainted with? I am not.

351. *Mr. Hurley.*] You must admit that you were labouring under a mistake? I say that unless some fresh arrangements are made in connection with the moving of the street on the other side it is impossible to make a high-level bridge there.

352. You have stated that since you have said you were against a low-level bridge? I say a low-level bridge must be provided as it stands at present.

353. *Mr. Trickett.*] You are talking in connection with Blanc-street? Yes.

354. *Temporary Chairman.*] A certain plan is before us, you complain, and when it is explained you say you did not understand what the plan was, and you thought the line of approach was to follow exactly the existing line of road—that was your impression? It is not.

355. Do you now entertain any objection to the proposed plan? I do not.

356. You withdraw your objection? If the engineers can construct the high-level bridge and move the site

site of the street so as to make it easy of access, it is certainly better in the interests of all parties concerned.

357. That is what they tell us they can do. You have no objection to a high-level bridge now. As your objection on that point is removed, what other objections have you? I say that there is nothing to prevent the bridge from being proceeded with at once, either on a high or a low level.

358. The engineers tell us that, although it can be done at once, it can be done more advantageously if the reclamations were made first—do you dispute that opinion? No.

359. Then, pending the delay, they propose to make a better bridge than the existing one, and within six months from the time of getting orders, so that the existing bad communication will only be wanted pending the construction of the better bridge. Have you any objection to that? I should prefer the old bridge being repaired, because once we get a temporary bridge the other bridge will be simply relegated to limbo—we shall never get a permanent bridge.

360. That seems to be the opinion of the people of Newcastle? That is my conviction.

361. If you know that the Railway Commissioners are exceedingly anxious to have this reclaimed space, and will use all their influence to urge on the reclamation, do you really think there is any danger? I do, most assuredly. As far as my experience of Newcastle is concerned, in its dealings the central Government has been exceedingly slow and very uncertain.

362. Would not a bridge such as they propose to build give you 50 per cent. more roadway than the present bridge, and answer the immediate purposes of the island now? I should prefer to see the present bridge repaired to getting a moderately permanent structure, because once we get a bridge of that sort it will have to do for the next twenty years.

363. I ask you if a bridge that would give you 50 per cent. more roadway than the present bridge does will answer the immediate requirements of the island? I do not think it would.

364. If the temporary bridge were made half as broad again as the present bridge, that would be wide enough? My opinion is that it would stop at that.

365. Suppose it did, what objection could there be? I think both the works might be going on together.

366. If the new bridge were sufficient for the next five years for the wants of the island, where is the reason for spending more? I should prefer to be without it, because I think the character of the two places warrants something better than a temporary bridge.

367. What I ask is, would not a bridge such as it is proposed to make be sufficient for the traffic for the next three, four, or five years? I do not think so.

368. We had accounts of the quantity of traffic going over, and the evidence was to the effect that there was no traffic which would not be amply accommodated by a bridge of that sort? I do not think it would.

369. That is merely an opinion? That is all.

370. You would not set your opinion against the statistics of traffic? No.

371. Is it not a fact that iron is particularly dear just now? I daresay it is—the market is high.

372. Suppose we were to order the ironwork of the bridge, and it really is not wanted for two years, would we not be spending money unnecessarily? I do not know that you would. I do not know that you have any assurance that the present value will not obtain for some time to come.

373. It is certain that the price is unusually high now? It was unusually low some time ago, and if the colliery strike in Staffordshire continues for some time it will make a further difference in the value.

374. Your contention is that the new bridge should be made at once, whether it is wanted for railway purposes or for the convenience of the island? I say it is wanted for the ordinary traffic between the two places.

375. How many houses are there on Bullock Island? Some hundreds I should say.

376. We were told 400. Do you think that if a bridge costing £3,000 would meet the wants of these 400 houses, a bridge costing £33,000 is immediately necessary? I do think so. I think that as far as your 400 houses are concerned it is a low basis on which to put the connection between two large centres of increasing importance. Newcastle is rapidly rising.

377. You are aware that it is proposed within five years to have this larger bridge? I do not believe it.

378. You are simply putting your belief against the positive statement of the officers? I do not believe it will be constructed, once the temporary bridge is put up.

379. Do you believe that the reclamations will not be made? I do not.

380. You believe that the railway people will not get their sidings at all? I do not believe the reclamations will be made.

381. Your attendance is simply to plead against delay? Yes; the thing is urgent, and it should be done at once.

382. *Mr. Trickett.*] You say that the reclamation will not be done;—are you aware that the work of reclamation is now going on in the basin? They have a sand-punt there, but I hope we shall soon have a Harbour Trust to deal with the reclamation. I do not suppose it will be done for some years to come—not with the Government stroke.

383. Have you considered that if this expensive bridge were authorized it would take three years to construct—that is the evidence given by the engineers? They are extraordinary engineers who would take three years to construct that bridge. It is time they were removed from the Government service.

384. Suppose it were to take from two and a half to three years, are you, as one of the representatives of Newcastle, willing that the people should put up during that time with the present rickety bridge? If sufficiently repaired, so as to make it available for traffic. I may tell you that Mr. Thomas Brooks, a gentleman largely connected with bridge-work, is prepared to undertake to put the existing bridge in order for £1,000, and to guarantee that it will carry a reasonable amount of traffic for the next two or three years.

385. Will you state that in the face of the evidence of all the officials that it will be better to build a new bridge than to repair the old one? I state that in the face of their evidence.

386. Until the reclamation works are carried out, this bridge, if constructed, would really be in a great measure a bridge over dry land? No; the larger portion is water space. Our water space at Newcastle is exceedingly limited, and we do not want to make dry land.

387. A large portion would be over dry land? Yes.

388. Do you think there should be a swing-opening in the bridge? I do, so as to enable the traffic to pass up and down on that side.

- A. Brown,  
Esq., M.P.  
18 Mar., 1890.
389. Up to Throsby's Creek? Up in that direction, towards Wickham.
390. Is it not nearly all private land at Throsby's Creek? A portion of it is.
391. We have had evidence to the effect that the greater portion of it is private property, and that it is all shallow? It will have to be dredged out. At present all the timber business is being transferred there; it will be the future shipping-place for timber. At present the water accommodation is so limited that they will not allow people to put their timber on the wharves—they have to raft it up there, bad as it is.
392. Where does Mr. Thomas Brooks live? In Newcastle.
393. He says he could make the present bridge a good substantial one for £1,000? He says so. He builds wharves for the Government frequently.
394. *Mr. O'Sullivan.*] It is the opinion of the Roads and Rivers Department that the present bridge cannot be fitted up to carry the traffic? I beg respectfully to differ from them.
395. Have you heard that it is also their opinion that it would be cheaper to erect a temporary bridge? I have not.
396. Have you heard that it is their opinion that this permanent bridge can very well wait for five years, in order that the reclamation works may be carried out? I have read it in the newspapers.
397. Would it be to the interests of the country to construct an iron bridge at a cost of at least £50,000 when the officers are of opinion that it will not be required for five years? I say you are spending £5,000 on a bridge unnecessarily, and that you may as well go on with the permanent structure at once.
398. The interest on £50,000 for five years at 4 per cent. would be £10,000, and if a temporary bridge costing only £3,000 will carry the ordinary traffic, will it not be to the interests of the State to have a temporary bridge put up for that period? It might be, but as far as Newcastle is concerned it is not to the interests of Newcastle.
399. The people of Newcastle appear to have an idea that the temporary bridge will be too good and last too long? That's true.
400. *Mr. Hurley.*] Do you think the people of Newcastle and Bullock Island would consent to go round by Cowper-street in preference to having a temporary bridge, so that they might secure a permanent structure? I don't think so. I think the citizens would prefer the erection of a bridge at once.
401. Suppose the present bridge could be repaired for £1,000, do you think, with regard to the heavier class of traffic, the people of Bullock Island and Newcastle would consent to travel the additional mile and a half by Cowper-street in order to secure a more permanent structure? I do.
402. Thinking that it will take only two and a half years to put up a permanent structure, you believe they are quite willing to wait until it can be done? I think so.
403. You have watched the growth of population on Bullock Island during the last few years? Yes.
404. It is extending very rapidly towards Newcastle? Yes.
405. There is sufficient Crown land on the island to accommodate a very large population? Yes.
406. The population of the island, judging by the experience of the past few years, is likely to increase? Very rapidly.
407. Seeing that a large population is likely to be located there, have you considered the necessity of providing tram-service communication to the city? I think there ought to be a tram service later on.
408. Suppose the temporary bridge were made, could a tramway be carried over that structure to Newcastle? No.
409. In your opinion it would be necessary to have an overhead bridge of a permanent character to carry the tramway? I think so.
410. Are you aware that the Railway Commissioners have offered to contribute £17,000, providing the Government will agree to construct a high-level bridge? Yes, through the newspapers.
411. The people of Newcastle, and you as one of their representatives, were led to believe that the Railway Department are in accord with the demands you are making? I think so.
412. Besides being a great convenience to all those interested in the shipping of coal, and the carrying of goods on the railway, would not a high-level bridge be a preventative against the loss of life which would probably occur with an increased number of rails, if it were a low-level crossing? I think so.
413. Therefore the construction of a high-level bridge is in every way very much desired, to meet the convenience of the general public, and to afford protection to life? I think so.
414. Knowing the rapid growth of Newcastle and Bullock Island, and seeing that there is no other outlet but Bullock Island for the suburban population, you consider, looking ahead twenty years, that a permanent structure is actually necessary? Looking ahead only ten years, I say it is very necessary that the structure should be proceeded with.
415. Have you a knowledge of the value of land on the island? I have.
416. Have you heard of the evidence given here by the Minister for Lands on that point? I have.
417. Can you ratify his statement? I do, without any hesitation.
418. There will be a large area of land reclaimed by the proposed works? A very large area of very valuable land.
419. And when these reclamations are completed there will be no difficulty in finding purchasers at good prices? None whatever. I will undertake to build the bridge if the Government will give me the reclaimed land.
420. Do you know the area of land that will be reclaimed? About 60 or 70 acres, I believe.
421. What value per acre do you put upon the land? It would be very hard to say what the value would be with such a frontage. It would be very valuable—it would be worth some thousands and thousands of pounds.
422. You believe that the proceeds of the land would defray the cost of a high-level bridge? Twice over, at any rate.
423. Do you anticipate that the Railway Commissioners are likely to give that £17,000, in the event of the low-level structure being carried out? I do not think so, because they would get no advantages unless they had a high-level bridge.
424. Therefore the construction of a high-level bridge would not only be a great convenience to the people of the island, but would also be of great benefit and advantage to the Railway Commissioners? Yes.
425. *Mr. Dowel.*] What are your reasons for stating that the construction of an iron bridge would increase the value of the Crown lands? It would give means of access to these lands. A valuable approach of this character must increase their value very considerably.

426. Can you say, of your own knowledge, if there is any considerable demand for land on Bullock Island? Yes, land will always sell there. Allotments that you could have bought there for almost a few pounds a few years ago are worth £1,200 and £1,500 to-day. Within the last few years the Government themselves have sold land there at £10, and bought it back at £1,500.
427. Do you think it desirable that the Government should reclaim this land at the island? I do.
428. Having in view the necessity of constructing a bridge, do you think a temporary structure would answer the purpose? No.
429. For what reason? A temporary structure is never satisfactory, with all the copra and other things we have in that water.
430. Would a composite structure answer the purpose—iron cylinders, with a timber superstructure? It might; but the question is, whether you would not be better off with an iron bridge than with one of wood, which you would have to repair from time to time, for the white ant is very bad with us.
431. At any rate you are of opinion that the bridge should be erected forthwith, in spite of the evidence which has been given by the departmental officers—that it would cost more to repair the existing bridge than to construct a new one? I am.

A. Brown,  
Esq., M.P.  
18 Mar., 1890.

James Fletcher, Esq., M.P., sworn, and examined:—

432. *Temporary Chairman.*] Are you one of the Members for Newcastle? I am.
433. *Mr. O'Sullivan.*] Will you be kind enough to make a statement to the Committee of your views with regard to the construction of a bridge to Carrington? I wish to state that in my opinion the construction of that bridge is absolutely necessary, and that it should be proceeded with as early as possible.
434. Are you aware that the Mayor of Newcastle holds a different opinion? Yes; but I do not know that he is very competent to give an opinion about the construction of bridges. I should not take him as an authority on bridge construction.
435. Was he not authorized to voice the opinion of the citizens of Newcastle? Not that I am aware of. At all events the people of Newcastle have requested me to give evidence before this Committee in the opposite direction.
436. You are aware that the cost of this bridge, if it is a high-level one, will be £50,000, and that the Department are of opinion that it might wait for about five years until the reclamation works are carried out? I think some of the Department are.
437. The interest on £50,000 at 4 per cent. would amount to £10,000 in five years;—would this Committee be justified in recommending that expenditure when, according to the opinion of the Department, a temporary bridge costing £3,000 would carry the traffic for that time? Yes, because I am not in harmony with the statement that it is going to take five years to do the reclamation works. The area of land which may be sold would bring four times the cost of the bridge, and the interest on that sum should be considered as a set off against the interest on the money laid out on the bridge. The reclaimed land will realize at least four times the value of the bridge. If it is fair on the one side to consider the amount of money which the Government will lose as interest, how much fairer is it to consider the loss they will experience if the land is not sold.
438. You think, then, that one matter would counterbalance the other? Much more.
439. Do you think the present bridge can be put in good working order? I think that if it were repaired—in fact, one tradesman in Newcastle said to me, "I will make it safe for £1,000"—it can be made to carry the traffic for a time at an expenditure of £1,000.
440. Would it then carry the heavy traffic? It would carry the traffic which is likely to pass over it until the new bridge is erected.
441. For how many years? I should think two or three years. I do not think it would take longer than two years to erect the bridge.
442. Is there not heavy traffic from Newcastle to the ironworks and shipping at Bullock Island? There is a heavy traffic.
443. Could that be accommodated by the present bridge if it were repaired? I think it could until the new bridge is erected, if it is erected within a reasonable time.
444. You think then that the importance of the traffic between Bullock Island and Newcastle justifies the immediate erection of a high-level bridge? I say, positively, in my opinion the work can be done very much cheaper before the dredging is done than it can be done afterwards, as you will have a surface upon which to lay your materials, which will save the cost—£1,000 or £1,500—of putting up staging. I suppose the foundations will consist of cast-iron cylinders.
445. Is there not a dread in the minds of a number of the Newcastle people that the temporary bridge is to be too good a structure, and will last too long? I do not know whether there is any such fear as that. I think myself that it would be a positive waste of public money, as long as the old bridge could be repaired to carry on the traffic for a couple of years, by which time a new bridge could be erected.
446. Is it important that these reclamation works should be carried out? It is.
447. Is the demand for water-frontages in Newcastle sufficiently strong to justify that work? I think that if the land were reclaimed the Government would readily sell it for £2,000 an acre, but as it is now it is not worth £10 an acre.
448. *Mr. Hurley.*] Looking at the question of the temporary bridge, and looking at the service which they have now across Cowper-street from Wickham, do you, as one of their representatives, think that the people of Newcastle would be willing to put up with the present structure, with some slight improvements of course, in preference to being subjected to a mile and a half additional haulage, in order to secure the more permanent structure? I think they would be prepared to put up with the inconvenience, whatever it may be, for a time, so long as they know that a permanent structure has been commenced, and with an intention to carry it out.
449. You are aware that the Railway Department anticipate extending their lines northward, in order to remove the bend from Wickham into Newcastle? I have heard that.
450. Have you heard that they intend to contribute £17,000 towards the cost of the construction of the more permanent bridge? I heard that also. When I know that they will get about 40 or 50 acres of very valuable land I am not surprised at them giving it.

J. Fletcher,  
Esq., M.P.  
18 Mar., 1890.

- J. Fletcher,  
Esq., M.P.  
18 Mar., 1890.
451. Will not the people of Newcastle benefit in a very great measure by such extension? They will get a corresponding benefit, but the Commissioners will get the lion's share.
452. Will not the municipality of Newcastle benefit by bringing into the market a lot of land, upon which buildings will be erected, and from which taxes will be received? No doubt the municipalities would benefit proportionately from every acre of land that is made taxable.
453. In view of the increased number of railway lines that are likely to be laid down, will not a low-level crossing be a great inconvenience as well as a danger to the travelling public? I am decidedly in favour of a high-level bridge, provided that the grades are of such a character that traffic can pass up them safely, but if they make steep grades merely to get a high-level bridge I should certainly condemn it.
454. If they can construct a high-level bridge upon which they can carry a tramway, will not that satisfy all the demands of the people? No. We must never stop the vehicular traffic.
455. The construction of a tramway will not interfere with the vehicular traffic? The present road is too narrow altogether for vehicular and tram traffic to travel upon, unless they make it wider.
456. You think that if an easy grade were given to a more permanent structure it would give satisfaction? If they make very steep grades the people of Newcastle will not like it.
457. In a high-level permanent bridge, do you think it will be necessary to have a swing? I think so. I think we should give the people the advantage of a channel, so that wharves may be constructed alongside the channel.
458. I suppose you admit that the port is fairly well supplied with steam-cranes for the export of coal? At the present moment, unfortunately, it is, but when the demand is great we find that large vessels have to wait a considerable time before they can get under the cranes, while at the same time collieries are idle, waiting for trade.
459. Seeing that the Government are now reclaiming this inner basin, and are going to give the people of Newcastle a third more wharf accommodation than they already have, will not that serve them for many years to come? A third more accommodation, and taking advantage of the whole length of the dyke, will no doubt serve for a time, but the rapid growth of the coal trade swallows up a great deal of the facilities, and, more than that, it wants a great improvement made in the harbour to take advantage of the cranes which are now being erected.
460. Notwithstanding that you are going to get seven additional cranes you believe it is necessary to open up with a swing bridge Throsby's Creek for the future supply of coal? I do, indeed.
461. You have watched the growth of Newcastle? I have known it for thirty-seven years.
462. Have you noticed the rapid growth of the population on Bullock Island during the last five years? I have.
463. Has not that been built up chiefly within the last five years? Not within the last five years. I think the first person went there about 1870 or 1872, but the last ten years have added very much to the growth of the buildings on the island.
464. Would you say more than 50 per cent.? I would say 400 or 500 per cent. I can remember when the whole of the island could be bought for less than £20 an acre.
465. Are you of opinion that the population will move up to that portion of the island which is now unoccupied—the north-west? I do. I think the Government will be able to dispose of that land at handsome prices.
466. Have you any idea as to how much land would be reclaimed? I think it would be over 100 acres.
467. You believe that the whole of that reclaimed land will realize on an average £2,000 an acre? I think it will, especially if they give facilities in the way of wharves, which I understand it is the intention of the Government to do.
468. *Mr. Copeland.*] Do you know how many houses there are on Bullock Island? No.
469. It is reported, I believe, there are some 400 houses there—how long do you think the old bridge would last, suppose £1,000 were expended in repairing it? I think it would last two years—sufficiently long until the new bridge was erected.
470. It would be of no further use then? I do not think so, then.
471. The country would be paying £500 a year for providing accommodation for Bullock Island? I do not look upon it in that light. I look upon it as a work of necessity. The bridge is fit to tumble down now, and I only look upon the repairs that will be made to it as a means to tide over the period which will elapse before the permanent bridge is erected.
472. But £1,000 would be expended in giving accommodation for two years? I think it would.
473. If a new bridge—a wooden structure, which is termed a temporary bridge—can be constructed for £3,000 that would last for fifteen years, the country would be paying £200 a year to give accommodation; do you not think the country would be more justified in reducing the cost of that accommodation to £200 than in spending £500 a year? If you look at it merely from a bridge standpoint your calculation is correct; but the people of Newcastle are not going to be satisfied for fifteen years without getting a bridge.
474. Would there be anything to prevent Newcastle growing, or traffic from taking place, if the bridge were made of wood instead of iron? No; they could travel as well over a wooden bridge; but you would not give people the same facilities to go there and make property valuable. If you look ahead, in all probability, when the Government get short of money they will be selling that land which is to be reclaimed at its present value, instead of letting the country realize the full benefit when the improvements are effected.
475. Do not you think the land is likely to be of more value after they get it level? I do not think so, because in the meantime they may drive population in another direction altogether.
476. How can that happen if they have accommodation for all that traffic over a wooden bridge? They will have accommodation for traffic over the temporary bridge, but what is really wanted to give that property a value is to cut a fresh channel where wharves can be made. The accommodation itself will give an additional value to the land, and induce people to go there.
477. You are speaking of Throsby Creek? Yes.
478. The bulk of the land on the Newcastle side is private property? Yes. Where the channel is being cut now there will be a very large area of land reclaimed which will be the property of the Government. In fact there is no definite boundary, scarcely, now. At a place where you can swim a boat, I can remember well when it was high and dry. This is simply because the water spreads all over. When a little channel

J. Fletcher,  
Esq., M.P.

18 Mar., 1830.

is cut the water washes away the sand and makes a channel, and by defining it a great area of land, which is now claimed by private individuals, but which in many cases does not belong to them, will become the property of the Government.

479. Would a wooden bridge in any way impede the traffic? Taking the cost of the present bridge as a guide to the life of the wooden bridge which is to be erected, it would not last very long.

480. How long is it since the present bridge was erected? I cannot exactly say, but I remember it being erected. It has been dangerous for a long time, and I have brought the matter under the notice of various Ministers.

481. I suppose you are aware that the life of a wooden bridge is reckoned at fifteen years, and that the majority of our wooden bridges have already lasted much longer than that period? Yes. This bridge has had a much longer life than fifteen years, although it has been frequently repaired.

482. Do you know of any stop to traffic, prevention of increase of population, prevention of despatch of coal, or any other disadvantage which would accrue from having a wooden bridge instead of an iron bridge, so long as the wooden bridge was wide, and solid, and strong enough to carry all the necessary traffic? I do not think that would prevent people from living at Bullock Island. I do not think a ton of coal less would be shipped now, but I say, considering the life of an iron and the life of a wooden bridge, it would be a wilful waste to erect a wooden bridge in a place like that, when it is intended to ultimately erect an iron one.

483. *Mr. Trickett.*] During the erection of this expensive structure, if it is to be erected, there must be some means of communication between Newcastle and Bullock Island? Certainly.

484. It is admitted that the present bridge is in a dangerous state? I say it can be made safe enough until the new bridge is erected, at an outlay of £1,000 or £1,500.

485. Do you set up that opinion even if the officers of the Department have stated that such is not the case, and that to repair the old bridge would mean really a new bridge—lock, stock, and barrel? I set up that opinion, not exactly in opposition to the opinion of the officers of the Department, but on the fact that gentlemen are prepared to take the work at that price and do it. That is a better proof than calculation.

486. Do you mind giving the names of these persons? Mr. Thomas Brooks, of Newcastle, has told me that he will make the bridge perfectly safe, to last two years, for less than £1,500.

487. During the time the bridge is being repaired there must be, I suppose, a stoppage to traffic? I suppose they will do the work with as little inconvenience as possible. It is no unusual thing to see a railway-bridge being repaired and traffic at the same time going on. I do not see why the traffic on this bridge should not be carried on without very much inconvenience to the public whilst the repairs are being made.

488. Taking it for granted that the expensive structure is to be ultimately carried out, you would sooner have the old bridge repaired than a new bridge erected? I would sooner have the old bridge repaired, provided the Department are prepared to go on at once with the erection of the new bridge. I say, notwithstanding what the Department may say to the contrary, that they will put the bridge up at a very much less cost before they dredge the channel than they will do afterwards.

489. *Mr. Humphery.*] I think you said that if a high-level bridge were erected the reclaimed land would be enormously valuable? I think so.

490. Could not the channel be cut and the reclaimed land be realized at full prices without a high-level bridge being built? But it would be necessary to put a portion of the stuff taken from the new channel to fill up the old one in the reclamation works. You cannot close the old one until the new one is cut.

491. That is what you mean by saying the high-level bridge should be built before the reclaimed land should be realized? I think so.

492. *Mr. Tonkin.*] Has there been any public meeting held in Newcastle to condemn the Mayor for the evidence which he gave before this Committee? Well, there is a universal difference from the Mayor's opinion.

493. There has been no public meeting held? There has been no public meeting held that I am aware of, beyond the fact that a majority of the people think differently from the Mayor on this matter.

494. The Mayor, of course, is a representative of the citizens? He is.

495. If the citizens were dissatisfied with his evidence, would they not have taken the usual course if they had called a public meeting and condemned his action? I think it is premature. I think they are relying more upon the Public Works Committee than upon anything which Mr. Christie said.

496. They know very well that the Committee goes according to the evidence? No doubt they do, but I do not think they paid very much attention to Mr. Christie's evidence.

497. He, as the representative of the citizens, is supposed to voice the opinion of the majority of the citizens, but if it is at variance with the opinions of the citizens there should be some demonstration, but none has taken place? Not that I am aware of, nor do I think the citizens of Newcastle view it in that light. I think they only took his evidence for what it was worth, and certainly not as representing the voice or the wish of the people of Newcastle.

498. But the mayor of a city is the mouthpiece of the citizens? You know there may be mayors and mayors.

499. *Mr. Dowel.*] Are you aware that it has been reported by the officers of the Department that the present bridge is unsafe? I have known that for a long time.

500. Are you aware that the Department have stated that it would be much better to build a temporary bridge at a cost of £3,000 than to repair the old bridge? I am not. I believe they recommend the erection of a temporary bridge in preference to repairing the old bridge; but, notwithstanding the very high estimate I hold of the gentleman at the head of the Roads Department—and I look upon him as second to none in the Government service—I beg to differ with him.

501. If it is their opinion that it will cost more money to repair the present bridge than to erect the temporary bridge, you would not endorse it? Certainly not, for the reasons I have given. If Mr. Brooks and others are foolish, their money is not, and they are prepared to do the work.

502. Are you aware that the officers of the Department recommend that the reclamation should be made first? Yes; and I believe they will take about seven years to do it. I have no sympathy with red-tapeism.

503. What are your reasons for proposing that the bridge should be erected first? I, perhaps, have had more to do with the sinking of cylinders than any man under the Government. I know the difference

J. Fletcher, Esq., M.P.  
18 Mar., 1890.

between starting with a surface upon which to lay my material and starting where I have to make staging. That being the case, I say that the bridge will be erected at less cost with the sand as it now lies than it will be after the channel is dredged.

504. You are in direct opposition to the opinions of the officers of the Department? I am decidedly in direct opposition to them, and I speak from practical experience. I have had to do with the sinking of every shaft in the Newcastle District with cast-iron cylinders—they were all sunk on my plans and specifications. I think I have had more experience than most people in sinking cylinders.

505. What was your reason for stating that you do not think a tramway could be laid down over this bridge? I did not say so. I said I did not think it was possible to carry on tram and vehicular traffic at the same time if the road were of its present width. Unless they widen the road it would not be safe for the two to be carried on at the one time.

506. You are referring to the road over the old bridge? I am speaking of the road across the island.

507. Did I understand you to say that the bridge was going to take five years to build? I have read in the newspapers that they are going to take seven years to erect the bridge and to make the reclamation. I venture to say that the whole thing could be done within three years.

508. You are strongly of opinion that the bridge should be constructed forthwith? Yes.

509. And that the reclamation should still proceed? Yes.

510. And that the whole of the works should finish, if possible, simultaneously? I would finish the bridge as soon as I could, and I would do the same with the others.

511. What saving would it be to the Railway Department to have a high-level bridge? I suppose it is a very important crossing. They have there the interlocking system established, which means the employment of three men every day, and by having a high-level bridge they would save the wages of these men, besides the inconvenience which naturally takes place when trains are passing to and fro.

512. From your experience in the sinking of cylinders, do you think it would be advisable to build a bridge of a composite character in preference to an iron structure—iron cylinders, for instance, with a timber superstructure? I would not have any timber, because the white ants are too bad down in that district.

513. Do they attack the various descriptions of timber that are used there? All but turpentine, and I am not sure about that.

514. Do they attack tallow-wood? I believe they attack all the same. The white ants are playing havoc with the various timbers that the Government have used in erecting their buildings.

515. You think that the construction of a high-level bridge would materially increase the value of existing Crown lands, that the Government should reclaim these lands at once, and that in all probability they would meet with a ready and good sale? I believe that if they cut that channel, and give people facilities by erecting wharves, no doubt the land will sell rapidly indeed.

516. Do you anticipate a very considerable increase in the population on the island? There is no doubt that as wherever you offer facilities so do you get people to locate.

517. You have recently come from Newcastle, and I presume you have been in contact with a large number of its citizens? I have.

518. What is the consensus of opinion in reference to this bridge? The general opinion is that the bridge should have been erected, and they are very much surprised and disappointed that a block should have been put to it after the money was voted.

519. By their own mayor? I would rather not offer any opinion about the mayor.

520. *Mr. Cox.*] Is not the new bridge to be erected on the site of the old one? No.

521. Therefore it would not interfere with the traffic? Certainly not.

522. *Temporary Chairman.*] You say a large quantity of the reclaimed land would be available to pay the cost of the bridge—where do you consider it will be—at the southern or the northern end? At the northern end there will be a very large area of land which is now covered with mangroves.

523. That will require to be reclaimed before it can be sold? Of course; if the Government were to sell it now it would go at a very small price indeed; I do not think you would get more than £8 or £10, certainly less than £20.

524. The Government must do some dredging to find sand to reclaim? In the event of dredging there when the Horse-shoe is dredged out, instead of taking the silt outside, as they have hitherto done, they will no doubt deposit it there, and thereby reclaim the land.

525. You are aware that it is proposed to use new sand-pumps to lift the sand on to the reclaimable land? I remember Mr. Sutherland telling me about it.

526. A certain portion of the unsold land on the island is at present wholly unfit for sale? Absolutely.

527. And even some portions which have been sold are rather low? In the case of many of the allotments which have been sold, the houses have been erected where there is an ebb and flow of the tide.

528. Would it not have been much better if that land had been reclaimed and raised a foot or two? It would have been an improvement, and would have enhanced the value very much indeed.

529. Looking at that mistake, you would not recommend selling any more land until it is reclaimed, and raised well above the water-level? Not one acre.

530. That will take some time? It all depends on the way they go about it. If it were in the hands of a private company, I know how long it would take.

531. If it will take some time, you could not lay your hands on the money that the reclaimed land will fetch until you have reclaimed it? Certainly not.

532. You would have to be out of pocket for the bridge? You would have to be out of pocket for the actual outlay. You could not get a return from the land until it was ready for the market.

533. So, even with your scheme, if it were in a private company's hands, you must advance the money for the bridge first, and get the reclamation done as fast as possible afterwards? Certainly. If a syndicate gets a block of land, they generally borrow money and lay out streets, and the Government would have to adopt the same principle in regard to this land.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

BRIDGE TO CONNECT BULLOCK ISLAND WITH THE MAINLAND AT NEWCASTLE

REPORT.

THE Sectional Committee appointed to "inspect, take evidence, and report on the proposed bridge to connect Bullock Island with the Mainland at Newcastle," beg to report as follows:—

The Committee left Sydney on Thursday evening, 6th March, arriving at Newcastle the same night. On the following morning they drove round Newcastle to inspect the wharfage arrangements, drove over the existing bridge to Bullock Island, and visited the works and wharfs on that Island, and the Wickham bridge. In the afternoon they took evidence in the Municipal Council Chamber, and examined Mr. Christie, the Mayor of Newcastle; Mr. Morrison, the Mayor of Carrington; and Mr. Myers, the Mayor of Wickham; and several other gentlemen.

On the afternoon prior to the departure of the Committee to Newcastle, Mr. McLachlan, the Secretary to the Railway Commissioners, gave evidence before the Parliamentary Standing Committee to the effect that the Railway Commissioners desired to get possession of the area to be reclaimed along the Newcastle shore, for the purpose of sidings and other conveniences, which they greatly need; but as this would necessitate an overhead bridge they were prepared to contribute £17,000 towards the cost of the more expensive structure.

The Committee found that the opinion in Newcastle and at Bullock Island was decidedly in favour of a high-level bridge, as the present level crossing is often inconveniently obstructed, both for the road and the railroad traffic, and this would be still more the case if the reclaimed area were occupied with sidings. Under these circumstances the low-level iron bridge, as submitted to the Parliamentary Standing Committee, is not to be recommended; but as no plans for the high-level bridge have been prepared, and as there is no exact estimate of its additional cost, nothing can be said as to the exact contribution it will be proper for the Railway Commissioners to make.

It is estimated by the engineers that the reclamation, together with the construction of the high-level bridge, will take about five years, and during that period the communication between Newcastle and Bullock Island must be maintained. The traffic is considerable, and is increasing, and though there are two other bridges across Throsby Creek, the use of them involves a detour of not less than a mile between the centre of Bullock Island and Newcastle.

Under these circumstances the proposal of the Department to erect a sufficient, though temporary, bridge by the side of the existing structure, at a cost not exceeding £3,000, is reasonable, because the present bridge is unsafe, and any attempt to repair it effectively, so as to make it serviceable for two or three years, will probably cost more money than it is proposed to spend on the temporary bridge.

Altogether apart from the communication between Newcastle and Bullock Island, is the question of the swing in the proposed bridge, and the deepening of Throsby Creek, so as to give access by sea-going vessels to a basin to be excavated above the bridge. So far as public wharfage is concerned this work is not immediately urgent, because the basin to be constructed below the bridge will, with its jetties at the north end, give nearly three times the accommodation at present furnished along the dyke; and it is scarcely possible to conjecture when it will be necessary, for Government purposes, to increase the wharf frontage on Bullock Island by bringing into use the shore line above the bridge, and on the south-west side of Bullock Island. On the western shore of Throsby Creek, and in the parish

of Wickham, is a private water frontage, which the owners are exceedingly anxious to see improved. From the limit of the reclamation to Wickham Bridge there is about 1,000 feet of land fronting Throsby Creek. In the grants of this land there was a reservation of 100 feet; but the cancellation of this reservation has been purchased by some of the owners. It was admitted in evidence that if the Government deepens the channel as proposed it would add three-fold to the value of this land, and the Mayor of Wickham testified that it would be advantageous to the district, and to the Government, if the whole of these frontages were resumed, so that the Government might reap the reward of the investment of its own capital in improvements. He also expressed the opinion that it would be better if the Wickham Bridge were removed, and replaced close to the Railway bridge across Throsby Creek, so that a larger space might be deepened out, and the wharfage on both sides of the creek extended.

Until the Railway Commissioners are in the position to utilise the land to be reclaimed, the low level temporary bridge will answer the traffic requirements of Bullock Island, but the high level bridge ought to be ready for use by the time the Commissioners are prepared to lay down their sidings.

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Mr. Hurley dissents from that part of the Report which recommends the construction of a temporary bridge.

Sydney, 11 March, 1890.

ANDREW GARRAN,  
Chairman.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

MINUTES OF EVIDENCE.

BRIDGE TO CONNECT BULLOCK ISLAND WITH THE MAINLAND AT NEWCASTLE.

[TAKEN BEFORE THE SECTIONAL COMMITTEE.]

FRIDAY, 7 MARCH, 1890.

[The Sectional Committee met in the Council Chambers, Newcastle.]

Present:—

The HONORABLE ANDREW GARRAN (CHAIRMAN).

The Hon. WILLIAM JOSEPH TRICKETT. | EDWARD WILLIAM O'SULLIVAN, Esq.  
JOHN HUBLEY, Esq.

The Sectional Committee proceeded to consider the proposed Bridge to connect Bullock Island with the mainland at Newcastle.

Colin Christie, Esq., Mayor of Newcastle, sworn, and examined:—

1. *Chairman.*] What position do you occupy in Newcastle? The Mayor of the city.
2. How long have you been a resident here? Forty years.
3. Will you be good enough to make a statement as to the interest of Newcastle in this proposed work? I would much rather that you would put me under examination, although I will say a few words if you wish it. I think that the bridge is of great importance, and is much needed. Bullock Island has risen from nothing during the last twenty years. I have with me documentary evidence, in the shape of cuttings from newspapers dating as far back as 1869, to show what Bullock Island was twenty-one years ago. At that time a request was made for a school—of course this has nothing to do with the bridge, but I mention it for the purpose of showing the littleness of the island at that time. There were about twenty children on the island, and it was urged that a school should be erected in consequence.
4. Confine your statement to the interest of Newcastle in this work? Bullock Island has risen from insignificance to be a place of much importance. That importance is shown by the amount of coal shipped from Bullock Island. The amount of trade between Newcastle and Bullock Island is so great that a temporary bridge in my opinion, and the opinion of the public as expressed in public meeting, would not be equal to requirements. Observe the number of houses which have been built there within the last fifteen years, since the bridge was opened for traffic. I do not possess documentary evidence to show the exact date of the opening, but the first pile was driven in 1870, and it remained for five years after that before a cart could cross over in consequence of the gap between the two ends. It was contemplated that a drawbridge should be constructed. Afterwards that idea was abandoned, and it was planked over, but it was at least five years before any cart traffic could reach the island. The island then was simply nothing, but it has grown to the dimensions which you will have noticed to-day—a place of immense importance, a place of large population, and a place now incorporated.
5. *Mr. Trickett.*] Let us come to the question at issue. I presume it is granted on all hands that the bridge is insufficient for present requirements, and is in what may be described as a dangerous condition? That is so. For some time a man has been stationed at the bridge to prevent heavy traffic crossing it. It is dangerous to take a load of bricks over it. Heavy loads are forbidden to cross it.
6. The proposal to erect a bridge to cost £33,000 is, I understand, a proposal which must be considered in connection with the dredging out of the inner harbour of Bullock Island? That is not for me to say.
7. But do you not look at the two matters as being connected? It would require a man skilled in the works contemplated—a skilled man like Mr. Hickson—to express an opinion on that point.
8. The erection of a bridge which would cost £33,000, would necessarily be a work of some duration? It would.
9. And the present requirement is that something should be done immediately? Just so.
10. Therefore, do you not think that instead of patching up this present dangerous structure, it would be better for all purposes that a bridge, sufficient for present requirements, should be built alongside the existing one? I know it would be a great inconvenience to Bullock Island and Newcastle also, if traffic between the two places were to cease, which it seems it must do unless the proposed bridge or some other is built.
11. Therefore, for present requirements, something is urgently required to be done? Yes. Either this bridge should be made more safe or, if it is impossible to make it thoroughly safe, that something else should take its place.
12. During the time this large structure is being built—if it is built at all—something must be done to keep up constant communication between the mainland and Bullock Island? It must.

C. Christie,  
Esq.  
7 Mar., 1890.

- C. Christie,  
Esq.  
7 Mar., 1890.
13. Looking at the matter in that light, do you not think it would be better to put up a bridge alongside the present one for the purposes of present traffic, rather than patch up this dangerous old structure, which Mr. Hickson has told us would cost almost as much as a new bridge, requiring new lock, stock, and barrel? Yes.
14. If the proposed bridge were built at the present time it would be built on dry land, so to speak? That is so.
15. And the drawbridge part of it would really at present be of no use at all? Of no use at all.
16. It would be no use until the harbour works which are contemplated in connection with the proposed bridge are completed? Just so. It would be of no use simply because the drawbridge would be crossing land instead of water.
17. You will have heard that the Railway Commissioners propose, if a large bridge is constructed, that it should even be of a more expensive character than the one suggested a few months ago? Yes, by raising the bridge higher. I noticed in yesterday's papers that it was suggested that £17,000 should be added to the money the Government contemplate spending on an ordinary drawbridge at ordinary level. For the extra £17,000, it is required that the bridge should be raised, so that the railway could pass under it, and so that shunting operations might be carried out under it.
18. What do you think of that suggestion? I am of opinion that the grade would be too great, and would necessitate more horse-power for loads going to Bullock Island or coming from Bullock Island. If the grade were not too great the bridge would be of great advantage, especially as our traffic would never be interrupted by passing trains.
19. Seeing how the traffic is inconvenienced between the custom house and the wharves, you consider that such a bridge would be desirable? Yes; I speak from experience.
20. Under these circumstances the work will be even larger than that the Committee have recently been considering? Yes.
21. That being so, do you not think there is still greater urgency for some good temporary structure being erected, to prevent any dead-lock in the traffic, whilst the new bridge is being put up? I am of opinion that we cannot do without traffic between Bullock Island and Newcastle.
22. At its present crossing-place? At its present crossing-place. It is impossible to do without it.
23. *Chairman.*] The great interest of Newcastle in this work is communication with Bullock Island? Yes.
24. And as you must have one or other inconvenience of crossing the lines on the level, or by means of a gradient—you think the gradient the least evil of the two? It depends on the nature of the gradient. If the gradient were 1 in 1 it would not do. If it were 1 in 40 or 60 it would be all right.
25. Any such grade as an engineer would lay out? I would say an easy grade.
26. *Mr. Trickett.*] What is the width of the present bridge? About 16 feet.
27. That is rather narrow, is it not, even for the present traffic? It is. It is dangerous, particularly if passengers are on it at the time two vehicles meet.
28. Even if a temporary structure were built, it would be better to have it a little wider for the present traffic? It would.
29. You think 22 feet would be wide enough for a year or so? It might do for a year or so, especially if it had a footpath connected with it.
30. *Mr. O'Sullivan.*] It is suggested by the Department that the construction of this bridge should stand over for about five years, and in the meantime they will erect a temporary bridge to give the accommodation you require. The cost of this proposed iron bridge would be £53,000, and the interest on that at 4 per cent. would be £2,120. Therefore five years' interest will amount to £10,600. On the other hand a temporary bridge will cost about £2,000. Which work do you think, in the public interest, should be carried out? That which is the most economical. In my opinion the temporary bridge would be the better, because the other would be of no use, seeing that it would cross a place which is at present dry.
31. Are we to understand that you are in favour of the temporary bridge being constructed? Yes; seeing that the erection of the other bridge is contemplated within a short period of time—that is twelve months or three years. This temporary bridge is absolutely necessary for the present traffic while the other is in course of construction.
32. Do you think, from your knowledge of Bullock Island and Newcastle, that a temporary bridge would prove equal to the growing traffic during those five years? Bullock Island is growing very rapidly.
33. Do you think a temporary bridge, to cost £2,000, would prove equal to that growing traffic? I am afraid it would not, and yet it would be a pity to spend more money on it. It would almost seem wrong to spend a great amount of money. It depends entirely on the length of time. If the bridge could be built within two years the present structure, with a little patching, would be sufficient for our present requirements. Piles should be driven in to strengthen it, and new girders put in where they are defective.
34. But you understand from the evidence of Mr. Hickson that the Department prefer to put up a temporary bridge? Yes.
35. They believe that the present bridge is not safe; therefore they propose to erect a temporary one? Yes, it would be better to have a temporary one than none at all.
36. You have been forty years in the district, and I want to know whether from your observation of the traffic between Bullock Island and Newcastle a bridge to cost £2,000 would prove equal to all growing requirements? There are those who know more of Bullock Island than I do. I know probably more than any of them as to what it has been.
37. And you think the temporary bridge would not prove equal to the growing traffic of five years? I would not say that it could not, neither would I say that it would.
38. *Mr. Hurley.*] You were chairman at the meeting held a short time ago, when certain resolutions were passed and forwarded to the Committee? Yes.
39. Resolutions were passed to the effect that you protested against the erection of a temporary bridge? Yes.
40. Will you state what the opinion of that meeting was? The opinion was decidedly against the erection of a temporary bridge. The expressions of the speakers were to the effect that the permanent bridge should be gone on with forthwith.
41. You are aware that it is contemplated to reclaim a large quantity of Government land in close proximity to Bullock Island? Yes.
42. Do you not think it would be to the advantage of the Works Department, and to the interest of the public

public generally, to defer carrying out any large works such as you propose to have carried out, until that reclamation is finally dealt with? That is a question which would need to be answered by Mr. Hickson. Not being an engineer, I cannot answer engineering questions.

C. Christie,  
Esq.  
7 Mar., 1890.

43. Did not one of the main questions raised at the public meeting have reference to the fact that the value of the land would more than compensate for the expenditure? So it will.

44. That is the land you contemplate reclaiming? Yes, it will double and treble the actual expenditure.

45. But, rather than be without a bridge, you would approve of the erection of a temporary bridge, pending the erection of a larger one? I think so. I think that the public even would be in favour of that, rather than of no bridge at all.

46. You are also aware that the Railway Department are desirous of contributing towards the cost of the construction of the bridge, providing it is an overhead or a high-level bridge? I am aware of that from the newspapers.

47. Do you not see that it will take a considerable time before a site for an overhead bridge can be decided upon? Yes, I see it will take a long time, and an expenditure of something like £50,000—£33,000 and £17,000.

48. Therefore, the work of reclamation, and the construction of a high-level bridge, would cause a delay which would be almost dangerous to the interests of Bullock Island people? Yes; unless they had a bridge of some sort. They must have a bridge of some sort.

49. Therefore, you actually fall in with the idea and suggestion of the Commissioner for Roads and Bridges, that a temporary bridge would be the thing? It would be the thing.

50. Instead of repairing the present bridge? I believe so. As Mr. Hickson has pointed out, the present bridge would require new stringers, new piles, and new lock, stock, and barrel. Those were the words he used. He has more knowledge of the real state of the bridge than I have, and I believe he speaks the truth.

51. You are aware that the population of Bullock Island and Newcastle are chiefly interested in this expenditure? Yes.

52. Do you think the people would stand paying the interest on the construction of this bridge? It would be a waste of money.

53. Are you aware that in former times, in this country, the people who gained an advantage by having a bridge over a given place had to pay a toll? I am.

54. Do you think the people would find fault if a toll were placed on a bridge of large dimensions, erected at a cost like that which has been mentioned. Do you think they would pay sufficient tollage to compensate the Government, and pay interest on the cost of construction? They would not like that.

55. You do not think they would? I do not think they would. Of course, I speak only as one person, and not as a Bullock Island resident.

56. *Chairman.*] You are aware from the plan you have seen, that it is proposed to make a large reclamation on the northern side of the railway line? Yes.

57. And to hand it over to the Railway Department for them to do their shunting upon? Yes.

58. Would it not be a great convenience to Newcastle if the Railway Commissioners could do that, and sell the frontages to Blane-street? It would be a great convenience from a municipal point of view, for we would then have a street of two sides. At present Blane-street is one-sided, and the other side is occupied by railway workshops.

59. Then it is to the interest of Newcastle that the reclamation scheme should be carried out? It is the finest thing we could have.

60. And when it is done, you would have a high-level bridge across? Yes; if it can be constructed, and I believe it can.

61. Then this latest proposal is really the one most in the interest of Newcastle? I believe so.

62. But it would be a waste of money to make the high-level bridge before there is anything to cross? Yes.

63. And if a substantial bridge, equal to all the present or prospective traffic for five years, is made between the Island and the mainland, it will meet all necessary emergencies? I think it will, so long as it does not exceed five years.

64. Then the plans of the department as they stand now meet with favour from you, as Mayor of Newcastle? Yes.

James Morison, Esq., Mayor of Carrington, sworn, and examined:—

65. *Mr. O'Sullivan.*] You are Mayor of the Municipality of Carrington? Yes.

66. How long have you resided at Carrington? About sixteen years.

67. I suppose you are well acquainted with the character of the traffic that is likely to go across the new bridge? I have a pretty fair knowledge of it.

68. What is the character of that traffic? Machinery, boilers, waggon-wheels and axles, rails, pipes, pig-iron, and general merchandise, and you can also include stone and sand, and piles.

69. There is a good deal of heavy freight? Yes; there are loads from 1 to 8 tons.

70. Has that traffic hitherto gone across the old bridge before it was condemned? Yes; some of it has gone over.

71. Do you think a temporary bridge, constructed for about £2,000, would carry the traffic of the nature which you have mentioned? I think it would not meet the requirements of the place, for it is growing very rapidly.

72. But do you think it would do as a temporary bridge for five years? I could not say, because the traffic is increasing so greatly.

73. What is your reason for saying it would not suit the traffic,—would it not be wide enough? The traffic is increasing in quantity.

74. Why do you think the bridge would not carry this heavy traffic,—is it because the bridge would not be wide enough or strong enough;—I am alluding to the temporary structure? Of course I do not know what the nature of the bridge would be, so I could not give you an answer.

75. It would be about 22 feet wide, and something after the style of the present bridge, or perhaps a little stronger? I suppose if you put a bridge down to carry the traffic, it will have to be erected so as to carry heavy traffic.

J. Morison,  
Esq.  
7 Mar., 1890.

- J. Morison,  
Esq.  
7 Mar., 1890.
76. I am asking you as a gentleman who has had some experience about heavy traffic, to give us a common-sense opinion? I may state that there is a good deal of sand there, and unless you went down to the bed-rock the sand round the piles would, by the ocean swell and tides, be washed away, and be made unstable and unfit to support a bridge properly.
77. Is it a fact that the present bridge has been there twenty years, and has carried the traffic? It may have been there twenty years, but it has not been open for traffic. About sixteen years ago, when I first went to reside at Carrington, the bridge was not completed. The central part was left open, being originally intended for a swing bridge, and all the means of getting across at that time were by walking on the longitudinal girders. Six months after I was there, two planks and rails were attached. I think you may say it has been open about 15 years.
78. But were there any piles put down for that bridge? Yes; it rests on piles to some extent, but the approaches are well shingled.
79. Do you know what reason the Department has for desiring to postpone the erection of this bridge for five years. Do you know they contemplate carrying out some reclamation work on the south side of Throsby Creek, and cutting a channel on the other side? I am aware that is the intention. It has been the intention for some twelve years, so we are given to understand. We are in the engineering business in Carrington, and when we purchased the present site we were given to understand that the reclamation for the excavation of the inner dyke would be proceeded with and completed in ten years. As a member of the Carrington municipality I may say we have discussed the question of the erection of this bridge for something like two years. We have been holding correspondence with the Minister for Works in reference to the instability of the present structure, and we were given to understand first that £22,200 was to be spent on the erection of a new one. Again, twelve months ago, the question cropped up in respect of tram communication going from Lambton, Waratah, and round by Carrington, connecting with the bridge, and at the other end connecting with the loop line to Wallsend. We had an answer then from the Minister for Works, to the effect that he would get the proper officers to investigate the matter. Subsequently we got a reply that there would be a bridge put up of the value of £33,000, and we have been given to understand that this iron bridge was to be proceeded with at once.
80. You are aware that the £33,000 was to be for a low-level bridge? It was not stated to us what style of bridge was to be put up. We understood it was to be a swing bridge.
81. Have you heard since that the Railway Commissioners suggest that a high-level bridge should be constructed, and that if that is done they will contribute £17,000 towards the work? I have read of it in the newspaper.
82. That would make a total of at least £50,000 for the new bridge? Yes.
83. And the interest on that for five years at 4 per cent. would be £10,000? Yes.
84. Do you think, as a citizen and as a taxpayer, that it would be better for the State to incur that expenditure in interest only, instead of erecting a temporary bridge at a cost of £2,000 or £3,000 for a period of five years? The exigencies of the case, and the rapid growth of Carrington in trade and traffic will justify the Government in putting up a large bridge. A large revenue is being derived from the port of Newcastle, and I think we have a right to expect that a bridge of strength and utility will be put up—a good, strong, substantial bridge—not merely to last five years, but for a lengthened period, so that there may be an inducement to persons to erect premises which will further increase the traffic.
85. Then you think it will be better for the State to incur this expenditure in interest only, than to build a temporary structure? I think so. As I have already stated the exigencies of the case warrant it.
86. You are also aware that the department say that they cannot well erect this bridge until these reclamation works and the new channel are carried out? They could be proceeded with to a certain extent.
87. If these works were started and left in an incomplete state they would be of no use whatever to the people? I should imagine that the Government would see the necessity of proceeding with all possible speed.
88. You say they can be carried out to a certain extent. That implies that they cannot be completed? I do not mean that they should be commenced and stopped. I understand, your question is as to whether it will be waste to spend this money until the reclamation is gone on with. The bridge can be continued and carried on together with the reclamation.
89. Then the construction of the bridge would not, in your opinion, impede the carrying out of the reclamation, and the cutting of the channel? No, I think not.
90. That would go on irrespective of the bridge? I think so.
91. What is the area of land which would be accommodated in your municipality by this bridge? I have not gone into that matter.
92. Do you know how much land is in private hands at Bullock Island? I could not say, without referring to the municipal plans.
93. You are a partner in large foundry works? Yes.
94. Which way do you send your heavy material to the railway? By all means available—sometimes by rail, sometimes by water, and sometimes by the bridge.
95. But which route do you take to reach the railway? We generally go over the bridge.
96. Over the old bridge? Yes, or the Wickham bridge. Both are used. I have an estimate of the quantity of pig-iron we carted from Newcastle to our premises during the last year—488 tons.
97. Why do you not use the branch railway which goes down to Carrington near to your place? It is not always practicable, and, besides, we can get our goods delivered much cheaper by cartage than by using the railway.
98. Then if this iron bridge is constructed the Government will be making a competitor to take away the trade of their railway? I think not. You must put up a bridge for the benefit of the whole district. The whole district, not merely Carrington, will be affected by this bridge. It is the only outlet to the whole of the municipalities.
99. You were going to make a statement with reference to the traffic in pig-iron? I was going to say something about the vehicular traffic. We are undergoing an exceptionally dull time at present, but during last week there was a traffic of something like 500 vehicles and horses per day. In busier times we would perhaps have two-thirds more than that.
100. *Mr. Trickett.*] And it goes over the present bridge? Yes. That is the traffic from Carrington to the different districts.

101. *Mr. O'Sullivan.*] By the condemned bridge? Yes. Of course you can go either by the Wickham bridge or the other. We have to use both on account of this bridge being bad.
102. Do you think the figures you are giving may be applied to the old bridge? Yes, I believe so.
103. And would they apply to the new bridge? Yes, and the traffic is largely increasing. Besides an engineering establishment there are two collieries, which use piles, timber, and iron work to a large extent. Again some of the vessels at the dock discharge the balance of their cargoes, such as pig iron. Instead of taking in coal ballast they carry this up to the wharf and discharge. Previous to getting in their lightering that has to be carted away. In fact, you can scarcely average the trade, it increases so fast. Especially during these last two or three years it has been increasing very largely.
104. Have you any further remark to make? I would only state that in the Carrington Municipality at the present time, there are about 400 houses, 4 churches, 7 hotels, 2 collieries, and 1 engineering establishment employing 120 hands. The collieries—Wickham and Bullock Island—at present employ 370 hands; the Hutton about 300, and they estimate that in a year or two, when they get their workings opened out, they will employ from 1,500 to 2,000 men.
105. Do the majority of the men who work at Bullock Island live there? Not at present. They come from different parts, but as they get regular employment houses are being erected.
106. What do you estimate the population of Bullock Island to be? I should say it will be about 2,500.
107. Have you got the valuation of the property? No.
108. Can you state the amount of rates received? About £1,100 last year.
109. The Wickham and Bullock Island colliery has its works on the main land? Yes.
110. Then they only have an air-shaft on the Bullock Island? No, they have their colliery as well.
111. But still their main works are on the main land? Yes, they go under Throsby Creek.
112. *Chairman.*] Their interest on the island is rather under-ground than above ground? Yes.
113. *Mr. Hurley.*] Do you believe that if something is not done to repair the present bridge or to erect a new one, some serious accident may happen to some of the inhabitants, either of Newcastle or Carrington? It is probable.
114. The dangerous condition of the bridge is likely to bring about an accident of a serious character? It has been considered unsafe for these last five years.
115. You have represented that to the Government through letters from the Municipality of Carrington? The municipality has been in operation for two years and ten months, and we have represented it during that time. Previous to that we saw Mr. Darley. We wanted a foot-bridge, attached to the bridge but he objected, on account of the unsafeness of the structure.
116. On account of these representations were you not informed that £33,000 would be placed on the estimates to satisfy the demands of the municipality? The first offer, I think, was £22,000. We have had many offers. At one time there was an offer of £7,000 to make a new bridge. Then we were told it was contemplated to put up an iron bridge. There has been nothing else but a series of promises.
117. You believe that the development of the place warrants the construction of an iron bridge? I do.
118. And you think the future outlook warrants the construction of a tramway into the midst of your district? Decidedly.
119. That has been foreshadowed by representations from your municipality, as well as by promises made by the Government? Yes.
120. Therefore, if a bridge of a permanent character were constructed, and a tramway laid into the harbour at Carrington, it would be a reproductive work for the Government? Decidedly.
121. Have you any knowledge of the value which would accrue to the Government in regard to the lands which would be reclaimed? I think I have. I could not say the quantity, but there is a considerable quantity of property. I could give you an idea of the value of the land. Some twenty years ago half-an-acre was bought for something like £20, and other pieces were bought for less. Now, in one instance, £1,200 and £1,700 have been given for half-an-acre of ground. This shows that the Government will be amply recouped by putting up this bridge.
122. Do you know the value of a piece of land (say) near Blanc street. Have you ever heard talk of a piece of land there being valued at £67,000? No.
123. Have you any knowledge of the acreage which it is expected will be reclaimed when these works are carried out at Bullock Island? Yes.
124. I am told that it is anticipated that in one strip there will be about 120 acres reclaimed. Can you tell us what the value of that land would be per acre? From £2,500 to £3,000 per acre. That would be the present value, and when the bridge is completed I should think it will be double.
125. So that the construction of the bridge would be of national importance to the Government in advancing the value of your own land? Decidedly.
126. You have heard of Mr. Hickson's objection to the construction of a permanent iron bridge at the present time? Yes.
127. I presume you took part in the public meeting held a short time ago? I did.
128. Can you give a synopsis of the objections made by the various speakers to Mr. Hickson's scheme? They had been promised so often by the Government that this iron bridge should be made, that they considered they had a right to that bridge, and that the Government should put it up. The impression is that if the temporary bridge is erected the matter will be left there, and no further action will be taken in reference to the iron bridge.
129. In fact you imagine that you have been deceived by the Department so often that you are doubtful as to their intention to carry out the more permanent structure? We can look upon it in no other light, as we have had promise after promise.
130. Do you think the construction of a more permanent bridge would lead to an increased population settling there? I think so. Then the swing-bridge which we are looking forward to will open up the communication towards Wickham.
131. Do you think the trade of Newcastle is likely to increase materially during the next ten years over the past five years? I think so. It has been making rapid strides during the last five years.
132. In what direction? Every direction.
133. What is your chief export? Coal.
134. Do you anticipate that the coal export will increase materially during the next five years as against the past five years? I think so, as we have been undergoing difficulty in getting it away. Owing to the vessels not arriving here, heavy orders have been in and they have not been sent away.

J. Morison,  
Esq.  
7 Mar., 1890.

- J. Morison,  
Esq.  
7 Mar., 1890.
135. Is not the accommodation sufficient to satisfy all present demands? Yes, so far as the wharfage is concerned, but not so far as the bridge is concerned.
136. I am now speaking about the probable trade? Yes.
137. It is anticipated that the reclamation of land, the construction of bridges, and other works, would be likely to develop the place. I want to know how it is going to develop in the future, as compared with the past? The place is growing in population, and its requirements will therefore be greater. It is only by increase of population that any city will rise. Moreover, being so close to the seaboard, we have every facility for increasing and carrying on trade.
138. Has not the Government amply provided for all the demands necessary for shipping in connection with Bullock Island? They have, in connection with the exportation of coal, and they see the necessity of increasing it further.
139. Are not many of the berths erected by the Government now vacant owing to the want of ships to take the coal away? There seems to be a scarcity of ships, but I have known the time when they have been double banked along the wharf, and when vessels have had to wait as much as nine and eleven weeks to get loaded. The Government saw the necessity for more accommodation then, and they have gone forward. I think the Government would be wise to have more wharfage and every other accommodation for the purpose of encouraging an increase of trade.
140. But still you will admit that there is at the present time twice the amount of accommodation necessary and workable? The present is an exceptionally slack period.
141. Have you taken into consideration the probability of the development of the southern mines in close proximity to the metropolis? I have.
142. Do you think that will interfere very materially with the future development of your mineral resources here? I think not. Our coal is superior.
143. Is there any likelihood of any industries, apart from your own, springing up on Bullock Island? I should think so. I look forward to the time when we will have an ironworks there. We have iron ore at Dungog, and we can have water accommodation to fetch it down.
144. Has it ever been represented by any of your deputations, or through your Municipal Councils, that great advantages will be gained by the reclamation of certain portions of Bullock Island? The great benefit to be derived by the reclamation will be the amount of area and frontage to the water. We all know when anyone has a water frontage that it always increases the price and value.
145. If a proper channel is made through Throsby Creek, and reclamations are carried out on a permanent basis, do you think the Government will meet with purchasers for what they reclaim? Decidedly so.
146. You think there will be no difficulty in finding purchasers? No: in fact we, as a Council, have asked the Government to put up some ground they have now for sale, and they have withheld it for some purpose of their own which they have not revealed to us.
147. *Mr. Trickett.*] Mr. Hickson has stated that it would be very undesirable to do anything to the old bridge—that it has gone so far that it is beyond repair. Do you agree with him in that idea? There are various opinions in reference to that matter. Of course I respect Mr. Hickson's opinion, but at the same time there are other experts who have stated that it can be repaired.
148. Do they state at what cost? I heard one gentleman say from £1,000 to £1,500.
149. Would it be better to repair it or to build a new temporary bridge? Well, the bridge is so narrow that unless it were made wider it would scarcely meet the requirements of the increasing traffic.
150. It will necessarily take some time to construct a costly bridge of £33,000 or £50,000? Yes.
151. What time do you think it will take? I have not seen the plans. Then this question of the expenditure of £17,000 by the Railway Commissioners would mean an alteration in the plan. But I should think if the whole scheme, including the bridge, were carried on with all despatch, there would be nothing to hinder its being completed in seven or eight years.
152. Are the people between Newcastle and Bullock Island prepared to put up for seven years with the present tumble-down structure? I suppose they will have to be content, as they have had to be those last five years.
153. They would be content? I don't say they would be content.
154. Would you be content, during the six or seven years it will take to construct the bridge, to go on with the present unsafe structure? It is very undesirable.
155. Therefore it is absolutely necessary to do something to make good the present bridge, or to erect a temporary structure near it? The question is this:—are we to get the iron bridge that has been promised so long, or are we to accept the statement that a temporary bridge will be put up to carry us through, until the iron bridge is completed. I have heard a great number say they would rather wait until this bridge tumbles down, than do without an iron bridge.
156. Do not the people fear that if a temporary bridge is put up the erection of the big one will be blocked? No doubt there is a great deal in that argument, and they believe it will be the case.
157. If the expensive bridge is put up where do you think it should start from on the Newcastle side? From Union-street.
158. I mean how near to Newcastle should it start—close to Blanc-street near the site of the present bridge or north of the present bridge? It should go to the west side.
159. But if we construct an expensive bridge, where would you commence the end of the bridge nearest to Newcastle? It would have to be started sufficiently near to allow of a proper gradient from the street.
160. Over the railway? Yes. When this reclamation takes place it is contemplated to shift this line to allow of another frontage of shops to come in on the other side of Blanc-street, which will give us a better chance of having an easy gradient over the railway shunting ground. This will allow the swing to take place, as it were, on the level part. We have plenty of room on the Carrington side.
161. But this idea of building the bridge right up to Blanc-street has only been started since the Commissioners decided that there should be a high level bridge? I could not say. I was not aware of what the intention was in regard to this iron bridge. The correspondence has referred to an iron bridge—a swing bridge.
162. But seeing that there is such a large traffic between Newcastle and Bullock Island, do you not, as a business man at Carrington, think some temporary measure should be taken in hand to give safe communication across the structure to Carrington? Unless traffic is to be blocked. One or other will have to take place—I should say repair the present bridge.

J. Morrison-  
Esq.

7 Mar., 1890.

163. Do you not think that building the bridge before the exact locality of the stream where the swing is to be, is fixed, would be putting the cart before the horse? I think not. The Government should have their plans of what the bridge is to be, and both works should be carried on at the same time.
164. The reclamation of the inside of the dyke is a large work? Yes.
165. And it will take many years? Well, at the present rate of doing work it will.
166. Has any money being voted to it? I am not aware.
167. At any rate, nothing in a large way is being carried on at the present time? No, the excavator which you saw to-day has only just commenced operations.
168. Do you think a substantial bridge, 22 feet wide, capable of carrying the heavy traffic which would go between Newcastle and Bullock Island, would answer for the next three or four years? There is the Wickham interest to be considered. There are many people on the Wickham side, and it will be to their detriment unless a swing bridge is erected.
169. For what purposes? To get their lighters in.
170. But the lighters go under the present bridges, don't they? Yes, with great difficulty.
171. But if a bridge were built with a sufficient camel-back to enable the lighters to go in, there would be no inconvenience? I would rather allow the Wickham representatives to answer the question.
172. But, as far as you are concerned, if a bridge were erected 22 feet wide, capable of carrying any load which might be required to be taken over, that would be sufficient for two or three years, pending the construction of the larger structure? It will do, providing we get that structure. That is the main thing, and that is what we wish to enforce on the Government. There is a great necessity for this bridge, and the worst feature is that its construction has been delayed so long that it has become almost painful to talk about it. We think we are entitled to the bridge, owing to the many professions which have been made to us. We have had our hopes raised and raised, until, at last, hope deferred has made the heart sick. We have just grounds for complaint.
173. At any rate you must have means of communication of some kind? Decidedly.
174. *Chairman.*] Your present bridge is on the level, crossing the railway? Yes.
175. That is often an inconvenience to that traffic? When the railway gates are closed it is.
176. And also an inconvenience to the railway? I daresay.
177. And if this reclamation is made, and a great number of parallel lines are laid down for shunting purposes, a level road will be more inconvenient than at present.
178. As a Carrington man, and looking at the inconvenience of the level crossing, and setting against it the inconvenience of a gradient up and down, which is it most to the interest of Carrington to have, a high-level bridge or a low one? A high-level bridge.
179. You clearly think that is so? Yes.
180. It certainly will be to the interest of the railways? Yes.
181. It would be very inconvenient to have all that shunting done on a level crossing? Yes; if it were a level crossing the traffic would have to wait until the shunting was finished.
182. Then on public and private grounds you think a high-level bridge is the best of the two? Yes.
183. Then if the work is carried out, you will, after all, be better off with a high-level bridge than a low-level bridge made four years ago? Yes.
184. So that this delay, which has caused so much vexation of spirit, may after all turn out to your advantage? According to the present outlook, it may.
185. If a low level bridge had been made at a cost of £33,000, even you would hardly have advocated pulling it down, to put up another at a cost of £50,000. No.
186. You would have been inconvenienced with a low-level bridge? I suppose so.
187. And you are going to be better off, after all, with a high-level bridge? Yes.
188. So that patience will have added a perfect work, after all? It is to be hoped so.
189. As Mayor of Carrington, you are largely interested in the coal trade, and you think the present wharfage is sometimes deficient? Yes.
190. You know that money has been voted to deal with the eastern side of the inner basin? I am not aware that the money has been voted.
191. The proposal has been settled? Yes.
192. When carried out, the southern end of this dyke and the eastern side of the Newcastle basin, will give accommodation to 10 more cranes? About that.
193. That will nearly double the present accommodation? Not quite; I think they have 12 or 15 cranes.
194. When the whole of the reclamation is carried out, and the wharf is made at the northern end, and the two long jetties proposed by Mr Hickson are put up, there will be nearly three times the present accommodation? That will all depend on the number of cranes erected.
195. But putting the cranes at the same distance from each other as they are now? Yes.
196. How many years do you think it will be before three times the present accommodation will be too little for Newcastle trade? It is hard to say.
197. Will you live to see it, do you think? I could not say, but I hope so.
198. At any rate it will be some time hence? Yes.
199. Then the Government can, having this swing bridge, make wharves on the western side of Bullock Island, and that will give additional room, if wanted, for coal ships? Yes.
200. But until the Government wants that bit of wharfage on the western side of Bullock Island, it has no special need for this swing bridge? I do not suppose the Government has any special need for it.
201. There is already a large frontage to deep water on the eastern side of this bridge? Yes.
202. So that for Government purposes alone, the swing bridge will not be wanted until they want to utilize the frontage beyond the bridge? The Government may not want it, but the public has to be considered.
203. So far as you are concerned, there is a possibility of three times the present accommodation being provided in your municipality alone? About that.
204. And it would take some little time before Newcastle uses it all up? On the Newcastle side they have diverted a good deal of their export of coal, on account of the coal shoots or staiths. Then there were steam cranes down towards the pilot sheds which have been taken away, and they will have to put others in their place.

- J. Morison, Esq.  
7 Mar., 1890.
205. But the whole of the coal trade is now concentrated on the dyke? Yes.
206. And the accommodation there will be trebled within the Carrington municipality when the excavation is completed as far as the bridge? I do not say it will be quite trebled.
207. But pretty nearly? Yes.
208. So that there will be an immense additional accommodation given to coal ships coming to Newcastle? Yes.
209. So far as your municipality is concerned there are no private frontages to the water? There are a few.
210. Whereabouts? On the eastern side—on both sides.
211. They were all killed by the Government proposed new wharfage? They have them, anyhow.
212. But in the previous case, when the Government made the dyke, they disregarded all private frontages? There are residents who will require to be recouped before the Government claim it now.
213. But the water frontage will be a Government frontage when the work is completed? Yes.
214. So that the Government money spent in making these frontages will make public and not private frontages? Yes.
215. There will be no private frontages improved by the expenditure by private money. The public will get the benefit of its own expenditure? Yes, and it will improve the property in close proximity.
216. But it will not improve any private wharf frontages? No.
217. The Government will have all the improved wharf frontage which its own expenditure creates? Yes.
218. Of course it will give greater additional value to the whole of the land in Bullock Island? Yes.
219. What additional value do you think the expenditure of this quarter of a million will give. Do you think it will add 25 per cent. to the land? I think so.
220. Do you think the value of this bridge alone would add 25 per cent. to the value of the land? Not far short.
221. You, as Mayor, look to have far better rates when the bridge is completed than you get now? Yes.
222. You expect a high valuation? Decidedly.
223. And the Government expenditure will make your revenue greater than it is now? Yes.
224. And of course it will make the private incomes of land owners greater too? Yes.
225. Presuming the bridge costs £50,000, do you think it will add £50,000 to the value of private property in Bullock Island? I think it would, in the course of time.
226. You think your assessment would go up £50,000? I think so. Of course, it will take time to do it.
227. But you quite expect it? Well, it will be the most valuable municipality in the district, owing to its close proximity to the shipping interests.
228. You have said that there is a great demand for land, and that industries are going to develop upon the island. What is the special advantage for industries on Bullock Island over those on the mainland? Their close proximity to the water frontage.
229. But although it is all public frontage, do you think that would still give an advantage over private frontages? It will not be all public right round the island, but only where wharfage is included.
230. But the Government is not likely to sell any of its water frontage to private people? There are some properties sold, I think, on the Throsby Creek side.
231. With frontage? With frontage, I think.
232. The northern part of the island is public property, is it not? Portion of it is. There is a reserve.
233. If this bridge is made, and the reserve is raised by silt, will it not make a valuable property for sale? Yes.
234. It would be a good speculation for a private person to make the bridge if he could be recouped by the grant of the land on the reserve? It would.
235. The reserve alone would more than pay for the bridge? It would.
236. And pay for the reclamation too? Yes.
237. So that the Government really has in its own hands the power of recouping itself for the expenditure on the bridge? Yes.
238. If it goes to the double expenditure of the bridge and reclamation it can pay the whole? I believe it would.
239. You talk about a tramway. Do you want to connect the tramway from Bullock Island with the existing tramway to the mining township? Yes; there is a tramway at present to Wallsend, and we propose joining at Lambton.
240. Which bridge do you propose to go over? The iron bridge, to connect with the city tramway.
241. But your tramway there would simply go to Newcastle station and go out again? Yes.
242. Practically, then, you only want a tram connection with Newcastle? Yes.
243. But if you want the bridge and new road, do you want a tram for such a distance as that? It would take in Lambton, Waratah, and Calcine Flat.
244. But your connection is with Newcastle; you will have to go to Newcastle? Yes.
245. You have already two other bridges connecting the island with Newcastle? Yes.
246. But the principal bridge is the one which connects you with Newcastle direct? Yes.
247. There is more traffic over that than the other two put together? Yes, at the present time.
248. But from your works you could cross the Wickham bridge and go to Newcastle, even if the other fell down? We have had to do that. The other bridge has become rather unsafe.
249. All your bridges are shaky then? They are. In fact we are badly bridged all the way. They have all been of a temporary character.
250. You are getting tired of temporary bridges? Yes.
251. Is the more northern one a shaky bridge? It is a light temporary bridge. There could be a good deal of traffic across there to the smelting works, and out to Waratah. There is a soap works out there.
252. Do you know what the Wickham and William-street bridges cost? No. I do not think they cost more than £1,000.
253. Causeway and all? With a causeway it would cost more. It is only narrow and short.

254. *Mr. Trickett.*] The northern end of the island, which Dr. Garran has asked you about, and which belongs to the Government, is marked on the plan as "Mangrove Sand, covered at spring tide"? Portions of it are.

J. Morison,  
Esq.  
7 Mar., 1890.

255. What is it worth an acre at the present time? Taking a prospective view, I think it would be sold for £1,000 an acre.

256. Could you give an idea as to what it would cost to make it all level country above spring tides? No, I could not say.

257. I suppose it would be very expensive? Well, if they had the excavator working in the creek, it should soon fill up the part desired to be reclaimed, and make it of benefit, so that shipping might go down at the northern end. If it were made up above the level of the water, its value would be increased by one-half. It would be worth about £1,500 or £2,000 an acre.

258. Do you know how many acres there are? No.

259. *Mr. O'Sullivan.*] You have stated that it would take seven years to complete the work. Do you refer to the bridge alone, or the reclamation and the bridge combined? I alluded to the bridge in connection with the other work.

260. Do you, as an iron-master, tell us that it will take seven years to construct the bridge? To make it, and sink the cylinders, and make it fit for traffic. I am only in a measure speaking at random, as I have not seen the plans or the quantities.

261. But as an iron-master, you speak with some authority when you say it would take seven years to construct that bridge? I am only basing my calculation on the manner in which they generally carry out Government work.

262. Are the people at Bullock Island to rely for seven years longer upon this defective bridge? Well, they should not.

263. But how do you propose to remedy it, if you prefer the iron bridge to the wooden one, and the iron bridge will take seven years to put up? The present bridge will require to be repaired, so as to enable a limited traffic to pass over.

264. But the Department say it cannot be repaired—what then? If it cannot be repaired I suppose they will have to put up a bridge to carry the traffic until the iron one is made.

265. You have come to the opinion, then, that a temporary bridge will have to be erected whilst the iron one is being constructed? It is quite evident that we require a bridge to get across, and if it is possible to repair the present bridge it would, as a matter of economy, be wiser to do that than to erect another bridge of a temporary character.

266. We have it in evidence that the present bridge cannot be repaired, and that it is dangerous. If you wait for the iron bridge you would wait for seven years, and be in danger all the time by crossing the present bridge? It is a matter of inspection, I suppose, as to whether the bridge can be sufficiently repaired or not. I do not think the bridge has been inspected with the object of showing whether it is worth repairing, or whether another bridge should be erected.

267. Has any wool ever been shipped from Bullock Island? I do not think so.

268. Are there indications showing that it is likely to be a place for wool shipping? Not unless the Government allow it.

269. *Mr. Hurley.*] Do you not think you might modify the seven years you have spoken of. You are aware of the magnitude of the bridge over the Hawkesbury. Have you any idea of the time that enormous bridge took to construct? No; I do not know how long the bridge took to construct.

270. Do you not think it took less time than the time you put down for the construction of this small bridge? As I said before, I referred merely to the slow mode in which Government work is carried on in Newcastle.

271. Here is a plan [*producing it*]. That will give you an idea of the difference between a low-level and a high-level bridge. Do you think that would suit the requirements as foreshadowed by the Chairman. You will see the level of the rails at the present time. That would give you a certain height above the railway crossing. I should like to know whether you would be in a position to put in a tender for the construction of a bridge manufactured from iron. You say there are large mineral deposits near Dungog? Yes.

272. Would you be in a position to take a contract for the construction of that bridge, manufactured out of the raw material of that district? We have not the iron works. We want the iron manufactured. It is not at present manufactured in the colony.

273. Would you be in a position to put in a tender for the construction of a bridge such as is foreshadowed? This is merely a sketch plan. There are no particulars.

274. Do you not think a high class iron bridge could be constructed in less than two years? When I said seven or eight years I was alluding to the slow method of doing work—not to a contractor undertaking the work in a certain time, but to the whole scheme.

275. But if tenders were invited, do you not think a work of the description foreshadowed on the plan, could be carried out in two years? Do you mean the excavation as well?

276. I mean an actual completion of the bridge, so that it may be ready for traffic. Supposing you had to send to England for the parts, could you not put the bridge up in less than two years? I doubt it. You see that an excavation has to be made. What I was referring to was the completion of the bridge, with the reclamation going on at the same time.

277. You admit the necessity of a temporary structure in order to avoid the dangerous character of the present bridge? A temporary structure must be built, or this bridge must be, as a matter of economy, sufficiently repaired.

278. Therefore a repairing of the present bridge, or the construction of a temporary bridge, is an actual necessity? It is, if we are to have the traffic.

Mr.

Mr. Morison subsequently amended his evidence by forwarding a letter to the Chairman, as follows:—

To the Hon. A. GARRAN, M.L.C.

Carrington, March 7, 1890.

Dear Sir,—My attention has been drawn to a portion of my evidence given at the Newcastle Council Chamber before the Sectional Committee this afternoon, in answer to Mr. J. Hurley's question,—“How long will it take to make an iron bridge to go over to connect Newcastle with Carrington?” My answer should have been, viz., “About two and a half years.” I must admit I was confused at the time, and understood it to mean the reclamation and building and erection.\*

James Myers, Esq., Mayor of Wickham, sworn, and examined:—

J. Myers,  
Esq.  
7 Mar., 1890

279. *Chairman.*] What is your official position? Mayor of Wickham.
280. How long have you been a resident of Wickham? About eight years.
281. What is the special interest of Wickham in the work under the consideration of the Committee? The special interest of Wickham is to get an opening, and a navigable opening, into the waters of Throsby Creek.
282. You are more interested in the deepening of that creek, and in better access to that water, than in a bridge to Carrington? Yes.
283. So that the two municipalities have two separate interests in this matter? Yes.
284. According to the map before me the frontage on the western side of Throsby's Creek, from about the soap-works to the bridge, is about 1,000 feet? Yes.
285. And between Hannell-street and the water it is subdivided into allotments? Yes.
286. What sort of water frontage have they at the present time? It is very shallow. You can scarcely get a small boat up to it.
287. Not even a lighter? No; at low water they are simply muddy flats.
288. It is not a frontage at all? No.
289. And the private right goes only to the high-water mark? That is all. I believe there are a few who have bought a water frontage. I believe the late Mr. Henderson, whose business is now worked by Mr. J. F. Ellis, bought the water frontage, and some other residents as well.
290. The bridge, as it stands at present, is practically no hindrance to these people, because if there were no bridge they could not get a lighter up at low water? No.
291. It is only the high-water frontage? Yes.
292. And then it is only a few feet? About 4 feet.
293. At high water it is 4 feet, and at low water it is a mud frontage? Yes.
294. So that the present bridge is no hindrance to navigation? Not at present.
295. And what the owners of this 1,000 feet want is an improved frontage and a good access. As Mayor, you know what these properties are rated at. What are these properties supposed to be worth per acre or per foot, between Hannell-street and the water? The frontages on from Hannell-street are worth from £15 to £16 a foot.
296. And if this deepening is carried out, and the swing-bridge is erected, you, as Mayor, will expect that they will be rated more highly? Yes.
297. What do you think it will add to their value? It will nearly double them. Where there is access to the wharf it would treble them. The amount of traffic which will be brought on the wharves will be something enormous.
298. Do you not think it will more than treble the value? I believe it would.
299. Won't it make a first-class water-frontage of what is practically no water-frontage at all? Yes.
300. What is the value of that 1,000 feet of land between Hammil-street and the bridge? I could not tell you.
301. I am talking of the soap-works to the bridge? That is from Henderson's place to the Wickham bridge. That is 1,000 feet at about £15 a foot.
302. And that would be quadrupled in value? I think so, quite.
303. The Government expenditure would add a value of £45,000 to private property? Yes.
304. Would that £45,000 pay the cost of the deepening and the swing-bridge? I do not think it would. We should require a depth of 20 feet to get ships up.
305. Have you formed any estimate as to what the cost of the deepening of Throsby Creek would be? No. I was under the impression that that reclamation was included in the general reclamation scheme. I was altogether at sea when Mr. Hickson told us it was not so.
306. We have been told by Mr. Hickson that the reclamation scheme only comes up to the bridge? Yes.
307. You heard the Mayor of Carrington say that for public wharfage purposes, the Government would hardly want this swing-bridge, until all the new wharf they propose to make is occupied? Yes.
308. And after that they would want to get into Throsby Creek? Yes.
309. You agree with that? Yes; for public purposes the swing-bridge is not wanted for coal purposes at present, but the amount of land the Government hold on the western side of the bridge up to Wickham bridge is very valuable.
310. If they want to utilise the western side of the island, they must have a swing-bridge and improve their frontage? Yes.
311. Meanwhile, you want the swing-bridge and the deepening to improve these private frontages? Yes.
312. Do you think the owners of the private frontages would pay the cost of deepening? I do not think they would.
313. Do you think it would be right for the Government to go in for this expenditure for the sake of adding £45,000 to the value of the property of private people? If it is not done in this district, it is done in others. I know the Government have spent a lot of money for private enterprises.
314. But that is more of an incidental character. Public works, incidentally, give a value to private property? I believe there are a great many private wharves in Sydney which have had much money laid out upon them for the benefit of private individuals, and I think the Government would be justified in dredging and reclaiming that portion of the land.
315. So far as I know, all private dredging done in Sydney for private purposes is paid for at a stipulated rates? I was not aware of that.

316.

\* NOTE (on revision):—I desire to make this addition to my evidence. I wish it distinctly understood that in all the questions bearing on the time it would take to complete the bridge I was mentally including the whole scheme complete—reclamation, dredging, building bridge and approaches—hence my answer, seven or eight years. During my cross-examination I lost sight of the point, the time to complete the bridge alone. My mind was occupied with the desire to have the iron bridge built, and not the temporary wooden structure—the object assigned me at the public meeting. Not having any plans or specifications to guide me of the proposed iron bridge, I could not give any correct estimate of the time to complete the same. But as I now understand the proposed iron bridge foreshadowed by the Chairman of the Sectional Committee, having reference to high-level bridge, swing and approaches, I should say, approximately, the time ought to be from two to two and a half years.

J. Myers,  
Esq.

7 Mar., 1890.

316. You do not know the amount which will be required to carry out this work? No.
317. But you have an idea of the value of the land for private property? Yes.
318. It is an unknown expenditure, but a known increase in value? Yes.
319. As Mayor of Wickham, do you think it would be a good speculation for the Government to buy all these private properties, and come in for the benefit of its own expenditure? I believe it would pay them, and they would benefit by it.
320. To buy out these people at £15 a foot? I would not say it would do that.
321. You think the price would jump up if the Government wanted to buy it? Yes.
322. You know the Government is able to take land at a valuation? Yes.
323. I suppose the value would not be much above what you placed on the assessment as a reasonable approximation? No.
324. It would not be enormously above it? No.
325. Say it was £20,000;—do you think it would be a good speculation for the Government to buy all that frontage below Wickham bridge at £20,000, and then deepen Throsby Creek? I believe it would. There are plenty of persons there now who hold a water frontage, and who make back yards of it.
326. Do you think the people of Wickham who are not interested personally in these water frontages would be willing to see the Government do a thing of that kind? Yes.
327. It would improve the township generally to have a public wharf? Yes.
328. And you think it would pay? I believe it would.
329. And you think there would be a large business done? Yes; there is a large number of timber yards, &c., along that frontage.
330. You mean trade is waiting for a better frontage? Yes.
331. What sort of trade? Principally timber.
332. Not manufactures? No.\*
333. Is that the best natural site near Newcastle for it? Yes. Hudson Brothers have a piece of land, and also Bibby and Cook, and they are erecting a large sawmill at present.
334. If it were made Government land, the Government could make a little railway between Hammil-street and the water frontage, and accommodate the whole of the wharf? Yes.
335. It would be more utilised as a Government frontage than a private one? Yes.
336. Whilst it is a private frontage there is no likelihood of a private railway? No.
337. So that the railway traffic, as well as the utility of the site, would be greatly increased by converting that into public property? Yes.
338. Is there no other part near Newcastle equally convenient for timber? I don't think so.
339. Is Stockton not so convenient? No.
340. Nor any part of Bullock Island? Yes, but it would have to go across the bridge. Most of the timber trade is out that way.
341. Do you think any advantage would be gained by the Government deepening the northern end of Throsby Creek? Not at present. There is no demand for it.†
342. The trade is all down near Newcastle? Yes.
343. You think this deepening is wanted in the interest of local trade? Yes.
344. Though not in the interest of coal shipping? No; You must have other accommodation besides the coal wharfage.
345. This Wickham bridge is not a valuable structure? If the Government were to buy property right up to the Wickham bridge across Throsby Creek, and deepen the whole up to the railway bridge, and give you a transit across the railway, would it be quite as convenient? Yes.
346. And it would be in the public interest? Yes; in fact there was a hard fight when that bridge was built, as to whether it should be put alongside the railway, or where it is now.
347. If the Government repossessed themselves of the whole of the private frontage between the Soap Works and the railway bridge, and ran a railway along, it would be an immense public improvement? It would.
348. And would pay for itself? I believe it would.
349. The Committee is to understand that the Wickham interest in this matter does not concern the bridge at all? No; we want a swing-bridge and deep water.
350. *Mr. O'Sullivan.*] What is your business? A builder and contractor.
351. How long do you think it would take to construct the iron bridge as proposed by the Department? I have never had anything to do with iron, but making a comparison between that bridge and the Hawkesbury, which was constructed in three years, I think it ought to be built in eighteen months. It is not a quarter or a tenth as big as the Hawkesbury bridge.
352. Do you mean to say that all the ironwork could be prepared, and the bridge erected within eighteen months? From that time to two years.
353. How long would the reclamation work take? Another three years. I presume they would be slow to start the reclamation work, and would not commence until the bridge was nearly finished.
354. How deep do you imagine the Throsby Creek to be? Twenty to twenty-five feet.
355. At that depth you could bring large vessels up to Wickham wharves? Yes. We have had a wharf at Wickham for seven years, and there has been no boat alongside except the waterman's boat. They have not been able to do it.
356. Is it a Government wharf? Yes. It was built in some one's interest, but I have failed to find out whose. It cost about £700.

357.

\* NOTES (on revision):—No 322. There are at present several manufactories on the shores of Throsby Creek, as well as other industries; but, in consequence of the shallow state of Throsby Creek, land carriage has to be substituted for water.

† No. 341. The north and north-western portion of Throsby Creek carries the drainage of all the area on the east side of the hills and ranges about Adamstown, Lambton, and Waratah, also the Hamilton, Newtown, Islington, Tigue's Hill, and Wickham drainage; and during the last visit of Dr. Ashburton Thompson, Health Officer, in our last dry season, that gentleman found the creek in the vicinity of Tigue's Hill in a filthy and dangerous condition; so much so, that there was an outbreak of sickness in that locality of a serious nature. All this the Health Officer attributed to the fact that the creek being remarkably circuitous at Islington and Tigue's Hill, and the currents being impeded by shoals, mud banks, snags, and other obstructions, caused quantities of filth and refuse from tanneries, slaughterhouses, &c., together with town matter and refuse, to accumulate about the windings and mud flats of the creek, which, when left exposed to the sun's rays, emitted a foul and dangerous odour, so much so, that persons travelling past were compelled to fly as if from a pestilence. The unusual wet season has, however, removed a deal of filth. At the same time, it only remains for a return of dry weather to set in, when the public health will assuredly be assailed.

- J. Myers,  
Esq.  
7 Mar., 1890.
357. *Mr. Trickett.*] Which do you think would be desirable, a high-level bridge over the railway, or a level bridge starting near the present one? I never knew what sort of a bridge it was to be until this morning. I was surprised to think it should be a low-level bridge at any time. Any one who stands at the corner where the Bullock Island bridge crosses the line will say that it ought to be a high-level bridge.
358. I was always under the impression it was to be a high-level bridge. Was that the general impression? I believe it was.
359. Would the construction of this bridge be any advantage to your municipality? As a bridge, no. It is simply to get an opening.
360. All your traffic comes now by direct road to Newcastle? Yes, independent of the water.
361. You know the Carrington Municipality, and the Island as well? Yes.
362. Do you not think that if this expensive structure is to be erected it will be absolutely necessary in the meantime to erect a good temporary bridge? There should certainly be some way of getting across. I fail to see any obstruction to the commencing of the erection of a big bridge. They could go down with the cylinders, and reclaim after the cylinders are in.
363. But even if that were done it would take three years to erect the bridge, and in the meantime something is necessary to keep up communication? Yes.
364. And there must be a repairing of the present bridge or the construction of a temporary one? Something must be done.

Thomas Bibby, Esq., timber merchant, sworn, and examined:—

- T. Bibby,  
Esq.  
7 Mar., 1890.
365. *Mr. Trickett.*] What are you? A timber merchant.
366. Where do you reside? Wickham.
367. How long have you resided there? Five years.
368. You are well acquainted with the district and its requirements? I am.
369. You know all about the question of connecting Carrington with Newcastle by bridge? I do.
370. Will you give us your views on the subject as it affects Wickham? The population of Wickham, of course, are desirous of having a large bridge built with an opening, so that craft would be able to get through to take merchandise, timber, &c., up to Wickham. At present we have no wharfage accommodation at all. If I get a cargo of timber from New Zealand, or any where else, I have to go to Captain Patten's office to sign a document to the effect that I will remove it as it comes out of the ship. There is not room at present for more than two or three small timber crafts. It is very necessary that we should have better accommodation. We have been told that certain plans have been approved of by the Government, and that we were to have a wharf extending as far as Honeysuckle Point.
371. Is that beyond Wickham? No, it is on this side of Wickham, on a line with Wickham. We were told that we were to get this bridge with an opening, and that a large portion of land was to be reclaimed along by the railway line, and that wharves would be built to which we could take our small craft, and land our timber, so that we would not be hunted about from pillar to post as we have been for the last five years.
372. To what point was this reclamation promised? I do not know that it was promised at all, I was only told so. We were told by some of our members that it was to go past the railway station. We were told it was intended to dredge as far as the soap works, and that the wharves were to be extended as far as Redmond's cordial works.
373. Would that be of great advantage to you? Yes, to all importers. We should have some accommodation then, whereas at present we have none.
374. Has everything to be carted up now? Yes, within the last year I have imported, in timber alone, 2,673,271 feet.
375. Of sawn timber? Yes, and 1,145 doors.
376. Is your place of business close to the water? Yes.
377. With a water frontage? It is close on the water. I am building a large mill at Wickham, and if this bridge is erected, and there is anything like a channel, I could come up close to the mill. I could import logs. I intend to import logs, and the mill is being built with the idea of cutting them up there.
378. Your idea in having the swing in the bridge is that sea-going vessels should come up to the wharves? I do not see why they should not.
379. Would you have any cartage from the Honeysuckle Station, or would that be close to your place of business? It would be very close. If we went to the Wickham wharves my cartage would be very little.
380. At present the only timber which can be taken up the creek is log timber? Yes, I have taken as much as 200,000 feet, in rafts, right up to Wickham.
381. Would this wharfage construction improve the value of property? There is no doubt about it.
382. Have you given any thought as to the necessity or character of the bridge under consideration? Yes.
383. Independent of the swing part of the question? Yes.
384. Will you tell us what you think should be done? I think the bridge is very desirable.
385. What character of bridge? A permanent bridge.
386. Starting from Blane-street? Yes; I should be in favour of a high-level bridge over the railway, starting from Blane-street. It is very necessary that the bridge should be a high-level one, seeing that the railway traffic is so very great.
387. You know that certain reclamation works are contemplated in the creek? Yes.
388. Do you think those works should be carried out before the bridge is commenced? I think they should be commenced together.
389. You think they could be commenced together? I do think they could; I know they could, and I think they should.
390. There would be no difficulty in erecting the swing-bridge you speak of, so that the two works should be carried on together? No.
391. Have you thought how long the works would take to carry out? I think a bridge might be made in two years. I cannot say much about the reclamation.
392. Have you had any experience in bridge-building? Not personally, but I have seen them built. I have taken a great deal of notice of the Hawkesbury bridge, for instance.
393. What do you think of the present bridge over the creek between Newcastle and Carrington? I think it is unsafe.
- 394.

394. Do you think it could be repaired? I could not say. I have not examined it; but I have felt it shake and tremble whilst going over it. If I go over in a vehicle I like to go slow.
395. Even if a costly structure is erected, it will be necessary to repair the present bridge or build a temporary one? I should think something should be done to repair the bridge, and to put it in a safe condition during the time the other one is being erected.
396. *Mr. O'Sullivan.*] Where is the timber you import landed? On the Market Wharf.
397. That is a Government structure? Yes.
398. This wharf was constructed by the Government for the general commerce of Newcastle, other than coal? Yes.
399. Do you think it would be right to expect the Government to make a channel to Wickham to land cargoes which should be landed at the public wharves? I presume the Government would make their own wharves if they dredged the channel. At the Market Wharf we have no accommodation whatever.
400. You say you float your timber up? If it is large timber we have no other alternative.
401. Therefore, if you float it up in rafts, the cost of carriage cannot be very great? There is a large quantity of timber which will not float, and we must cart it.
402. How far is it from Wickham to the Market Wharf? About a mile and three-quarters or 2 miles.
403. But you are no worse off if you have only to go 2 miles with timber than a large number of builders and contractors in Sydney or Newtown and other suburbs? I think I am a great deal worse off. Most people in Sydney have every facility for landing timber, but here we have none.
404. Have you not a wharf at Wickham? No, I have not. There is one there.
405. Do you know how it was obtained? No, I do not.
406. Then you think it is highly desirable, in the interests of the people of Wickham, that this channel should be constructed and a wharf made there? I do. In doing this you will reclaim a large amount of land on both sides of the channel, and in my opinion it will more than compensate the Government for the work.
407. You think it would be a reproductive expenditure? I am quite sure of it.
408. You have said you think it would take two years to construct this bridge? If the material is to come from home I dare say it will, but if the material is in the colony I do not think it will take anything like that time.
409. In saying that you have in view the idea that the work will be let by contract, and not done on the Government stroke principle? I hope not. If it is done on the Government stroke principle, I am afraid it will take a little longer.
410. Would you advise that the old bridge should be patched up, or a temporary bridge constructed, whilst the iron bridge is being erected? I do not think that is a fair question to put to me, because I am not an engineer.
411. I only ask you as a taxpayer who will have to bear a portion of the cost? If the engineers say that it will be more saving to repair this bridge, by all means have it repaired. If you are going to give us a temporary bridge let it be as temporary as possible. I should not propose expending any great sum of money on a temporary bridge, if we are going to have the bridge which has been proposed.

Henry Joseph Brown, Esq., solicitor, sworn, and examined:—

412. *Mr. Trickett.*] You are a solicitor? Yes.
413. And an old resident of this district? Yes.
414. Do you hold any civic office at the present time? No; I have never done so.
415. You know the subject of our inquiry? Yes; as to the advisability of constructing a bridge between Newcastle and Bullock Island.
416. Do you think it would be desirable, at the present time, to erect a low-level bridge or an overhead one? An overhead bridge would certainly be desirable, if it could be constructed with convenient gradients of approach.
417. That would be a bridge starting from Blane-street? Yes; I think an overhead bridge would be highly desirable. The inconvenience to traffic caused by the shunting of trains is very great. I know of one company which has its office some little distance away, and the shunting of the trains is a perfect nuisance to them. It is also a source of danger.
418. There appears, recently, to have been some indignation in Newcastle at the prospect of a temporary bridge being erected to connect Newcastle with Bullock Island? Can you give us the particulars of that agitation. Were you at the public meeting? No, I was otherwise engaged.
419. As a public man, knowing something of the opinions of the people;—what is the real reason of the agitation? The idea was that if a temporary structure were put up the construction of a permanent one would be indefinitely postponed.
420. Are you aware whether this costly bridge over the crossing has been promised from time to time by the Government? I cannot say I know much about it, I have heard of it.
421. Do you know anything about the reclamation works there? I know there are works of great importance being carried on with the view partly of reclamation and partly of excavation.
422. Do you think they are desirable works? I think so.
423. With what object? I may say they are desirable from a sanitary point of view. These low mud flats, even with a few inhabitants upon them, must be very hurtful, but when there is a large number of people about them they will become the receptacle of filth of all kinds, and they are likely to breed pestilence.
424. What other advantage will the reclamation give? It will give further accommodation for shipping. The trade is increasing very rapidly, and would increase more rapidly if the present regulations for shipping coal were altered. It will also give a large area of land of great value.
425. Do you think the proposed basin is a suitable place for such costly works? I think so. I should, myself, have thought it better to have carried them to the west of the Bullock Island Bridge, along the Newcastle side. That is apparently part of the present scheme, or it might ultimately be worked in with it.
426. That would carry the reclamation and the deepening of the creek more to the west? Yes.
427. Do the people of Wickham suffer any inconvenience by not having wharfage accommodation nearer to them? I have no doubt about it, and I think as a matter of justice to the water-frontage owners, something should be done. The water-frontage land was originally sold by the Crown by the acre. I know

T. Bibby,  
Esq.  
7 Mar., 1890.

H. J. Brown,  
Esq.  
7 Mar., 1890.

H. J. Brown, Esq. know this professionally, but as usual in those days, and without knowledge on the part of the purchaser, the usual reserve of 100 feet from high-water was included improperly in the grant. The result has been that recently a large number of property holders, who had paid for their land, have had to pay the Government again for it, and that on the presumption that they had a water-frontage.

7 Mar., 1890.

428. *Chairman.*] What proportion of these have been purchased? A good many that I know of. Some within the last year or two.

429. Out of 1,000 feet how many feet do you think have been purchased? I am not prepared to say. I know that one client of mine paid £2,000.

430. For the purpose of getting back what he had already paid for? He bought the whole of the land, but the Government who prepared the deed erroneously inserted a condition.

431. Do you mean that different terms were inserted in the grant to those named at the auction mart? Yes.

432. *Mr. Trickett.*] The greater part of the coaling takes place at Carrington? Yes, practically the whole of it, with the exception of that of some special companies, such as the A. Company, and the Waratah Company.

433. Is the wharfage accommodation at the foot of the town ample for loading purposes? There is not enough of it for present requirements.

434. What business is carried on there, seeing that the coal is loaded further up the river? There is a large timber traffic. There are direct shipments from England. There is also a good deal of wool laden there, and cattle are frequently exported, besides passenger and other traffic exists to a very considerable extent.

435. And that kind of traffic usurps, so to speak, the whole of the old wharfage? Yes, and there is considerable delay in many instances for want of more accommodation.

436. And you think this proposed reclamation would be of great advantage to the port generally? It will be of great advantage to the port generally, and to the Government as property-owners.

437. And it would be availed of directly it was constructed? No doubt.

438. If the accommodation for shiploading were doubled at the present time, do you think a sufficient number of ships would come to take up the tonnage? I think so. At all events it would be the case in a very short time.

439. Is the population of Newcastle increasing year by year? Very much. When I first came here, thirty years ago, the population of the whole district could not have been more than 6,000 or 7,000, and now it is between 60,000 and 70,000.

440. Have you also seen the rapid growth of Carrington? Yes; twenty years ago half-acre allotments were sold for not more than £20. Now many of them must be worth £2,000 an acre.

441. If this costly bridge is constructed, to connect Carrington with Newcastle, what will be the best thing to do in the meantime to keep up communication? Of course that would depend on whether a practical man would say it would be better to repair or strengthen the present structure. Of course it might be strengthened, even if it could not be repaired.

442. But something must be done—either the present structure must be strengthened, or a new temporary bridge erected? Yes.

443. Even if the costly structure is to be carried out? That, undoubtedly, would have to be done. At the same time I do not think there is any reason for postponing the erection of the new bridge. The bridge ought to be very strong, judging from what I have noticed of the nature of the traffic which would go over it, and a temporary bridge would not be strong enough.

444. *Chairman.*] I understood you to say that the feeling of Newcastle against a temporary bridge is lest it should not be temporary enough, but should be too durable? Practically that.

445. But is not that fear groundless, from the fact that the project at present is for a high-level bridge across the reclamation, which is to go to the Railway Department. If that reclamation is made, and comes into use as a shunting-yard, is it not certain that you must have a high-level bridge over it? I do not know exactly what is proposed to be done. The authority to make the new bridge should not be delayed till the temporary structure is worn out, otherwise at some time there would be no bridge at all.

446. It is proposed to reclaim certain ground, and to turn it into a shunting-yard, in which case a high-level bridge must go over it. Therefore the fear of the Newcastle people, that the temporary bridge would last too long, must be groundless? When this reclamation work is completed, we may have to wait a number of years before we get the vote for the new bridge.

447. Do you think that it is at all likely? Yes, I think so, from past experience. For many years we were promised a new Court-house, and tenders are about to be accepted for one which is too small for the purposes required of it.

448. With regard to the Wickham frontage, you have informed us that part of it is still a Government frontage? Yes.

449. And part of it has recently been repurchased under the Land Act? Yes.

450. Are you of opinion that it would pay the Government to buy back what it has sold between Hannel-street and the water, and make a public wharf on that side? No doubt a public wharf here and there is required; but I think it would be to the advantage of the community if certain portions of the water-frontage were in private hands.

451. But where it is close to the railway, and where it is necessary that the portion which is to be utilized requires the expenditure of a large amount of public money, do you not think, in a case like that, a resumption would be to the advantage of the public? I think so.

452. There is all the frontage to Throsby Creek north of the railway-bridge which would be available for private use, if the Government thought fit to sell it? Yes; that would be rather high up.

453. But do not you think it would be impolitic on the part of the Government to spend a large sum to deepen Throsby Creek, and so make this a wharf for seagoing ships, simply for the purpose of adding threefold to the value of private property? Undoubtedly; but under existing circumstances some deepening ought to take place, so that those who bought land with water-frontages a second time should be able to use them to some extent. But if a large expenditure is made, to fit it for seagoing vessels, I think more would be done than the purchasers would have a right to expect, and they could not complain if the land were resumed.

454. But you know the Government sold this land with the existing water-frontage as it was? Yes.

455. And that is mud at low water and 4 feet at high water? Yes. 456.

456. If the Government is going to turn that into a frontage for seagoing ships it will add enormously to the value of the property? Exactly. H. J. Brown,  
Esq.

457. Then do not you think the Government should receive a *quid pro quo*? Yes.

458. Do you think the Government is entitled to spend citizens' money in adding threefold to a private person's property, when it could buy the property first, make the improvement, and come in for the benefit of its own expenditure? No; but considering that the people have had to pay twice over for their land, something in the way of giving them water-frontage should be done. At the same time, if the excavation makes the place fit for seagoing vessels, you will do more than the owners have a right to expect. When the improvements are completed, the Government should sell what is not required for public purposes, as experience shows private enterprise would utilize the rest to a greater extent than the Government would.

7 Mar., 1890.

459. You think it would be advisable before deepening Throsby Creek to resume that frontage? It depends on the extent to which it is proposed to be deepened.

460. And if they resume that and make it fit for seagoing ships, it will be an immense addition to the value of the harbour of Newcastle? Undoubtedly. This small deepening I speak of, for the benefit of property-holders, is also necessary for sanitary purposes.

461. But the Government has it in its power to make this improvement and recoup itself of the cost? No doubt.

462. And you think it would be better to do that than throw the property into private hands? Yes, if it were considered desirable to make a deep channel.

463. *Mr. O'Sullivan.*] Do you think, if this bridge were constructed, and the reclamation works and channel carried out at an expense of £130,000, the Government would get a return for that expenditure in the shape of the lands they would have to sell at Bullock Island? They would get a return in a variety of ways. The land at present belonging to the Government would be greatly increased in value. They would get a large return for the use of the cranes or other appliances at the wharf.

464. But would the land reclaimed on the Bullock Island side be more in value than the expenditure upon it? That would depend on the amount of reclamation and the position of the land. I have no doubt the Government would be in pocket by making a large expenditure there.

465. And you think that, though it may seem a large expenditure, it may be a wise one in the end for the Government to incur? I have no doubt about it. For instance, the net revenue from eight or nine cranes only would certainly be over £20,000 a year, supposing they were constantly going. The seven steam cranes which used to be on the wharf on this side used to produce £15,000 net at the least.

466. *Chairman.*] Do you think it would be fair to Newcastle to put on tonnage dues to pay the interest on this expenditure? Certainly not, because, practically, this is money belonging to the port.

467. How? Because the difficulty in getting things done here is not a recent one. Tonnage dues were imposed thirty years ago to make improvements. A considerable sum was raised from them, and under the Act money was borrowed. The Act provided that all moneys raised by means of the dues should be paid into separate accounts: instead of that they were paid into Government accounts. The works which were produced from the tonnage dues and the money borrowed were so enormously profitable that they paid off the debt and enabled more works to be constructed. These again yielded a large revenue, and if an account were properly taken it would be found that there is a large sum to our credit.

468. But did not the tonnage dues at that time clear off the debt, principal and interest, about the time Mr. Lloyd moved for their abolition? I should think so.

469. Since then the debt has been enormously increased, and there have been no tonnage dues? Yes, but the works have been increased, and have been still more profitable, and have more than paid for themselves.

470. But do you mean to say the money received from these cranes will pay off the interest on all the public money spent here? Yes; and repay the principal as well.

471. Have you gone into the figures? I went into the matter some time ago, and came to the conclusion that there must be a large sum due to Newcastle.

472. That is only an opinion? Yes. I must also point out that when the tonnage dues were stopped other dues were put on in their place, and a considerable sum is received for pilotage and for other purposes.

473. Does the sum received for pilotage more than cover the cost of the service? Yes.

474. Does the money received from the wharf more than cover the cost of the depreciation of the wharf? I do not know, positively, what the difference is between the gross and net earnings.

475. You would not like to commit yourself? No.

476. *Mr. Hurley.*] You say you think there is a credit due to Newcastle? Yes.

477. From that I suppose you intend to convey that Newcastle has been somewhat neglected, compared with other portions of the country? I do not think there can be much doubt about that.

478. Are you aware that the Government proposes to spend £112,000 upon one work alone in Newcastle? No; what work is that.

479. In the reclamation? Yes; but that is not for the benefit of Newcastle, but for the benefit of the Government in improving land which would otherwise be valueless.

480. The improvement of the land is surely an improvement for the people of Newcastle? Yes; but it will be an improvement for the Government revenue when they sell the land.

481. Will not the erection of seven more cranes be an advantage? Undoubtedly, and it will also be an advantage for the Government in increasing the revenue.

482. How, then, can you say there has been any neglect on the part of the Government, or that there is a credit balance, as it were, due to you now? I may mention one fact which has been brought to my knowledge to-day. A vessel came in, the draught of which ought certainly not to have been too much for this port; but, as it was, she took the ground, and remained there for a few hours. If there had been a proper expenditure this would not have happened.

483. Do not you think the abolition of harbour dues was a great concession to the port? The abolition of tonnage dues was an act of justice. You are under a mistake. The harbour dues have not been done away with. At the time the harbour dues were imposed there were tonnage dues as well, and none in Sydney. The abolition of these tonnage dues put us in one respect in the same position as Sydney was. I have just had placed in my hands some information which the Committee might like to have. In 1879, the revenue of Newcastle was £57,477; and in 1889 it was £132,000. 484,

- H. J. Brown, Esq.,  
7 Mar., 1890.
484. Have you any idea as to the export of coal from Newcastle? I believe nearly 2,000,000 tons.
485. And you think it is likely to increase? I think so. It would have increased long ago if we had had better regulations.
486. You think, for the want of accommodation, ships have been forced to take their cargo elsewhere? There is no doubt of that, and the accommodation which exists is not used to the best advantage, owing to the nature of the regulations.
487. Are you of opinion that the work in connection with the wharves would be more satisfactorily carried out by a Board of Trust? That would depend to a considerable extent on whom were appointed, and the extent of the endowment. If they had to impose fresh dues to carry on, the Trust would be an injury to the port.
488. *Mr. O'Sullivan.*] You have given us figures showing a large increase in the revenue in the port of Newcastle? Yes. In 1889 the sum of £103,000 was derived from haulage and shipping—that is to say, haulage from the various mines. A minimum of 10d. a ton is charged upon all coal brought from the mines.
489. *Chairman.*] That refers to the railway service mostly? Yes; but these are railway works.
490. But you are crediting Newcastle with revenue from railway works,—you are crediting the railway with nothing? This is what has been paid to the Railway Department practically for the use of the wharf, which is a railway yard; all the wharves belong to that department.
491. It was for the use of carriage as well as the wharf? Only the carriage from the pits, along private railways, principally.
492. Not all? Part of it, of course, is public.
493. *Mr. O'Sullivan.*] Can you give the figures indicating the revenue derived from the use of the cranes? The Government charges 10d. a ton for the use of the locomotive from the pit to the wharf, and dropping the coal by means of cranes into the ships.
494. Then you are unable to separate the railway figures from the crane figures? It is all in one sum, as the cranes belong to the Railway Department, and their earnings are included in the railway revenue.

James Curley, Esq., M.P., sworn, and examined :—

- J. Curley, Esq., M.P.,  
7 Mar., 1890.
495. *Mr. Hurley.*] You are one of the representatives of Newcastle? I am.
496. Have you been long in the district? For something like fifteen years.
497. You are conversant with the subject matter before the Committee? Yes.
498. Can you give us an opinion in regard to the necessity for a bridge, and as to what character of bridge would be suitable for the future requirements of Newcastle? Before going into the matter I would like to refer to certain figures to show the importance of the port, and the progress which has been made. I have obtained certain statistics from official sources. The revenue collected in 1879 was £57,477 18s. 9d., and in 1889 it was £132,018 0s. 1d. The total value of exports, including coal, to foreign and intercolonial ports in 1879 was £648,427. The total value in 1889 was £1,894,321. The railway revenue for haulage and shipping in 1879 was £76,602.
499. But are you crediting Newcastle with that amount of money as being receivable through Newcastle? This is simply haulage and shipping from the coal mines, that is the item of £76,602.
500. It is purely in reference to coal? Yes. In 1889 the revenue for haulage and shipping was £103,824. The shipments in regard to foreign and intercolonial exports were, in 1879, 830,675 tons, and in 1889, 2,091,557 tons. I mention these figures simply to show the expansion of the trade, and what may be anticipated in the future.
501. What year did you quote from last? I am making a contrast between 1879 and 1889.
502. And what does it average? 2,091,557 tons for last year.
503. We have it in previous evidence that the exact figures are 1,658,386 tons of coal? If that is so there must be some mistake, because I got my figures from the Collector of Customs this morning.
504. Do you think that Captain Newton's evidence on oath would be accurately given? I can verify my statement by again referring to the customs officer.
505. What is your object in referring to the question of imports and exports, and the traffic of the railway department, as we are met to discuss the necessity of the construction of a bridge to Bullock Island. I suppose you merely quote the figures to show the importance of the place? To show the importance of the reclamation works being carried on and so forth.
506. And you believe that the works foreshadowed by the Works Department—the reclamation of certain land, and the erection of new cranes—is a necessity? I do.
507. And the construction of a bridge to connect Newcastle with Bullock Island is also a necessity? Yes.
508. You have visited the bridge which connects Newcastle with Bullock Island? I have.
509. What is your opinion of it? I consider it is both unsuitable and dangerous.
510. You have heard the evidence in reference to a high-level and a low-level bridge, and the project the Railway Commissioners have in view of reclaiming a certain area of land, in order to avoid the crossing of the line by persons proceeding from Carrington to Newcastle? Yes.
511. Can you give us your opinion in regard to that matter? A high-level bridge may have its advantages, and a low-level bridge may have its advantages as well, because if you reclaim this ground going towards Wickham, and it is made a public wharf, you may, perhaps, have heavy goods landed there which you would require to get away to Carrington over this bridge. If it were a high-level bridge we might not be able to get over it, unless you had a crane to lift the goods up.
512. *Chairman.*] Could not they go over the Wickham bridge? They could go over the other way, but if this bridge were a low-level bridge they could take the goods off the wharf at once.
513. You are speaking of an exceptional case, when a very heavy load might be required to be taken to Carrington? I am looking well into the future.
514. Could not there be heavy loading at the Carrington wharf. Why load goods on the Wickham wharf, and take them over the bridge? I have no doubt, as far as appearances go at present, that a high-level bridge will be the best.
515. Very heavy girders could be landed by the cranes at Carrington wharf more easily than they could be carried by the road over the bridge? Possibly the difficulty might be met in that way.
516. *Mr. Hurley.*] I suppose you recognize the fact that an overhead bridge would afford greater safety for the public, and that it will also give facilities to steamers travelling to Wickham, which a low-level bridge would not give? Yes.

J. Curley,  
Esq., M.P.

7 Mar., 1890.

517. And that it would also be a greater convenience to the Railway Department generally, if they had no low-levels to contend with? I conceive that you must have a low-level crossing somewhere, or how can the people get to the wharf with the goods.

518. But as far as the people of Carrington are concerned, you have sufficient wharf accommodation on this side already, for the purposes of the merchandize of the city? With regard to the merchandize of the city, I suppose the people have to come here over the bridge, and go down to town with it.

519. But surely you do not anticipate a wharf alongside every man's dwelling? Certainly not.

520. Looking at the convenience it would be for the Railway Department, and the safety it would afford to the general public, do you not think an overhead bridge would be the best and most suitable? I daresay it would.

521. Have you formed any estimate as to the improved value of land through the construction of a first-class high-level bridge to connect Carrington with Newcastle? I suppose that would take in the reclamation of the land there. I think it would double the present value of land.

522. Do you think the people of Carrington have cause for complaint of the negligence of the Government in not providing suitable accommodation to enable them to reach their holdings at Carrington? I do not think it is the people of Carrington alone, but the general public around who have cause for complaint.

523. *Mr. O'Sullivan.*] I understand you prefer to have an iron bridge constructed instead of the temporary wooden bridge? You must either repair the present bridge or put up some kind of expedient in its place. I should say that the present bridge ought to be inspected for the purpose of ascertaining whether it can be repaired for a year or two or not.

524. You know that the departmental officers have condemned the bridge, so much that they had issued an order that no loads above three tons in weight shall cross? Yes.

525. That being so, it is no good relying on the old bridge much longer for traffic of that kind? No.

526. Then you think an iron bridge should be constructed? I think it should be commenced as soon as possible.

527. In the mean time would you suggest the construction of a temporary bridge? I certainly would, if the old one cannot be repaired.

528. What renders it absolutely necessary that a strong iron bridge should be constructed to Bullock Island;—what heavy freights are there beyond those coming from Morison's establishment, and which often go by the Wickham bridge? Occasionally, heavy building material goes over the bridges.

529. I suppose that will go in drays? Yes.

530. A dray will not carry much more than 2 or 3 tons. Therefore the loading would not be very weighty so far as building material is concerned? It is possible that boilers which may be landed at Bullock Island may be brought from there.

531. You mean for the mines? Yes.

532. Would they not be likely to take the Wickham bridge instead of the one proposed? That would depend upon where they wanted to get to.

533. Would not the majority of the mines be served by the Wickham bridge? Some would and others would not.

534. Is it not a dread amongst the people that if a temporary bridge is constructed, the construction of the iron bridge may be indefinitely postponed? I believe that is one of the reasons assigned by the public.

535. And you think a bird in the hand is worth two in the bush? Yes.

536. And that it is much better to insist on the Government carrying out their promise to construct an iron bridge? Yes; the public think that it is a desirable work, and that it should be done at once.

537. And you think an iron bridge is absolutely necessary for the heavy freights which go to and from Carrington? Yes; and also for the purpose of getting on with the reclamation. If a swing bridge is put up a dredge could be utilised for the purposes of reclamation.

538. That is another reason why you desire the work pushed on? Yes.

539. You think that if a wooden structure is put up, no dredge could be used, and that the channel will not be used for some years in consequence? Yes.

540. That sways you in preferring to have the iron bridge constructed without delay? Yes.

Alexander Sheddton, Esq., sworn, and examined:—

A. Sheddton,  
Esq.

7 Mar., 1890.

541. *Mr. Trickett.*] You are an alderman in the city of Newcastle? Yes.

542. Have you lived here long? I have been fully twenty years here.

543. And you have taken an active part in public affairs? I have.

544. And you have noted the advance and the requirements of the city? Yes.

545. You know the matter under consideration? Yes.

546. Were you present at a public meeting held here recently? I was.

547. Can you tell us what was the feeling on that occasion in regard to the proposal not to construct this expensive bridge from Newcastle to Bullock Island? It was really thought that the construction of what we may call the permanent bridge was about to be shelved by the Government. We lost no time in calling a public meeting to ascertain the feelings of the people.

548. And the result was that the people thought an expensive structure should be constructed? Yes. It had long been promised. I held a seat in the Wickham Council up to the last term, and I can say that promises of that kind had been held out to us for two years.

549. If this permanent structure is erected, it will be necessary to take some immediate steps either to repair the old bridge or to put up a temporary one? I did not know that the present bridge had been condemned; but if it is only to serve for a moderate time until the permanent structure is built, I cannot see why, at a slight expense, it cannot be strengthened so as to enable traffic to pass over.

550. Have you thought what expense would be required to make it answer the necessary purposes for a year or two? Not myself, but I have heard a great deal from others—men holding good positions—who understand the work, and they say it would cost from £1,000 to £1,500. To find out it would have to be examined properly. If I were to examine it I could tell you exactly.

551.

- A. Sheddon, Esq.  
7 Mar., 1890.
551. Do you think the Government would be justified in spending £50,000 in the construction of a bridge from Blane-street over to Carrington? I am sure they would.
552. What makes you think that? Because of the importance of the two places. They have grown very rapidly during the last few years. Seeing that the Government is about to reclaim the foreshores, there is no doubt that if they were to sell the land it would far more than recoup them.
553. What is the interchange between Newcastle and Carrington which makes such a permanent structure necessary? We say that when you build anything you should build a good thing. It is most profitable to build a good, firm structure.
554. But is it necessary to go to this large expense? No doubt the Railway Commissioners see the benefit of a high-level bridge.
555. And you think such a bridge would be desirable? There is no doubt of it, because the two places will, in a manner of speaking, be one town in a very short time. I look upon it that there is only the matter of a bridge between the two places. If the land is reclaimed and sold you will see that buildings will go up to the bridge on both sides.
556. Do the supplies of Carrington go from Newcastle, or are they mostly landed at Carrington? They are mostly landed from Newcastle.
557. And taken over the bridge? Yes; I do not think there is accommodation for taking goods to Carrington by water.
558. Have you had any experience in bridge building? I have?
559. What time do you think it would take to construct an overhead bridge from Blane-street to where it is proposed to take it? About three years from the acceptance of the tender.
560. If ordinary expedition is exercised the bridge can be used in three years? Yes.
561. Meanwhile, the present bridge must be repaired, or a new structure put up? I hold it would be better to spend more money to make the present one safe. It could easily be done. It never was a strong bridge.
562. It has lasted a great number of years? Yes, 15 or 16 years.
563. Could you tell us what it cost? I could not.
564. Have you ever heard that it only cost £600 or £700? No.
- 564½. Has there ever been an accident on the bridge? Not to my knowledge.
565. Or a blockage of traffic? The bridge is narrow. One vehicle has to stand while the other passes.
566. It is only 16 feet wide at present? About that.

James Frank Ellis, Esq., timber merchant, sworn, and examined:—

- J. F. Ellis, Esq.  
7 Mar., 1890.
567. *Mr. Trickett.*] In what business are you? I am a timber merchant.
568. Have you any evidence to give in addition to what has already been given? I believe the previous witnesses have been under a disadvantage, because they were not fully acquainted with the circumstances of the case. They are not fully acquainted with the circumstances connected with the £112,000 vote which has been placed on the estimates.
569. The question before is as to the expediency of building this bridge immediately or not? That, I believe, is part of the £112,000 vote. I could give evidence as to how the money should be expended in erecting the iron bridge proposed, instead of a temporary one.
570. You mean the high-level bridge? Yes.
571. Give the reason? I think the bridge should be erected immediately, because there are certain works proposed to be carried out in regard to reclamation, &c., in connection with Throsby Creek. That is on the western side of the present bridge. I believe the public would be willing that the traffic should go over the Wickham bridge until the permanent one is erected.
572. I understand you to say your principal reason for a high-level bridge with a swing is the urgency of improving the Wickham water frontage? Not necessarily so, but it has something to do with it, because the proposed reclamation works will more than recoup the Government for its expenditure on this new bridge. The old bridge has stood requirements for the last sixteen years, and for the last three or four years no heavy traffic has gone over it. I maintain that the public would sooner be put to the inconvenience of running their traffic over the Wickham bridge, than that a temporary bridge should be erected.
573. Do you not think the public themselves are the judges of their own convenience? I should imagine so, but they have been put to an inconvenience because they have not seen a plan of the Government proposal.
574. The evidence hitherto has been to the effect that they would rather have a temporary bridge than none at all. You were saying they would rather have no bridge than a temporary one? They say so, because they have not been put in possession of the proposals of the Government. I maintain that the population would sooner be put to the inconvenience of running their traffic over the Wickham bridge, and have a permanent bridge erected, than have a temporary structure put up.
575. And that is the statement you wish to make? Exactly.
576. You bring all your timber over the Wickham bridge and down Hannell-street. Where do you land your timber from the ships? I deliver it at Newcastle.
577. At the Government wharf? Yes. If I could get my vessels to Wickham with logs, it would pay me better to cut up my own logs than import the sawn timber as I do now. At the same time, I do not look upon this as a personal matter, but from a public point of view.
578. It is for the sake of improving the Wickham frontage that you wish to see the swing-bridge made? To a certain extent. I think if these reclamation works were carried out, the Government would be recouped ten-fold.

George William Webb, Esq., sworn, and examined:—

- G. W. Webb, Esq.  
7 Mar., 1890.
579. *Mr. Trickett.*] You are an alderman for the city of Newcastle, and an ex-mayor? Yes.
580. How long have you been living in Newcastle? All my lifetime, close upon forty years.
581. You know the subject of inquiry? Yes.
582. What are your views in respect of the matter? I was cognizant of the plan which was laid down by the Government during the time I occupied the position of mayor, that was in 1889.
- The

The old bridge is certainly not fit for heavy traffic, and has been condemned for some considerable time. My opinion is that the Government ought to resume the land on the south side, in a direct line with the A. A. Co.'s wharf, as far as Throsby Creek, a width of 300 feet, and the inner line with Union-street. I have been over the old bridge several times, and it rocks about a good deal. My opinion, as a practical man in the building trade, is that if a few piles were driven in, the bridge would serve while the new one is being built. I know a good many bridges which have been built, and I think the whole of the work could be done in three years, more especially if the Government were to start on the south side.

G. W. Wobb,  
Esq.  
7 Mar., 1890.

583. That is on the Newcastle side? Yes. It will be a waste of money to spend £1,500 on that old bridge. If piles were put in to strengthen it, it would last two or three years while the new bridge is being built. By reclaiming the land the Government will reap great advantage. The sale of the land will recoup them for all they lay out upon it. Land in Blane-street is at present worth £40 or £50 a foot.

584. Near the site of the proposed bridge? Yes, and it is increasing in value every day. The population of the district is increasing every day, and the coal traffic is also increasing. We have had a slack time, and that has been not only on account of the strike but on the account of the scarcity of shipping, but at the present time, however, there are a large number of orders for coal in hand, and we cannot get the shipping to take it away.

585. Do you approve of a high-level bridge from Blane-street? I do.

586. Do you think there would be any difficulty in getting an easy gradient? No, if my memory serves me correctly, you have a gradient of 1 in 25 from the Newcastle side.

587. Would a gradient of 1 in 25 be an obstacle to heavy traffic? Certainly not.

588. Do you think the future traffic between Newcastle and Carrington would justify such a large expenditure as £50,000 upon a bridge? I do; the more cranes there are started in the Carrington direction the more traffic there will be.

589. You say you have seen the rapid growth of Carrington? I have, it has been something wonderful. The lower end of Newcastle has also grown wonderfully during the last two years.

590. That is at the lower end and in the vicinity of the bridge? Yes; in the part I live in there were seven years back only two houses, now there is not a piece of vacant land in the place.

591. What is to make Carrington become a large population, seeing that the land is low-lying, and that it is at present almost under water? People are going there in large numbers, they are filling in the land, and it is becoming very valuable there.

592. There is no obstacle to people living there? Not the slightest.

593. Has it proved to be an unhealthy place to live in? It is no more unhealthy than any other place about Newcastle. There are very few deaths over there.

594. And its low-lying character does not make it unhealthy? Not to a great extent. I presume there is sickness over there.

595. Is your opinion in regard to the repair of the old bridge a practical one? The bridge has been condemned for three or four years. There has been no heavy traffic over it, and it is no worse now than it was then.

596. But that is by reason of the heavy traffic having been stopped? Certainly, and the traffic has gone the other way through Wickham.

597. Has there been much cause of complaint by reason of the traffic having to go through Wickham? Certainly. All heavy traffic must go round or be punted across to Bullock Island.

598. That is a serious inconvenience? Yes.

599. *Chairman.*] What is the extra distance if you go round, say from the foundry? It will make a good mile difference.

James Frank Ellis, Esq., sworn, made a further statement, as follows:—"Of course the value of the frontages at Throsby Creek has a lot to do with the voting of the money by the Government for the proposed improvements. I have just come into possession of a property in Wickham. It has recently been leased to me. The property is worth £20 a foot to Hannell-street. The late owner of the mill bought the reclamation right of the frontage to the creek from the Government, and paid over £2,000 for that property, and there being 100 feet frontage, more or less, gives a valuation of £20 per foot to the water frontage.

J. F. Ellis,  
Esq.  
7 Mar., 1890.

Mr. Joseph Henry Collier, land agent, sworn and examined:—

600. *Mr. O'Sullivan.*] What is your business? A land agent.

601. Do you desire to make any statement in regard to the proposal under consideration? I would like to point out that the Government owns a large amount of land about Bullock Island, and by so doing they deprive the Carrington Council of a large amount of rates, and retard the improvement of the place. If they carry out the work of building the bridge, and reclaiming the land, it will be at least some compensation for the amount of rates of which the people of Carrington are deprived. This applies not only to the Carrington, but the City Council. The Government have all the frontage to Blane-street, and the amount of rates the Council is deprived of, is rather more than £1,500 a year—£2,000. Three years ago the side of Blane-street, occupied by private individuals, yielded a rate of £1,500 a year.

Mr. J. H.  
Collier,  
7 Mar., 1890.

602. How is the Council deprived of these rates? Do you mean that they would get the rates if the land were private land? Yes; by the land being kept as it is at present, without being improved, the local Councils are deprived of a large amount of rates. The erection of the bridge, and the reclamation of the land, will compensate them, to some extent, for the large amount of rates of which they are now deprived.

603. Is communication ever cut off from Bullock Island by floods? The water runs over the approaches to the Wickham bridge.

604. Does it cover the roadway? Yes.

605. Is there any traffic across whilst the roadway is covered? Yes; any traffic which possibly can go, goes through the water.

606. Do the people suffer much inconvenience? Of course you cannot go across on foot.

607. And you think that would be a reason why a high-level bridge should be constructed through Carrington? This does not apply to the bridge in question. I am speaking of the Wickham bridge.

608. Traffic by the old bridge is not cut off by floods? No. 609.

Mr. J. H. Collier.  
7 Mar., 1890.

609. Do you desire to make any other statement? I may point out that the population has grown enormously. The bridge should be a permanent one. It should not stand merely for ten or twenty years, but should stand for 100 or 200 years. The channel proposed to be bridged is about 400 feet wide, and 24 feet deep at low water. Therefore the bridge would have to be of a permanent and costly nature. It should carry a tramway, and should be a swing-bridge, so as to allow ships to pass through. On that account it ought to be a permanent and substantial structure.\*

\* NOTE (on revision):—I am more than ever of the opinion that tenders should be called at once for the construction of the permanent bridge and the dredging out of the channel towards and above Wickham.

## PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

### Bridge to connect Bullock Island with the Mainland at Newcastle.

#### APPENDIX.

##### A.

##### PRECIS OF PAPERS RELATING TO THE PROPOSED BRIDGE.

THE papers in this case, as they have been referred for *précis*—and inquiries for earlier papers have been fruitless,—enter on the subject in *Medias res*, nothing being shown of the circumstances which led up to the proposal to rebuild the bridge.

21/1/87.—The first paper on the file is a report from Mr. W. A. Smith, stating that he had made inquiry as to the cost of widening the road from Newcastle to Bullock Island Bridge from 20 feet to 40 feet, and that it could be done for £3,000.

25/2/87.—The same officer reported that the road was dangerously narrow, being on an embankment, and not fenced in, and that it could be metalled and patched up for £580.

24/8/87.—Mr. Ellis, M.P., forwarded to the Minister a letter which he had received from the Mayor of Newcastle, in which the latter stated that he had been informed that it was in contemplation to build a timber bridge, and that he thought an iron bridge was in every way preferable.

Mr. Ellis was informed that the bridge would be of iron, and that the idea of erecting a wooden bridge had never been entertained.

7/9/87.—Mr. Smith reported that he had ascertained that Harbours and Rivers did not propose to open up Throsby Creek from the New Bridge to Wickham Bridge. The depth of water was from 2 feet to 4 feet, and dredging would be expensive. The land along the frontage was becoming very valuable, and he anticipated objections from owners of property when it became known that the design of the bridge was such that the creek would be close to future navigation. Mr. Smith added that the approach on the Newcastle side would have to be widened to 40 feet.

20/9/87.—The Council Clerk, Wickham, referring to the proposed closing up of Throsby's Creek, wrote asking if it was proposed to make the bridge a drawbridge. There were, he said, numerous industries established within a short distance of the water, and other industrial establishments were in contemplation along the foreshores of the creek. It was, therefore, of vital importance that the navigation of this arm of the Hunter should not be intercepted by an impassable bridge. No action seems to have been taken on this remonstrance.

23/10/87.—Mr. Smith now submitted specification of the approaches to the proposed bridge, and there is also an unsigned and undated estimate—by whom prepared is not shown—of £13,681 13s. for a bridge.

For some months the papers do not record anything, but in March, 1888, a new feature was introduced. Mr. Smith submitted a plan for an extensive reclamation of land involving an alteration in the site of the proposed bridge. It is not necessary here to give details of the proposed reclamation, as they can be given separately if required, and it may suffice to say, that the scheme if carried out would result in creating an area of 45 or 50 acres of most valuable land now useless mud-flat, and in making a navigable channel of Throsby Creek, and enable the Railway Department moreover to utilize a valuable strip of land opposite Blane-street, said to be worth £67,000.

In reply to Mr. Bennett, Mr. Smith further reported that the scheme was originated by Mr. Scott, of Carrington, and that he had reported upon it because the question of the bridge and the road was so materially affected by it. He had proposed to increase the span of the bridge to 125 feet in order that cylinders might be sunk in the centre of the channel for the bridge to swing upon, with 50 feet openings. If, however, the scheme were only partially carried out an opening might not be required for fifteen or twenty years.

Mr. Bennett thought the papers should be referred for report to Harbours and Rivers and the Railway Department, and they were referred accordingly.

The Commissioner for Railways minuted that the Minister would remember that when they visited Newcastle together this reclamation had been decided upon, and as regarded the Blane-street frontages that the policy in the interests of Newcastle of disposing of them had been recognized, and directions had been given for the sale of some of them, and that tenders were to be invited for filling in the frontages to road level. The filling would cost 1s. 3d. a cubic yard, but perhaps the silt from the dredging might be used for this purpose.

Mr. Hickson considered that the scheme had many points to recommend it, and he thought all future work, such as the erection of the bridge, should be carried out with a view to the adoption of this scheme.

3/7/88.—The Under Secretary requested Mr. Hickson to report for the Minister's information with reference to a letter on the subject of the proposed land reclamation which had appeared in the *Evening Call*, and which had been handed to the Minister by Mr. Ellis, M.P., who warmly advocated the proposal. The letter referred to—from Mr. Jno. W. Scott,—urged the adoption of the reclamation scheme, and pointed out that every year 1,040,000 tons, or 780,000 cubic yards of silt were carried out to sea, and this was sufficient to reclaim, at an average depth at 4 feet, 120 acres of land; the cost of removing this silt being £17,333 per annum for simply throwing the material away. Mr. Scott proceeded to demonstrate the enormous gain to the country which would result from the adoption of this system of reclamation.

Mr. Hickson referred the Minister to Mr. Smith's report of March, 1888, and intimated that he had that day made a proposal to the Minister in connection with the proposed reclamation. The Roads Department he said should be moved with reference to the bridge over Throsby Creek, the position of which would have to be altered if the proposed scheme were carried out.

26/9/88.—Mr. McDonald submitted statement of additional amount (£10,200) required for the bridge, and Mr. Bennett minuted in explanation that in consequence of the change of site, and the substitution of a movable for a fixed bridge this amount would be required in addition to the £7,500 already voted.

The amount was voted for the Loan Estimates.

6/11/88.—Mr. McDonald submitted an amended Estimate (to suit greater width of channel) of £22,200, and the amount was duly noted.

9/4/89.—The Council Clerk drew attention to the unsafe condition of the existing bridge. The sum of £33,000 was placed on the Draft Loan Estimates for 1890, and the bridge was described as consisting of an iron or steel swing span with an opening on each side of 65 feet, roadway 28 feet wide footways to carry tramway. Swing worked by hydraulic power, Approach span of iron and deck throughout, iron covered with tarred metal. Piers iron and concrete sunk to rock.

The

The bridge was referred by the House for the consideration and report of the Public Works Committee, but subsequently

10/2/90.—Mr. Hickson reported that he thought the erection of the large structure should be deferred pending a consideration of the question of the development of the shipping and railway traffic there. The swing-bridge to accommodate vehicle and tram traffic, crossing the Railway land at a high level and giving space for for vessels to pass up and down the creek, would cost £3,300, involving an annual charge of £1,300 to £2,200, and he was of opinion that a wooden bridge on present site, at a cost of £2,500, would meet all the requirements of the traffic for some years.

The Minister minuted to withdraw all the iron bridges except Cowra, and explain the change.

C.A.B., 16/2/90.

### B.

MINUTE BY THE COMMISSIONER AND ENGINEER-IN-CHIEF FOR ROADS AND BRIDGES.

Bridges referred to Public Works Committee.

Sydney, 10 February, 1890.

WITH reference to the four bridges which it was proposed to refer to the Public Works Committee, I have the honor to state that the design for Cowra Bridge will be ready by Tuesday next.

With regard to Bullock Island Bridge, I am inclined to think the erection of the large structure should be deferred for the present pending a consideration of the whole question as to the future development of the shipping and railway traffic of this place. A swing-bridge, capable of accommodating vehicular and tram traffic, crossing over the Railway land at a high level, and leaving ample room for vessels passing up and down Throsby Creek channel, would cost about £33,000, the interest and working expenses of which would range from £1,800 to £2,200 per annum. A wooden bridge on site of present one would cost about £2,500, and would, I believe, meet all the requirements of the traffic for some years.

Jerry's Plains and Tarban Creek Bridges should also be withdrawn, as they can be erected for an amount under £20,000; and, in any case further investigation is necessary as to whether any expenditure at these places is justifiable.

ROBERT HICKSON.

WITHDRAW proposal for all the iron bridges but Cowra from Public Works Committee, and explain change of proposal from iron to composite, costing less than £20,000. Alter proposal re Cowra to composite at £26,537 cost.—B.S., 11/2/90.

### C.

RESOLUTIONS PASSED AT A PUBLIC MEETING IN NEWCASTLE.

The Chairman of the Public Works Committee, Sydney.

Sir,

Newcastle, 1 March, 1890.

I do myself the honor, on behalf of my colleagues, Messrs. Fletcher and Curley and myself, to transmit herewith resolutions arrived at in a large and enthusiastic public meeting held last night in this city, having reference to the construction of the Newcastle and Bullock Island Bridge, and I hand you under another cover a full report of the proceedings as reported in the local press. The decision of Mr. Hickson has come with great surprise to the citizens, and evidence will be tendered, if it is now admissible, to show the Committee that Mr. Hickson has not judged the opinions of the citizens rightly, and that the carrying out of the original structure to the Government themselves, in the increased value of their own land, will more than compensate for the expenditure.

I have, &c.,

ALEXANDER BROWN.

The Newcastle-Bullock Island Bridge--Proposed Temporary Structure.

The Mayor of Newcastle in the Chair.

Moved by Alderman Rodgers, seconded by Mr. H. E. Stokes, and supported by Mr. William Grahame, a resolution as follows:—"That, as in the opinion of this meeting, the erection of a temporary bridge to connect Newcastle and Carrington would be a waste of public money, and inadequate to the requirements of the district, we therefore protest against its erection."

Moved by Mr. J. H. Collier, seconded by Alderman Morrison, and supported by Mr. Alexander Brown, M.P.:—"That, in the opinion of this meeting, the necessities of public traffic and growing requirements of the district demand and warrant the erection of a substantial and commodious bridge. We therefore urge that the original plans should be adopted and carried out."

Moved by Mr. Blackiston, seconded by Dr. Morgan, and supported by Aldermen Sheddon and Lloyd:—"That the foregoing resolutions be conveyed to the Works Committee by the Members for the city and county."

Moved by Mr. Grahame, and seconded by Mr. Bibby:—"That the Mayors of Newcastle, Carrington, and Wickham proceed to Sydney, with such evidence as they desire fit, on Tuesday next, and give evidence before the Parliamentary Committee."

[Two plans.]



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

BRIDGE CONNECTING CARRINGTON WITH  
THE MAIN LAND AT NEWCASTLE.

(PETITIONS FROM RESIDENTS OF NEWCASTLE, HAMILTON, WICKHAM, AND CARRINGTON, IN FAVOR OF.)

*Received by the Legislative Assembly, 29 April, 1890.*

To the Honorable the Speaker and Members of the Legislative Assembly of New South Wales, in  
Parliament assembled.

The Petition of the undersigned residents of Newcastle, Hamilton, Wickham, and Carrington, of  
New South Wales,—

HUMBLY SHOWETH:—

1. That Parliament having voted the sum of £33,000 for the erection of a bridge connecting Carrington with the main land at Newcastle, and the question of the expenditure of this sum on the contemplated structure having been referred to the Public Works Committee for consideration and report, and the recommendations of such Committee being diametrically opposed to the expression of opinion given at a public meeting of the citizens held at Newcastle with reference to this matter,—

2. Your Petitioners, in consideration of these facts, desire that your Honorable House will take into consideration the prayer of your Petitioners for the erection of the proposed iron bridge of a permanent character, which has been estimated at £33,000, will be proceeded with as soon as possible.

3. That your Petitioners cannot too strongly urge the attention of your Honorable House to the fact that the present antiquated structure is in imminent danger of collapsing, and has been reported upon by various officers of the Works Department with a view of having a more permanent structure erected.

4. Your Petitioners therefore respectfully pray that the consideration of the matter for the carrying out of a permanent structure may be proceeded with without delay.

And your Petitioners, as in duty bound, will ever pray, &c.

[*Here follow 422 signatures.*]

Similar Petitions were received:—

29th April, 1890, from residents of Newcastle, Hamilton, Wickham, Waratah, and Carrington; 59  
signatures.

Do. from residents of Newcastle, Hamilton, Wickham, Waratah, and Carrington; 255  
signatures.

Do. from residents of Newcastle, Hamilton, Wickham, and Carrington; 994 signatures.



1890.

NEW SOUTH WALES.

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PARLIAMENTARY STANDING COMMITTEE ON  
PUBLIC WORKS.

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REPORT

TOGETHER WITH

MINUTES OF EVIDENCE, APPENDICES, AND PLAN,

RELATING TO THE

PROPOSED BRIDGE

OVER THE

HUNTER RIVER AT JERRY'S PLAINS.

---

Presented to Parliament in accordance with the provisions of the Public Works Act,  
51 Vic. No. 37, section 8.

---

SYDNEY: CHARLES POTTER, GOVERNMENT PRINTER.



## MEMBERS OF THE COMMITTEE.

## LEGISLATIVE COUNCIL.

The Honorable JOHN LACKEY, Vice-Chairman.  
 The Honorable ANDREW GARRAN.  
 The Honorable FREDERICK THOMAS HUMPHERY.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 The Honorable GEORGE HENRY COX.

## LEGISLATIVE ASSEMBLY.

JOSEPH PALMER ABBOTT, Esquire, Chairman.  
 JACOB GARRARD, Esquire.  
 HENRY COPELAND, Esquire.  
 JAMES EBENEZER TONKIN, Esquire.  
 WILLIAM SPRINGTHORPE DOWEL, Esquire.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.  
 CHARLES ALFRED LEE, Esquire.

## SECTIONAL COMMITTEE.

The Honorable ANDREW GARRAN, Chairman.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.

## GENERAL INDEX.

Report by the Committee.  
 Minutes of Evidence taken by the Committee.  
 Appendix to Evidence taken by the Committee.  
 Report by the Sectional Committee.  
 Minutes of Evidence taken by the Sectional Committee.  
 Plan.

## LIST OF WITNESSES.

[Examined before the Committee.]

	PAGE.
Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges . . . . .	1, 3-4
Colonel Frederick Wells, Engineer for Roads . . . . .	1-3

## [Examined before the Sectional Committee.]

	PAGE.
John Brown, Esq., Jerry's Plains.....	1-5
Edward Parnell, Esq., Newcastle.....	5-7
Mr. Benjamin Harley, Storekeeper, Jerry's Plains .....	7-8
Mr. Henry Parker, Grazier, Jerry's Plains.....	8-10
Mr. Walter Young Cousins, Grazier, Singleton .....	10-11
Edward Alford, Esq., Inspector of Stock .....	11-12
Mr. William Gillett, Drover, near Singleton .....	12-14
James Cobb White, Esq., Edinglassie .....	14-16, 23
Mr. William Wood, Drover, near Muswellbrook .....	16-18
Mr. Charles Smith, Drover, near Muswellbrook.....	18-19
Reginald White, Esq., near Muswellbrook .....	19-20
Mr. Michael McTaggart, Drover, near Muswellbrook .....	20-22
Alexander Rawson, Esq., Manager of Woodlands Station .....	22-23
Mr. John Frith, Drover, Muswellbrook .....	24-27
Mr. W. Hobden, Grazier and Farmer, near Singleton .....	27-28
Mr. Richard T. Keys, Grazier, Bengalla .....	28-29
Mr. John Mason, Drover, Denman .....	29-30
Mr. Thomas Cook, Grazier, Turanville, near Scone .....	30-31

## APPENDIX.

## [To Evidence taken by the Committee.]

Prices of papers in relation to the proposed Bridge at Jerry's Plains .....	A
Report by Colonel Frederick Wells, Engineer for Roads .....	B
Supplementary Report by Colonel Frederick Wells .....	C

## PLAN.

Plan showing site of Bridge over Hunter River at Jerry's Plains.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

BRIDGE OVER THE HUNTER RIVER AT JERRY'S PLAINS.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, appointed during the first Session of the present Parliament, under the Public Works Act of 1888, 51 Vic. No. 37, and the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, to whom was referred the duty of considering and reporting upon the expediency of "constructing a bridge over the Hunter River at Jerry's Plains," have, after due inquiry, resolved that it is not expedient the proposed bridge should be constructed, and in accordance with the provision of subsection IV, of clause 13, of the Public Works Act, report their resolution to the Legislative Assembly:—

1. The information regarding the proposed bridge, as it was placed before the Committee, is somewhat meagre and contradictory, but the object in proposing the work was that the structure should replace at Gee's Crossing on the Hunter River, at Jerry's Plains, a low-level bridge washed away by flood from another crossing-place on the river, known as Bowman's Crossing, and also to give the west side of the river access to the Great Northern Railway at Liddell. The bridge, as far as can be ascertained from the papers in the case, was to be an iron continuous girder bridge 560 feet long, with timber deck roadway of 18 feet, the piers to be iron and filled with concrete, and it was to cost £20,000.

Description of  
the proposed  
bridge.

2. At the opening of the inquiry, the Under Secretary for Public Works expressed to the Committee the desire of the Minister for Works that the proposal should be withdrawn, on the ground that it had been ascertained the bridge could be erected for a sum less than £20,000, a circumstance which would make it unnecessary for the work to be inquired into by the Committee. The bridge having, however, been referred to the Committee by the Legislative Assembly, the inquiry was unavoidable, and it proceeded, with the probability, at the commencement, of the proposal being reported against for the reason put forward by the Under Secretary for Public Works. Then came evidence from responsible officers of the Roads and Bridges Department which, while it strongly advocated a cheaper bridge than the one proposed, appeared to raise a doubt whether any bridge at all was required; and the inquiry had no sooner reached this point than representations were made to the Committee by residents of Jerry's Plains, questioning the accuracy of the information upon which the officers of the Works Department had given their evidence, and urging the construction of the bridge as at first proposed. In this position of matters the Committee saw no course to take but to appoint a Sectional Committee to visit the district and take the evidence of local witnesses. This was done, with the result that the Committee have decided to negative the proposal for the construction of a bridge at a cost of £20,000, their decision being based on the evidence of the departmental officers and of local residents that a cheaper bridge could be constructed, and that the cheaper bridge would be adequate for the wants of the district.

The  
Committee's  
inquiry.

3.

Circumstances  
connected  
with the  
proposal.

3. The proposal to erect this bridge was made in the first instance with the object of meeting the requirements of the stock traffic of the district; but since railway communication between Sydney and Newcastle has been established, much of the northern stock traffic has been conducted by railway, and this circumstance led the present Commissioner and Engineer-in-Chief for Roads and Bridges to doubt whether the bridge was required, and to decide that at any rate it was not desirable to erect a bridge of a costly character. When the present Commissioner took charge of the Roads and Bridges Department he found that considerable difference of opinion existed in regard to the bridge. It was not definitely known where it was best the bridge should be put—whether it should be erected at Jerry's Plains, or further up or down the river; and it appeared doubtful whether it should be erected at all. In this uncertainty, the Engineer for Roads and the Engineer for Bridges were sent to the locality, and the former wrote a report, which was to the effect that the stock traffic being very different now from what it had been, the bulk of it going by railway, the proposed bridge was not necessary. Upon this the Commissioner advised that the proposal for the erection of the bridge should be withdrawn, he having come to the conclusion that if any bridge were constructed it should be cheaper than the one proposed, and that in any case further investigation was necessary to determine whether any expenditure at all was justifiable.

Evidence of  
local residents.

4. The local residents say the stock traffic at the present time is much greater than represented in the official report, and is such as to make a bridge necessary; but according to the evidence given before the Sectional Committee the general opinion among those interested is that a structure considerably less expensive than the one submitted to the Committee would be sufficient to meet requirements.

Decision of the  
Committee.

5. From all the circumstances of the case, the Committee have arrived at the conclusion that a cheaper bridge than the one proposed might with advantage be erected. The district is one of importance; the main stock-road from the north and north-west to Richmond and Sydney passes through it; and a bridge over the river at Gee's Crossing, though not absolutely necessary, would be a great convenience. The Sectional Committee, as will be seen from their report, were of opinion that a suitable bridge might be erected for £10,000; but the opinion of the Commissioner is that it would not be advisable to construct a bridge of a kind that would cost less than £15,000. The Committee took the report of the Sectional Committee and the evidence before both the Committee and the Sectional Committee into consideration on Wednesday, 19th March, and again on Tuesday, 1st April; and the following is the record in the Minutes of Proceedings of the resolution adopted:—

On Wednesday, 19th March:—

Dr. Garran moved—

“That in the opinion of the Committee it is not expedient that the proposed Bridge over the Hunter River at Jerry's Plains, at a cost of 20,000, as referred to the Committee by the Legislative Assembly, be carried out.”

Mr. Trickett seconded the motion.

Mr. O'Sullivan moved—

“That the motion be amended by the addition of the words—‘but they recommend the erection of a high-level bridge at Gee's Crossing, in the same locality, at a cost not exceeding £15,000.’”

On the motion of Mr. Garrard, seconded by Mr. Dowel, the further consideration of the motion and the amendment was adjourned.

On Tuesday, 1st April:—

Dr. Garran moved the following amended motion:—

“That, in the opinion of the Committee, it is not expedient that the proposed Bridge over the Hunter River at Jerry's Plains, at a cost of £20,000, as referred to the Committee by the Legislative Assembly, be carried out, inasmuch as the Departmental Officers report that a cheaper bridge could be constructed that would be adequate for the wants of the district.”

The motion was seconded by Mr. O'Sullivan (whose amendment, previously moved, was withdrawn), and passed.

J. P. ABBOTT,

Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Sydney, 15 April, 1890.

# PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## MINUTES OF EVIDENCE.

### BRIDGE OVER THE HUNTER RIVER AT JERRY'S PLAINS.

THURSDAY, 20 FEBRUARY, 1890.

Present:—

The HONORABLE JOHN LACKEY (VICE-CHAIRMAN).

The Hon. ANDREW GARRAN.	JAMES EBENEZER TONKIN, Esq.
The Hon. FREDERICK THOMAS HUMPHREY.	WILLIAM SPRINGTHORPE DOWEL, Esq.
The Hon. WILLIAM JOSEPH TRICKETT.	EDWARD WILLIAM O'SULLIVAN, Esq.
JACOB GARRARD, Esq.	JOHN HURLEY, Esq.
HENRY COPELAND, Esq.	CHARLES ALFRED LEE, Esq.

The Committee proceeded to consider the proposed Bridge over the Hunter River at Jerry's Plains.

Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges, sworn, and examined:—

1. *Vice-Chairman.*] You know the proposal to construct a bridge over the Hunter River at Jerry's Plains? Yes. R. Hickson,  
Esq.
2. You have been examined by the Committee with reference to the proposal to construct a bridge over Tarban Creek? Yes. 20 Feb., 1890.
3. For similar reasons to those which you gave why that bridge should not be constructed you recommend the withdrawal of this proposal? Yes—to some extent similar reasons.
4. Are there any other reasons which you would like to add? This case is not quite on all fours with the other. When I took charge of the Department I found a considerable difference of opinion existed, first as to where this bridge should be put; whether it should be erected at Jerry's Plains or further up or down the river; and secondly, as to whether it should be erected at all, and I did not feel justified in going on with the plans until I obtained some further reports. Accordingly I instructed Colonel Wells and Mr. McDonald to go up and examine the place carefully and submit a report. Colonel Wells submitted a report, which has been laid on the table here, and as I do not know the place myself very well—I have been there, but a great many years ago—I would suggest that Colonel Wells be asked to give evidence. I can say very little, except that, judging from the reports I received, I did not think it was desirable to go on with such a costly bridge.
5. Under these circumstances you wish to withdraw the proposal before the Committee? Yes. Perhaps I ought to say that the circumstances which led to the proposal in the first instance are totally altered now. At that time the Northern Line was not connected with Sydney, and there was a very heavy traffic at this place which warranted the expenditure, but that has nearly all ceased now.

Colonel Frederick Wells, Engineer for Roads, sworn, and examined:—

[The Report made by witness with reference to the proposal to construct a bridge at Jerry's Plains was read by the Secretary.]

6. *Dr. Garran.*] At what places are the two bridges to which you refer in your report that were washed away? One was at Denman, and the other at Bowman's crossing. Col. F. Wells,  
Esq.
7. How much did they cost to construct? I can scarcely tell you now. They were low-level bridges, and not very costly. 20 Feb., 1890.
8. Where do you propose to construct this bridge? At Gee's crossing.
9. That is the nearest point to Jerry's Plains? Yes; the nearest available point.
10. When these two bridges were in existence were they much used for stock purposes? Yes.
11. At that time stock went by the Bulga Road? Yes, and a good many went by Sir Thomas Mitchell's route and crossed at Alford's. They made straight tracks for the Cockfighter Bridge at Warkworth.
12. The whole of that traffic has now ceased? It has very much diminished.
13. It consisted of cattle from the far north, not of cattle in the district? Yes, of cattle from the Company's herds, I imagine, and cattle down the Goulburn and through Merriwa.
14. At that time both these crossings were high roads? Main stock routes.

- Col. F. Wells. 15. The demand for bridges for high road traffic has ceased? Almost, at this locality.
- 20 Feb., 1890. 16. The demand now is for local traffic? Yes, more than for stock. I judge by my local observations of the tracks upon the old travelled stock route, which I have known for years. It used to be travelled considerably; but there was not a hoof-mark on Sir Thomas Mitchell's line, and on the other, by Jerry's Plains, there was scarcely any evidence of cattle traffic.
17. Very little ever goes down the Bulga-road now? There is traffic still; but I do not think that it can be so much as it was, judging from what I saw at Jerry's Plains, and from what I heard when there. I have another paper here, which I wrote after making an inquiry in Sydney with regard to the stock. [*Read by the Secretary*]. I may mention that Alford is the proprietor of the land through which Sir Thomas Mitchell's line goes.
18. Is there a ford at Bowman's crossing? Yes.
19. Passable except in flood? Yes.
20. Are there fords at Gee's crossing and at Denman passable except in flood? Yes. There is also a bridge at Denman—not at the same place, but still available for stock traffic.
21. What is the nearest township for the residents on the north side of the river when they cannot get across? Do you mean at Denman?
22. Yes? They go to Muswellbrook.
23. They have an accessible road in all weathers? Yes.
24. The settlers on the south can go to Jerry's Plains, Warkworth, and Singleton? There are no settlers there. The land is held in large estates.
25. But can the holders on the large estates get a dry road? They would go to Liddel.
26. But can they get to a township? Yes.
27. As things are no one could be cut off from communication? No.
28. Then it is purely for local convenience that they want a bridge to go backwards and forwards? Practically so.
29. They can get backwards and forwards at any time except for the few days during which a flood lasts? They can.
30. The bridge that it is proposed to build will be a low level one? No; it must be a high-level bridge.
31. You would not recommend us to go in for cheap low-level bridges? Decidedly not.
32. You think that our experience on the whole has been against them? Everywhere.
33. The bridge at Richmond has answered? Yes, but it was built under somewhat different circumstances.
34. Does less timber come down there? Less timber would come down the Nepean, and the bridge is a very strong one, with a better holding than could be got here. The bed of the Hunter is very loose.
35. The Richmond bridge is built on rock? No; on good sound hard driving.
36. Do you know what it cost? I forget; but it was something enormous. I believe it cost, from first to last, nearly £20,000.
37. It was constructed at first by private enterprise? Yes.
38. What is the difference in the height between a low-level bridge and one built above the highest flood? It would depend upon the height of the flood. I could not say without seeing the sections.
39. The extra expense would be in the piers? Not alone. A low-level bridge would land between the banks, while a high-level bridge would need approaches and spans, and would be longer in every way.
40. Then you get extra expense on every account in a high-level bridge—more in piers, spans, approaches, and in everything else? Yes.
41. Do you think that at Gee's crossing a high-level bridge could be made for £10,000? I think it could in timber of the olden style. In the way that I used to estimate bridges, when they were under my own design and construction, I think that it could be carried out for less than £10,000; but in the improved style which has been brought in by Mr. McDonald it would cost more than that—it would have a wider roadway, for instance. With such a bridge as I put over the Williams River at Dungog it could be done for the money I state.
42. What would be the life of a timber bridge? I believe a timber bridge could be made to last forty years.
43. What would be the weakest part of the bridge? Its liability to decay, and the attacks of the white ants.
44. Would the part under water be weaker than the rest of the structure? No. In fresh water wood will stand a long time.
45. You do not think that the piles will be weaker than the top work? I do not think so. Our experience is that the piers, if properly cared for, will outlast the superstructure.
46. Do you ever soak the piers in oil? No; they are tarred and left until a new coat is required.
47. Does the tar penetrate into the wood, or does it merely form a skin? It penetrates the wood, and I believe that sometimes, like paint, it is detrimental, because it confines the sap.
48. Supposing a bridge were put up at Gee's crossing, and a toll were charged, would anyone go across the bridge while there was a ford? The tolls on Gee's Bridge would not be worth collecting.
49. There is no possible revenue derivable from a bridge there? No.
50. If the bridge were paid for out of loan money, there would be no revenue from it to pay off the principal and interest? I do not think any revenue could be derived from the bridge.
51. *Mr. Trickett.*] What was the original estimate for this bridge—how did it come to be submitted to the Committee? That I cannot tell. I believe that at one time £6,000 was put down for the bridge. That would have been for the bridge alone, without counting the land or approaches, and would come near to the estimate that I myself since made.
52. Is Jerry's Plains a township? A small township with very few inhabitants.
53. You state that the full cost of the composite bridge would be only £17,000? I am given to understand so by Mr. McDonald.
54. *Vice-Chairman.*] In reference to the matter of wooden bridges, to which the department seem to have given some consideration lately, you have had some experience of the very old bridges constructed in the early days of the colony? I have for thirty years.
55. Can you form any estimate as to how long those bridges have lasted—what is the longest period? I have known some of them which must have been twenty-five years old, and were still good. I know bridges that must be older than that.

56. *Mr. Dowel.*] The bridge over the McDonald River? That at Bendemeer is about thirty years old. Col. F. Wells.
57. *Vice-Chairman.*] You have heard of ironbark lasting for fifty years? I have seen timber under the ground fifty years old, and still sound. I cannot say that the whole of the structure would last that time. 20 Feb., 1890.
58. Is it possible to get as good ironbark now as was obtainable in those days? I think it is as good if it is treated with consideration—though it is not so plentiful now. First-class ironbark may still be obtained near Dubbo and at some places where the timber has not been so much cut, though I do not think it can be got of the same size.
59. There is a considerable quantity of ironbark about the Hunter, and on the ranges between Molong and Parkes;—do you think that that ironbark is as lasting as that which used to be got from the ironstone country on the coast? No.
60. It is not so robust? No, nor are the trees so large. I have seen ironbark at Eugowrn, near Forbes, not fit to put in any structure. I am not altogether an advocate of ironbark. In some places the ironbark is not so good as other timber growing near it.
61. Have you given attention to the merit of any specific for keeping away white ants? We have tried three or four remedies for it. I think the best is that with which your name is associated. We have also tried anti-ant.
62. That has been used throughout the Railway Department? We have used both in our department, but I know of nothing that has proved more effectual than arsenic and tallow.
63. *Mr. Lee.*] Could you enumerate the bridges upon which tolls are levied at the present time? I do not know one.
64. If a bridge were constructed at the site proposed, would it not be open to the public free of charge? Of course I cannot say; that would be a matter for the higher powers.
65. Can you tell me whether such tolls have been abolished by special Act of Parliament? I think it was done by a resolution of the House.
66. Applying to any individual bridge, or to the whole of the bridges? To all Government bridges, and I believe the Government purchased all private bridges—the last being, I think, either the Pymont bridge or the Wagga bridge.
67. At the present moment no tolls are levied on any bridges in the colony? I do not know of any.
68. If an estimate was submitted to this Committee showing the value of the traffic over a proposed bridge, it would be of no practical benefit? I really do not see how that affects the question.
69. If an estimate were given to the Committee showing the probable return from tolls from any proposed bridge, would that estimate be of any value? I do not think so.
70. For the reason that no tolls are collected? Yes.

WEDNESDAY, 12 MARCH, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).

The Hon. JOHN LACKEY.

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee further considered the proposed Bridge over the Hunter River at Jerry's Plains.

Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges, sworn, and further examined:—

71. *Dr. Garran.*] In the design put before the Committee for the bridge at Gee's crossing what was the width of the roadway which was provided? 20 feet clear. R. Hickson, Esq.
72. The evidence of all the practical drovers, given before the Sectional Committee, was to the effect that a roadway 15 feet in the clear would be ample for all their purposes; what would be the reduction in cost if the width were reduced to 15 feet? Very little, as there would be the same piers and the same girders. Only just the cost of the roadway and cross-girders. 12 Mar., 1890.
73. Sufficient to be worth while making? I don't think it would.
74. Could you make a substantial bridge there which would be likely to be safe for the sum of £10,000? I don't think so. There are really two bridges in this place: a bridge over the main river and a bridge over the ana-branch which has to be crossed. The cheapest bridge we can put up there with our own timber would cost £12,000.
75. Is that exclusive of the cost of resuming the road to Gee's crossing? That is the mere cost of the two bridges, with the approach.
76. If you have to make a bridge over the ana-branch it is told to the Committee for the first time. The cost of a bridge over Gee's crossing would be greater than the cost of one over Bowman's crossing? No; there is a little ana-branch to be crossed there.
77. Was there a bridge over the ana-branch when the old bridge was in existence? I do not think so. I have not been there. I think they depended on crossing when the flood was not so high. It was not so deep as at Gee's crossing.
78. The local residents all admitted that they do not want an expensive structure, but they thought that the cheapest possible bridge would come within a price which the Government can easily afford? The cheapest possible bridge I could recommend would cost £15,000 and that does not provide any footway. With the footways it would cost £18,000.
79. *Mr. O'Sullivan.*] What breadth? 20 feet in the clear.
80. *Dr. Garran.*] What percentage off that if you reduce the width to 15 feet? I do not suppose it would make a difference of more than £1,000.
81. It would be only in the planking? Practically the girders would be slightly reduced, but not much.

- R. Hickson,  
Esq.  
12 Mar., 1890.
82. Is your plan for wooden piles throughout or for iron piles? For wooden piles, except in two instances.
83. No iron girders? No.
84. What is the largest span you propose? There are three of 160, and six of 35; and over the little ana-branch one of 90 and five of 35 feet.
85. Three of 160 would be sufficient to let all the drift go through? I think so.
86. We had it in evidence that the reason why the previous bridge washed away was because the piles had no bite in the ground? I could not say. I know nothing of the old bridge.
87. You are perfectly clear that you could not put anything over there that would be safe at a cost of £10,000? No. We could put a bridge over, but I do not think it would be advisable to put one across for less than £15,500 or £16,000.
88. *Mr. O'Sullivan.*] What led your department to believe that there was more stock driven across Bowman's Crossing? That is the evidence we got from the two officers who went up there to inquire.
89. Were they officers of the Stock Department or officers of your own department? Officers of our own department.
90. Are you aware whether the evidence points to the fact that 20,000 head of cattle cross Bowman's Crossing every year? I have seen by the newspapers that that is the case.
91. What is the width of Gee's crossing in flood time? If it is high flood it is about 1,000 feet.
92. Would that be above the highest flood level? That is the highest.
93. How much would the bridge be above that? 18 inches.
94. You think that a lower bridge would be unsafe in flood time? I do.
95. Of course you know that the bridge which was swept away was a low-level bridge? Yes.
96. Have you heard any reports about the scamping of work in connection with that bridge? No. It was made before I took charge of the department.
97. Who was the officer who supervised its erection? I do not know, but I can find out if the Committee wish it.
98. I suppose that a bridge across the ana-branch would be indispensable? Yes, it is quite as necessary as the other one.
99. How far is the ana-branch from the river? It depends on what state of the river you mean; if you mean at low water, I suppose it is about 500 feet from it. At high flood, it is practically a portion of the river.
100. You do not see your way to erect a substantial high-level bridge under a cost of £15,500? No.
101. *Mr. Hurley.*] The erection of a bridge there has been agitated for chiefly on account of travelling stock? Yes.
102. Since the completion of the railway from Newcastle to Sydney has not a very large number of stock travelled by train? There has been an enormous increase. I laid before the Committee the returns from the Muswellbrook station.
103. So, in a great measure, the stock trains have got over the difficulty and inconvenience caused by driving them by Bowman's Crossing to Sydney? I think so.
104. Have you considered the probability of the Railway Commissioners eventually giving facilities in the west, north, and south, for conveying dead meat to market in chilled vans? I have read in the newspapers that such a thing is contemplated; I have not given it any attention.
105. If that were carried out, especially at the various points along the northern line, would it not dispel in a great measure the necessity for a bridge over Bowman's Crossing or Gee's crossing? I presume there would be less cattle travelling along the roads if arrangements were made to carry dead meat by train.
106. By this means meat would be delivered to the consumer in a much better state than it is now, when cattle are driven along the roads? I believe so.
107. Or even when cattle are carried by train? I think so.
108. Do you know if the proposed bridge will tend to serve any large population other than drovers? The reports I have had certainly go to show that it would not.
109. On the northern side of the river they could reach a station 9 miles distant? Yes, at Liddel.
110. Even when the river is high a large number from Jerry's Plains, in order to reach the market in Sydney, would have no need to use the river at all? From Jerry's Plains they have a high-level and a low-level road. They have a high-level road 22 miles long, clear of all floods, to Singleton; and they have also a low-level road, which is subject to floods, and which I think is 16 miles long.
111. As regards the people of Jerry's Plains proper there is actually no necessity to erect a bridge for their accommodation? All the evidence I have had goes to show that.
112. And, practically, this bridge would be constructed solely in the interests of pastoralists or drovers? I think almost entirely.
113. Which may be overcome by the facilities which the Commissioners will offer for conveying their cattle to market in another form? It may be.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

BRIDGE OVER THE HUNTER RIVER AT JERRY'S PLAINS.

REPORT.

THE Sectional Committee appointed to "inspect, take evidence, and report on the proposed bridge over the Hunter River, at Jerry's Plains," beg to report as follows:—

The Committee arrived at Singleton at 1.30 a.m. on Saturday, March 8th, and at 10 o'clock met in the Court-house to take evidence. Six witnesses were examined. In the afternoon the Committee visited the Singleton Bridge, and inspected the roadway, which is largely used for stock traffic as well as for general traffic, and the available breadth of which does not exceed 12 feet. On Monday morning, March 10th, at 7 o'clock, the Committee left Singleton for Muswellbrook, and took evidence in the Court-house from 11 until 1, resuming the sitting in the afternoon from 3 until 5. Eleven witnesses were examined. As regards the proposal originally submitted to the Standing Committee for a bridge to cost £20,000 or upwards, the evidence was almost unanimous that so expensive a structure is not required. But the testimony was equally in favour of a bridge with a roadway of about 15 feet, if a stable structure could be erected at a moderate sum. The local demand for a bridge is not very great, as both on the north and the south side access is obtainable even in flood times to a railway station. The district immediately north of the Hunter, in the neighbourhood of the proposed bridge, is principally devoted to fattening cattle, and it was admitted that though to those occupiers a bridge would be of very great convenience, it was not a matter of extreme urgency, because they seldom start their cattle for market unless they know that the river is passable. But the crossing at Bowman's is on the great highway from the north and the north-west to Richmond and Sydney, and even in competition with the facilities offered by the railway the number of cattle now crossing is estimated at not less than 20,000 a year. This is exclusive of sheep, which would be more sent by this route were it not for the difficulty of the crossing. There is also a moderate traffic in ordinary vehicles and by horsemen. For nine or ten months in the year it is admitted that, in ordinary seasons, the river is fordable with but little delay, but when the flood is up the delay and the inconvenience are greatly complained of. The stock is often sent back through Denman to Muswellbrook, and compelled to make the detour on the metalled road through Singleton to Warkworth. One drover testified that the crossing at Bowman's was the worst between Warrego and Sydney, and several drovers testified that it was the only serious difficulty on the road to Sydney.

Looking at the importance of the district, and the great convenience that a bridge would be, the Committee think that if a high level bridge, likely to be stable, with a 15 feet roadway, could be erected for £10,000, the expenditure would be justifiable.

The Committee made several inquiries as to the relative merits of Bowman's and Gee's crossings. They found the evidence to be in favour of the latter on engineering grounds, while for stock purposes both would serve equally well. But a bridge at Gee's would have the additional advantage of putting the people of Jerry's Plains within 11 miles of the Liddell platform; and that, according to the evidence of one fruit-grower, would facilitate the sending of orchard produce to northern markets.

The selection of Gee's crossing will necessitate some resumption of private land, but even including that the expense could probably be kept within £10,000.

Mr. Hurley disapproves of spending money on the bridge, considering it is not necessary.

ANDREW GARRAN,  
Chairman.

Sydney, 11 March, 1890.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

MINUTES OF EVIDENCE.

BRIDGE OVER THE HUNTER RIVER AT JERRY'S PLAINS.

[TAKEN BEFORE THE SECTIONAL COMMITTEE.]

SATURDAY, 8 MARCH, 1890.

[The Sectional Committee met at the Court-house, Singleton].

Present:—

The HONORABLE ANDREW GARRAN (CHAIRMAN).

The Hon. WILLIAM JOSEPH TRICKETT. | EDWARD WILLIAM O'SULLIVAN, Esq.  
JOHN HURLEY, Esq.

The Sectional Committee proceeded to consider the proposed Bridge over the Hunter River, at Jerry's Plains.

John Brown, Esq., sworn, and examined:—

1. *Mr. Trickett.*] Where do you reside? At Jerry's Plains.
2. How long have you resided there? About thirty years, but I was in Singleton during five years during that time.
3. You represented the district of Patrick's Plains once in Parliament? Yes.
4. Do you know the site the Government has suggested for erecting a bridge over the river at Jerry's Plains? Three sites were surveyed, but I do not know the one which was suggested by the surveyors.
5. Do you know Gee's crossing? Yes.
6. Do you think that is a good position for a bridge? It would not be a bad position, but it would have to go through private property. On this side of the river you would have to go through a portion of Mr. Parnell's lands. You would have to go about 3 miles through Pearse's land, and about half a mile through Parnell's.
7. That would be  $3\frac{1}{2}$  miles which would have to be rented or purchased? Yes, before the top of Bowman's Hill is reached.
8. Would either of the other routes avoid the necessity of going through private property? Yes.
9. Which one? Bowman's crossing, on the main Northern road, passing through Jerry's Plains.
10. How far is that from Gee's crossing? Nearly 3 miles. There is another site at what they term "The Rocks."
11. How would that convenience the public generally? That would go over Government land mostly.
12. The crossing known as Bowman's is the one which could be used without any new roads being arranged for? Yes; we should not require any compensation for a new road there.
13. Is the road fenced? Yes, on both sides.
14. Would it be easier to erect a bridge at Bowman's crossing, or at Gee's crossing? I am not an engineer, but I do not think it would be so expensive to erect a bridge at Gee's crossing as it would at Bowman's crossing, but perhaps the difference would be made up in compensation which would have to be paid.
15. What is the width from bank to bank at Gee's crossing? About 70 yards.
16. How about Bowman's? It is not quite so wide there, but there is a gravel beach extending out from the river.
17. Upon which the foundation of the bridge could be erected? Of course, the foundation could be put in there.
18. You state that if a bridge is erected at Gee's crossing we should have to go through private property and compensation will have to be paid? Yes.
19. Do you think, taking all the circumstances into account, that the expense of erecting the two bridges would be about equal? Yes.
20. Would Bowman's crossing be as good a place as Gee's crossing? I think it would for travelling stock, but not for all purposes. The only advantage Gee's crossing would have would be that people would use it to go to Camberwell Railway station and Muswellbrook.
21. Are the people of Jerry's Plains unanimous as to where the bridge should be? They are all unanimous that a bridge should be erected. I do not think they care, so long as they get a bridge, whether it is at Gee's crossing at Bowman's, or at the Rocks. Perhaps the majority of people in the township might like it at Gee's crossing.
22. Do you know of any actual objections to the bridge being erected at Gee's crossing? I do not think anyone would object.

J. Brown,  
Esq.  
8 Mar., 1890.

- J. Brown,  
Esq.  
8 Mar., 1890.
23. Does not Mr. Pearse object? He might object, but I do not know. I know he would expect compensation, but what amount I cannot say.
24. Do you not know he objects, because it would have the effect of cutting off his property? Yes.
25. How are the people inconvenienced through the want of a bridge? Very badly. This is on the main cattle road, and people, for hundreds of miles out into Queensland, send their cattle down this road.
26. What course would the cattle which would use the bridge, if it were erected, take? Some come through Liverpool Plains, and others by different routes. There are three or four different routes.
27. *Chairman.*] Is it a stock route? Yes. The cattle can come down the main road to Muswellbrook, and they can go to Bowman's crossing and swim there.
28. *Mr. Trickett.*] I suppose a great quantity of stock for market concentrate at Bowman's Crossing? Since the river came up the horned cattle have averaged from 150 to 200 a mob. There have been two or three lots a week or more; sometimes four lots go past in a day.
29. And they all come to Bowman's crossing? Yes; for the purpose of getting to market. There is a boat there, but I am certain you would not attempt to go into it at the present time. It is dangerous. The cracks are stuffed up with bits of rag.
30. Do the cattle cross Jerry's Plains? Those coming from Denman do. To avoid Bowman's crossing others would have to go over the Goulburn, through Hungerford, and Mr. White's land, on sufferance.
31. How does the traffic in cattle and stock generally compare now with the traffic before the railway was opened? Last year there must have been an average of from 400 to 500 cattle a week passing.
32. Did many more than that pass before the railway was opened? There were more cattle in the northern district at that time.
33. Do I understand you to say that it is not the construction of the railway which has lessened the number of cattle travelling by road, but the falling off in the cattle themselves? Yes; but you must remember that when the river is fordable a large number of sheep cross, but it is impossible for them to do so now. The river has been up for six or seven months. Mr. Richards sends all his sheep by road if the weather will permit, because it is cheaper to do so, in the first instance, and in the second instance, the meat arrives at its destination in a far better condition than it would if sent by train. Butchers will give 5s. a head more for cattle sent by road as against cattle sent by train.
34. That is all very well in good seasons, when there is feed along the road;—what is done when there is no feed? When there is no feed they might make use of the railways if there was a rise in the market.
35. You are in the habit of observing the stock traffic along the road every day? Yes.
36. And have done for a number of years? Yes.
37. What do you think of an opinion of this kind. The question asked the witness examined was as follows:—"The demand now is for local traffic?" The answer was: "Yes, more than for stock. I judge by my local observations upon the tracks upon the old travelling stock route, which I have known for many years." What is your idea as to that opinion as to the traffic;—is it in accordance with your own observation? No, it is not. In the driest times stock has come by road.
38. And the route is constantly used? Yes. I do not believe there was a single week during the drought but what cattle and horses came by road.
39. Do you know the Bulga Road? Yes.
40. Does that converge into this crossing? Yes, that is the reason the cattle come that road. All the cattle going to Maitland come that road, too.
41. Do you think the traffic along that road for cattle and stock is as great as it used to be? Perhaps not, for there is not the same amount of cattle now, but it is always used.
42. Is there a bridge at Denman still? Yes.
43. Does not that bridge suit the Jerry's Plains people? No, only so far as the cattle coming to Bowman's crossing, and going no further.
44. What is the population of Jerry's Plains? It is a small township; I could not say what the population is, but within 5 miles round there will be about fifty houses, and I think the families will average from four to six.
45. Are there any selectors or small holders? Yes.
46. Is it not mostly held by people with large estates? No; there are a good many small holders.
47. Could you tell us the names of the holders of the large estates within that radius of 5 miles? I am nearly the largest landowner there. I have about 1,800 acres on this side of the river, and I think Bowman has about five sections.
48. These are the largest? Yes; the rest would not average much over 500 to 600 acres.
49. I suppose the real advantage of constructing this bridge would be to give an easier and a shorter approach to the railway line than at present exists? Yes; that would be the real advantage to the local people, but it would also be an advantage to stock-owners and graziers. Nearly every stock-owner in the northern district sends cattle, at times, by that road.
50. Have you known of any large number of cattle or stock being stuck up at the river? Yes; several have had to stop on the reserve for three or four days. The other day a man had to ask Mr. Miller to allow his cattle to stay in his paddock. In swimming them across next morning he lost one bullock.
51. Do you think stock-owners would pay a toll if a bridge were erected? I believe so; I would do so myself rather than swim them.
52. That means, I suppose, that they would only use the bridge when they could not use the river? If a bridge is built, people cannot evade toll. At Wiseman's Ferry you have to pay, even though you may have to swim your stock.
53. Looking at the matter in all its aspects, apart from the mere local aspect of the question, you think the bridge is an absolute necessity to enable you to get stock to market? Yes.
54. *Chairman.*] So far as cattle coming from the north are concerned, they can, if they like, make for Singleton or Denman? They make for Denman first, and then go through Jerry's Plains.
55. They cross the Goulburn River? No; 8 or 9 miles on the other side of Denman they turn off, and they have to go through Hungerford's land; there is not any road that way, only on sufferance.
56. If you were bringing a mob from Queensland and the river was up here, you could strike for Denman or Singleton? You would have to go over at Denman and then go to Singleton.
57. And from Singleton you can get to the Bulga Road? Yes.
58. So that the want of a bridge here does not prevent cattle from Queensland from crossing the river? No.
- 59.

J. Brown,  
Esq.  
8 Mar., 1890.

59. If you were coming down with cattle, at what point would you go off the road to strike Singleton, if you heard the river was up? I would be compelled to go to the bridge if I did not wish to swim them.
60. Where would you leave the main road? At Denman, and go back 14 miles to Muswellbrook.
61. But if you were coming from Queensland? The chief of the cattle go to Denman before going to Muswellbrook to be sold. If fat cattle are coming from Queensland they go to Denman and on to Jerry's Plains and swim. Otherwise they have to go 14 miles back to Muswellbrook; there are no reserves upon the Muswellbrook line for stock, until after they cross the river from Singleton.
62. Then the fat cattle route from the far north is through Denman? Yes, through Jerry's Plains also.
63. There is a bridge at Denman? Yes.
64. Then fat cattle have no inducement to come through Bowman's? Yes, they have. That is the shortest road. If they do not wish to swim the cattle they follow up the road to Muswellbrook; then they come back 14 miles. It is 14 miles from Denman to Jerry's Plains, and 14 to the Bulga.
65. But instead of aiming for Denman could not they make tracks to Singleton? Not without going back to Muswellbrook.
66. I mean when they are north of Muswellbrook altogether? There is a road called Sandy Creek which they can turn off upon. There is a road that way to Muswellbrook.
67. If you were bringing cattle down yourself to the Sydney market, and you heard the river was up, and you could not cross at Jerry's Plains or Bowman's crossing, which road would you take? I should prefer to wait on the reserves.
68. What kind of cattle cross here most, locally fattened or cattle from the north? Cattle from the north chiefly, but of course there is a great number of local cattle. All coming from the north prefer swimming to travelling on the metalled road down to Singleton.
69. And that is the reason they prefer Bowman's crossing? Yes.
70. But if that becomes an important road it is likely to be metalled, too? I don't know.
71. Is it because there is no bridge that the road is not metalled? I don't know.
72. If you get a bridge, it is very likely to become a good road? Well, we shall still have the reserves for our stock. We must have grass.
73. This line is a stock line for that reason? Yes, there are several reserves for stock.
74. The bridge is as much wanted for through stock as local stock? Yes, more so. The local people could keep their cattle back a day or two in the paddocks, but travelling stock can only stop a certain time on the reserves.
75. How long does it take for the river to go down? If it were up at the bank to-day, and were going down, you could swim the cattle to-morrow.
76. If there is no more rain now, the river will be crossed at the usual places in three days? Not without swimming at Jerry's Plains. It is over a week since the river was at its full height.
77. In a season like this, when the river is not fordable, would you get stuck up between here and the Bulga Road? No, there is a bridge at Warkworth, and another at Bulga.
78. This is the one difficulty, then? That is the only one.
79. Between the north and Sydney? Yes. If they think proper they can join the Wollombi, and cross at the ferry, where they can swim the cattle.
80. One bridge between Singleton and Denman would be sufficient for the whole of this district? Yes.
81. At any one point? Yes.
82. How many times within the last ten years, and for how many days a year, has this place been impassable? I could not say. We have had a good many dry seasons, but during the last six months I do not think it has been fordable for a man on horseback above a week or ten days at a time. A vehicle could not well cross it.
83. Do you think, if a bridge were made, it would take any quantity of stock from the railway traffic, and induce travelling by road? If a bridge were made, I believe the traffic, more especially for sheep, would return to the road.
84. And the building of a bridge would be rather against the interests of a railway? Yes; but you must consider the interests of the public. I know there would be a great number of sheep come along that road if the river were fordable, for this reason: A drover would drive 2,000 sheep from Breeza to Sydney for £50. From Jerry's Plains he would drive 2,000 sheep for £20. If you look at the railway charges you will find that after the drover is paid the owner would save about £75.
85. You are within easy reach of the railway, and would send by road? I have never yet sent a beast by rail.
86. The railway is only useful to you as a passenger and for goods? That is all.
87. During the last six months the river has been up a good deal? Yes, nearly every week.
88. And it has practically diverted all sheep traffic? Yes; only two lots have been able to go, and some of them were drowned in swimming.
89. The cattle business has been reduced about one half? I could not say, but there is not the same amount of cattle.
90. I mean of through cattle coming from the north? I do not think it has been reduced one half; but it has been reduced to some extent. On the average there would be 500 cattle a week travelling that road. If a bridge were up, I believe there would be something like 4,000 sheep. There is seldom less than 200 in a lot, and the average would be over two lots a week.
91. Do you think the convenience afforded would be such as to justify the expenditure upon this bridge? I think so.
92. Upon a high-level bridge? Yes. It will have to be substantial, and not liable to be swept away.
93. You think it would be a proper investment of public money to put £20,000 in an iron bridge? I believe so. There will be a greater demand for meat and other things every year as the population increases.
94. But the population of this district will not increase very much? I do not think it is decreasing. There is no doubt, if there was a bridge here, more people would settle down. I do not look on it as a local requirement, but as one for the whole of the people throughout the whole of the northern part of the colony.
95. You look at it as a high road? Yes.
96. *Mr. Hurley.*] You put this bridge down as a sort of squatters' bridge? I put it down as a bridge for the use of the public in general.

- J. Brown,  
Esq.  
8, Mar., 1890.
97. What class would benefit by the construction of a bridge at either of the three points named? The whole of the people travelling in the northern district.
98. Would any agricultural population benefit by it? I think so, in the course of time.
99. Would general merchandise be taken over? I think so. I think it would be used by the public in general.
100. You referred to the value of meat brought by road to market compared with the cattle that are trucked? Have you ever taken into consideration the probability of cattle being slaughtered inland and taken to market by refrigerating cars? There has been some talk about it, but I do not think it will ever pay.
101. Supposing facilities were given by the Railway Commissioners for taking meat to market in a chilled condition, would it not be more beneficial to the consumer and producer to send it by rail? I cannot say, for I do not know what they would charge per truck.
102. But I mean if the charges are favourable? In that case they might prefer to send by rail, but if they could get it cheaper by driving they would drive.
103. Would it not be better to the consumer that cattle should be killed inland and brought to market in the way suggested? It might, if the market could be regulated.
104. Are you aware they can take cattle and sheep from here to England with perfect safety and sell it? I think they take sheep, but not many cattle.
105. You admit it will be more advantageous to the consumer in the metropolitan market to have his meat conveyed to him through the chilled process, than by driving? I daresay it would.
106. Therefore, if refrigerating cars are used, there will be no great necessity for the construction of a bridge at either of the points named? I think there would. All the people in the locality would require the bridge.
107. What is the population of the district? There will be between 400 and 500 people.
108. The holdings are of a large character? No; they are small, with the exception of about four.
109. Is the land suited for anything else but pastoral purposes? You cannot have better agricultural land in the colony.
110. You only require population to make the place reproductive? That is all.
111. You said something about the bridge paying for itself, how do you make that out? I said the people would be satisfied to pay a toll. If the bridge were a wooden one, and did not cost much money, a toll might pay the interest on the cost of construction.
112. You are aware that the life of a wooden bridge would be only about twenty-five years, whilst an iron bridge would probably last four times that length of time? Yes.
113. You are aware that tolls, generally, are abolished, and that people have an aversion to paying them? Yes.
114. This bridge would only be used for travelling stock? Lots of people going up north travel on horseback. They do not all go by train. It is the high road to the north-west and the north. It is the travelling-stock road, and the road for everything else besides, right up to Cassillis and out north. At the present time there are no teams coming round Jerry's Plains for want of a bridge, but years ago I have seen twenty or thirty teams come round.
115. How many times was the river impassable last year? I could not rightly say. I suppose it must have been impassable three months out of the year for people not on horseback. People come over at the risk of their lives. If we had seasons in the future like that we had last year, there would only be three months in the year in which the river would be passable.
116. And you would only have the bridge used three months out of the twelve? It is a hard matter to get sheep to go through water; therefore sheep would always use the bridge at any time.
117. You have, in reality, not paid any attention to the question of cattle and sheep being brought to market in a chilled condition? I cannot say I have.
118. If that system were carried out and facilities for conveyance were given by the Railway Commissioners, the meat would be sent to market by rail? I expect so.
119. In the event of that system being carried out, a bridge would practically not be used by sheep? I do not expect the whole of the sheep in the northern district would be chilled. There would have to be more chilling places than one to do so.
120. Have the people of the northern district been looking for this bridge? When I was in the House, £10,000 was placed on the estimates for a bridge at Bowman's crossing, and one at Denman's. The Denman people got a bridge, and the Jerry's Plains people did not.
121. Do you not know that in those days members asked for most outrageous things on the slightest provocation? I do not think, during the time I was in the House, I asked for anything outrageous. I asked for what I considered was a public benefit.
122. And not to please your constituents? No.
123. *Mr. O'Sullivan.*] Do the people send a large number of cattle from this district down to Mr. Richards, at Riverstone? Yes.
124. I suppose he is likely to continue his works there? Yes.
125. And, probably, he will add the chilling process to his works? I cannot say.
126. Then the road is likely to be required to send cattle to Riverstone? I think so.
127. You seem to advocate the construction of a bridge at Bowman's crossing? I have no particular spot to advocate.
128. Are you aware that Bowman is opposed to this bridge being constructed there? No; I had no conversation about it. I do not think he is against the bridge at what is termed Bowman's crossing. Perhaps he is against the bridge at the Rocks, or at Gee's.
129. Why is Mr. Parnell opposed to the bridge at his crossing? I cannot tell you unless he considers the roads through his property would do an injury.
130. Do you think the people generally who use that road would prefer to have a bridge at Gee's crossing? No doubt the local people might.
131. The local people do not appear to be the most interested in this proposal? No. The public in general are in favour of a bridge being erected; but they do not care where, so long as they get one.
132. Can you state the number of cattle which went down the road last year? From 400 to 500 horned cattle a week, and a number of horses as well.

133. And all these crossed without a bridge? Yes, by swimming, and running the risk of being drowned.
134. Did they go down to Wiseman's Ferry? Yes; they take that road after leaving Jerry's Plains.
135. They would have to swim these, then? Yes; there is a punt there, but they prefer swimming. They have conveniences there; but here we have only a little boat, and the current is four times stronger here than there.
136. Do you think a good punt here might suit you? Yes; it might suit at Bowman's crossing for the sheep, if they are taken care of, and perhaps for the carts and people on horseback.
137. In view of this chilling process becoming general, and special cars being constructed, there is a prospect that these travelling routes will not be required, excepting at places like Mr. Richards', at Riverstone? I think the Government will do an injustice if they ever shut the reserves or roads up, for we do not know whether the experiment will pay or not.
138. If the chilling process is successful and the necessity of travelling stock to Sydney is dispensed with, the chief argument in favour of a bridge would be removed—In view of the chilling process being successful, would it not be better to have a good punt and boat at Bowman's crossing for the present? A bridge would be far better, but a punt might suit local requirements.
139. Is there sufficient justification, from the point of view of local requirement, for the construction of this bridge? I think there should be. There are bridges at other places which do not so much require them as this.
140. But this bridge is to cost over £20,000—Is there strong enough argument in favour of the construction of a bridge to cost as much as that, for local purposes, when possibly a punt or wooden bridge would be sufficient? We want some way of getting over the river in time of flood, either by punt, a good substantial bridge, or otherwise.
141. What do you think it would cost to construct a fairly good wooden bridge? I am no judge of these matters, but I think £6,000 or £7,000 ought to make one.
142. In view of the probability of the chief argument in favour of the construction of this bridge being removed in the course of a year or two, do you think a bridge costing £6,000 or £7,000 or a good punt would serve the requirements of the district? I daresay it would serve them, but not, perhaps, as well as a bridge.
143. Have you ever been to Wilcannia? No.
144. You know how sheep are crossed over some of those wide rivers out there? No.
145. You know there is a strong fall down the Darling River? There is more fall in the Hunter than any other river. If the river is more than half bank high here, you cannot take a punt across. You cannot take a punt across if the river is anything more than 8 feet high.
146. You know that enormous flocks of sheep and herds of cattle, 2,000 in number, cross at Wilcannia? Yes, but I do not think there is such a strong current there.
147. They cross the sheep there with a pontoon, with rails stretching across the river, and it seems to serve as well. You think the current of the Hunter would be too strong to allow of that being worked here? Yes.

J. Brown,  
Esq.  
8 Mar., 1890.

Edward Parnell, Esq., sworn, and examined:—

148. *Chairman.*] Are you a resident on the Hunter River? I was for a number of years, but I am living in Newcastle now.
149. But you retain your interest in property there? Yes.
150. You know the traffic of the locality well? I do.
151. During the time you were resident there, was there a bridge? Yes, for a short period.
152. Where? Bowman's crossing.
153. And that was swept away by flood? Yes.
154. Was that a low-level timber bridge? Yes.
155. What height above the bed of the river was it? I think about 10 or 12 feet.
156. It was available for all freshes which did not raise the water more than 12 feet? Yes.
157. But in heavier floods it was closed? Yes; the debris collected and lifted the bridge away.
158. Would you again recommend the erection of a low-level bridge? No; it is a waste of money.
159. When that bridge was in existence was it a great convenience? Yes.
160. And has its absence been much felt? Yes.
161. What has been the effect of the destruction of the bridge on the cattle traffic? It has caused it to deviate.
162. Where to? To the railway.
163. You think it has thrown traffic on to the railway? Yes.
164. And the reconstruction of that bridge would take traffic a little [from the railway? It would. At the same time it would confer great public benefit.
165. Do you think one bridge between Singleton and Denman would be sufficient for the whole of the district? Yes, it would for cattle and sheep, but for people wanting to come to Singleton, a bridge is necessary at Wiseman's crossing-place, a place called Maison Dieu. Otherwise one bridge would be sufficient.
166. You think there should be a bridge at Maison Dieu, as well as at Jerry's Plains? Yes.
167. That is the shortest track to Singleton? Yes.
168. When the river is down they take the ford there? Yes.
169. It is only in flood-time they go round by water? Yes, it is 16 miles from the post office, Jerry's Plains to Singleton, and to go round in flood it is 25.
170. Has there been any attempt to have a punt on the Hunter River? Yes.
171. Where at? Bowman's crossing.
172. How did it work? Badly, and dangerously.
173. In what way? In the first place, the current was so strong I have seen drovers refuse to go over, although there was real necessity for so doing.
174. At what height of water? About the usual level.
175. When it is 10 feet high it begins to be useless for a punt? Yes, and it is useless when it is very low. When it is very high the stream is too strong for a punt to work, and when it is too low a punt will not move, and sheep are very difficult to get over in winter time. I have been stopped when it has been only a foot deep.

E. Parnell,  
Esq.  
8 Mar., 1890.

- E. Parnell,  
Esq.  
8 Mar., 1890.
176. If the crossing were near Gee's crossing, it would enable people south of the Hunter to get at one of the railway stations? Yes.
177. Which would they go for? Liddell or Camberwell.
178. Is there a good cross-road? No; one would have to be made.
179. And the idea of making a bridge for that purpose would necessitate a new road from Jerry's Plains to the railway? Yes.
180. Is such a road wanted for the traffic of the district? Individually, I do not want the road, but I think the people at Jerry's Plains would benefit by it.
181. It would have to go through your property? Yes.
182. And you would rather not have it there? Yes.
183. Would you prefer the bridge to be at Bowman's? Yes, I wish it to be understood I was opposed to the erection of a bridge at Gee's crossing-place, believing Bowman's was the best, but when I understood that the site at Bowman's was objectionable I withdrew my opposition, and I say now that if a bridge at Gee's is beneficial to the public, I do not think I have a right to stand in the way. It would do me a considerable amount of harm, because it would go through my cultivated property, and it would also do Mr. Pearse harm.
184. But still you admit the banks are better at Gee's crossing? I am not an engineer.
185. And it would also be a short cut for the Jerry's Plains people to the railway? It would.
186. Do you think the traffic crossing here is important enough to justify this large expenditure? I am inclined to think so. I think the traffic would grow.
187. During nine months of the year you can get stock across without trouble? No, not sheep.
188. Are there many sheep come down this way? I have been at Newcastle a good deal this last three years, but I go up country occasionally, and I think there would have been more come down if they could have crossed.
189. Do you think sheep suffer as much from being carried by rail as cattle? I do not think they do. I think the wool prevents them from being bruised.
190. Sheep do not travel so much on foot to Sydney now, since the railways were opened? I think that if the railway only took 100 there would be 100 less travelling by road. I do not think it has made any perceptible diminution in the number going to Sydney.
191. Do you think this bridge is mostly wanted for the locally fattened stock, or for stock coming from the north? For stock coming from the north.
192. You advocate the construction of the bridge more as a national than a local work. Yes.
193. And you think it is really wanted? Yes.
194. And although it would be a decided advantage to the local people, it would be a greater advantage to the through stock people? Yes, it would be scarcely any advantage to myself.
195. That is because your land would be cut up? Yes.
196. But to you, as a person sending stock to market, it would be a convenience? Yes.
197. It will lead to a great deal more communication between the north and south bank? Yes.
198. In wet weather like this people do not travel stock unless obliged? If there is a good market they will travel at any time.
199. What I want to know is whether the stoppage of traffic for three or four days materially affects business? I think so, because there is no place to feed sheep upon, unless they trespass.
200. There are reserves? Yes, a little distance back.
201. In wet weather like this the reserves have plenty of grass upon them? Yes.
202. So that when it is too wet to cross the river, there is always food to be had? Yes.
203. If you are stuck up you have something to eat? Yes, unless the river comes down suddenly, which is unusual.
204. For how many days at a time have you known the river to be impassable? Two or three days for cattle, and at least a week for sheep.
205. *Mr. Trickett.*] If a bridge is built at Bowman's crossing will it be absolutely necessary to erect another at Maison Dieu? Not absolutely necessary, because a bridge at Maison Dieu would only be for the benefit of the people at Jerry's Plains.
206. If a bridge were erected at Gee's crossing, would it be absolutely necessary to have one at Maison Dieu? No, because I think the people would then go up to Liddell railway station, if a road were made, or to Camberwell.
207. Do you think that if a wooden bridge could be built for £6,000 or £7,000 it would be a desirable work to carry out? No, because I have heard it said that an iron bridge would last four times as long as a wooden one.
208. Have you known of frequent stoppages of traffic up the river? Yes. I know of one person who suffered whilst endeavouring to cross. He suffered from hernia, which became strangulated, and he died in consequence of an operation. I know of one person who, six or seven years ago, was killed or drowned there, and it would not have happened if there had been a bridge. The other day, at Jerry's Plains, a man told me he had been nearly washed off his horse in endeavouring to cross.
209. Where do the people of Jerry's Plains make for,—Singleton or Muswellbrook? Singleton as a rule, but occasionally they go to Muswellbrook. If they go to buy cattle at the sale yards they go to Muswellbrook, and then the bridge will be a great convenience.
210. Do you regard the district as one for settlers? I do not know a better district in the colony for settlers, if produce was selling at a paying price.
211. Is there a large area of land open for settlement? No; it is an old settlement.
212. Since the old bridge was washed away, there has been serious inconvenience? Yes; I have experienced inconvenience myself.
213. Do you know Krust's lane? Yes.
214. Did you ever hear of Mr. Lawrence recommending the construction of a high-level bridge at that place? Yes.
215. Would that meet a public convenience? It would.
216. If a bridge were constructed there would the people use Liddell station? Yes.
217. Can you give us an idea of the distance from there to Liddell? About 9 miles as the crow flies. It would pass through a large quantity of cultivated land, even by that road.

218. You know the bridge at Denman? Yes; it was at Denman that the unfortunate case of the man suffering from hernia arose.
219. You do not think that that district is likely to give occupation to an agricultural class, unless they have more easy access to market for produce? Yes; until we have a railway, which was promised by the Government. I believe the last Government promised a survey. A deputation, of which I was a member, was promised by Mr. Sutherland that there should be a survey, and we have heard nothing about it.
220. Promises of surveys for railways were made in a very indiscriminate fashion some years ago? I did not value it much.
221. There is not a sufficient population to justify an expenditure of that kind? It would be a great feeder for the Singleton line.
222. From what you say there seems to be no probability in the immediate future of an increase in the agricultural population of the district? I do not think so.
223. So that, practically, this bridge you are asking for will be for the benefit of the pastoral class? Yes; but if the bridge were erected at Gee's I have no doubt that produce would go to Liddell, and it would grow in consequence.
224. *Mr. O'Sullivan.*] Are most of the lands about here private holdings? Yes.
225. You are in the Eastern Division, are you not? I think so.
226. Are there any leasehold areas to be thrown open? None, that I am aware of.
227. Do none of the pastoralists about here own leasehold areas? I think none. It was all taken up at once.
228. Then there does not seem to be much scope for an agricultural population? No; unless the present proprietors chose to let their land.
229. What is the land in this district most suited for? At Jerry's Plains' the other day, I saw the finest corn and onions and other products I have ever seen. It is not only good for agriculture, but for fattening. Three years ago I had some heifers taken to Maitland sale-yard, and Mr. Brunker, a good authority, said they would have done as exhibits in England. I had as many as 40 bushels to the acre of wheat. The wheat was exhibited in Collins-street, Melbourne, but it does not pay to cultivate it. I think it costs 6d. a bushel to bring it to the Singleton market alone. Nature intended this district, I believe, for an agricultural and grazing one.
230. You think, then, there is scope in this district for agriculturists? If they could get a better price for their grain. People will not grow grain at 3s. per bushel when they can get £5 and £6 for bullocks.
231. *Mr. Hurley.*] You have heard the examination of previous witnesses in regard to the probability of chilled meat being conveyed to the markets? Yes.
232. You recognise the fact that beef or mutton taken to market in this state is more acceptable to the consumer than if driven or conveyed by train? Yes.
233. If the system were carried out successfully, could you not reach market at the same cost? Yes.
234. Would not the necessity for this bridge be then done away with in a great measure? If all the sheep and cattle were killed and frozen up country and sent to market, it would do away with the necessity of it a great deal. But I agree with Mr. Brown when he says he does not think the experiment will pay. I am told, what with the room which will be occupied by ice, &c., the sheep will take up more room than they do at present. Consequently, the railway would have to charge more.
235. It is all a matter of cost? Yes.
236. The difficulty of reaching market and the high rate of charges by railway—Are these the reasons why there is not an agricultural population on the soil? Yes. If they opened the road to Liddell the difficulty would not be so great—25 miles to bring a bushel of wheat from Jerry's Plains, and 17 miles when the river is low.
237. The construction of a first-class road to Liddell would probably lead to a larger population? Yes.
238. And it would be remunerative to the Department? Yes. I may mention that there are a number of young men who supplement what they get from small farming by droving, and I think if the bridge were not erected, these persons would lose their occupation. The result would be that they would become discontented and would probably join the ranks of the unemployed in Sydney.
239. What will become of your cattle if, because the bridge is not constructed, these men leave the district? The people will have to look after them themselves.
240. You will be forced into the position of sending them by rail? Yes. Of course, the railroad is a most important interest, but I do not think it should be carried on at the expense of all other interests.

Mr. Benjamin Harley, storekeeper, sworn, and examined:—

241. *Mr. Hurley.*] What are you? A storekeeper.
242. Where do you reside? At Jerry's Plains.
243. Have you lived there long? Close on twenty-five years.
244. You know the district well? Yes.
245. You know the subject-matter before the Committee? Yes.
246. You have heard of this crossing? Yes.
247. Which do you think would be most favourable for the construction of a bridge? Gee's.
248. Why? Because it is nearer to Liddell and nearer to Muswellbrook, and travelling stock could come that way, by a road being made through Mr. Pearse's.
249. Do you look on the construction of the bridge as being chiefly in the interests of the pastoral class? No; it would be for the benefit of the public at Jerry's Plains.
250. Would not general merchandise be taken along the road? Probably grain and corn would.
251. How do you get your other goods? I have to go round to Singleton, whereas I could go to Liddell if the bridge were constructed.
252. Are there any other storekeepers in the district save yourself? Only one at present.
253. What population do you generally serve? Almost all who are in Jerry's Plains. They number something like 400 or 500.
254. What do you pay for the freight of your store goods? £1 per ton.
255. And if you could reach Liddell it would be 50 per cent. less? Yes.
256. Is there any probability of a settled agricultural population raising itself there? Yes; there is a lot of Crown land, called the temporary common, available.

E. Parnell,  
Esq.

8 Mar., 1890.

Mr.  
B. Harley.

8 Mar., 1890.

- Mr. B. Harley.  
8 Mar., 1890.
257. Are there any reserves? Yes, at this end of the town.  
 258. A large area? Yes.  
 259. Suitable for agriculture? Not the reserves, but the temporary common is suitable.  
 260. Do the people of the district follow any other vocation than that of droving? Yes; there are a few farmers, and at Doyle's Creek there is a lot of them.  
 261. Where do they send their produce? To Singleton.  
 262. Is it of a productive character to them? Yes, they make a living by it. I was farming there myself for seventeen years.  
 263. What is the produce? Principally wheat.  
 264. Looking beyond the fact that the bridge is asked for chiefly on behalf of the pastoralists, you believe it would be of great advantage to the general public otherwise? Yes.  
 265. Which crossing do you think is the best? Gee's. It has the best banks, and is the best site I know of.  
 266. Have you noticed how many times the river was impassable last year? Of late it has been impassable a good deal. Within the last year I have come three times to Singleton across Maison Dieu, and I have had to travel 26 miles additional by Warkworth.  
 267. You think the bridge is absolutely necessary in the interests of the general public? Yes.  
 268. Is the road good or bad? Very bad in places.  
 269. Are the roads generally ill-attended to? Very badly, especially from Bulga to Jerry's Plains.  
 270. Mr. O'Sullivan.] If a bridge were constructed at Gee's crossing, and a road were made to Liddell, the railway traffic between Singleton and Liddell would develop? Yes, there is no doubt about that.  
 271. Would it be better for the people of Jerry's Plains to be served that way or by way of Maison Dieu? Better by Liddell, I think.  
 272. Is that a reason why you advocate a crossing at Gee's? Yes, and it would convenience the public travelling up country.  
 273. If the river is up you have to go away from Singleton 26 miles to go up country. How many people would be served locally by the construction of the bridge at Gee's crossing? The whole of the public, I think.  
 274. What about their number? Somewhere about 500.  
 275. A bridge constructed at Bowman's crossing, then, would serve you as well for the purpose of reaching the railway as one across Gee's? No; in fact there is no site at all at Bowman's for a bridge.  
 276. But a bridge at Bowman's would better serve the travelling stock? Perhaps it would.  
 277. Is Bowman's crossing on the through stock route? Yes.  
 278. You mention that there would be some Crown land—partly of the temporary common—open for selection. Where is that? Close on Jerry's Plains, in the Muswellbrook district.  
 279. How many acres do you think are available for settlement on the temporary common? About 4,000 acres.  
 280. Is not this temporary common required by the public? No.  
 281. You think they have commonage enough in the permanent one? Yes; we had a meeting the other night, and decided to try and get it thrown open.  
 282. Who uses the temporary common at present? The inhabitants of Jerry's Plains.  
 283. Is it not leased to one man? No.  
 284. You spoke of some reserves; are they not required for public purposes? Some of them.  
 285. What are they? Travelling stock and timber reserves, and church and school reserves.  
 286. Have these timber reserves any timber upon them? Yes, some of them.  
 287. Are they leased for any particular purpose? I could not say.  
 288. Do you think these timber and water reserves are useful for travelling stock? Not all of them.  
 289. You think some might be thrown open for selection? Yes.  
 290. If a bridge were constructed it might induce persons to take up land around Jerry's Plains, and become permanent settlers? Yes.

Mr. Henry Parker, grazier, sworn, and examined:—

- Mr. H. Parker.  
8 Mar., 1890.
291. Chairman.] Where do you reside? At Jerry's Plains.  
 292. What business are you engaged in? I am a publican and grazier.  
 293. Do you rent Crown lands? No.  
 294. Do you occupy your own land? Yes.  
 295. How long have you resided there? Seven years.  
 296. During the time you have been there, there has been no bridge? No.  
 297. Is it your opinion that the want of a bridge has been much felt? Yes.  
 298. By what class of society? Mostly by the graziers.  
 299. Graziers on the north or south side? On the north.  
 300. Wanting to get south with their fat stock? Yes.  
 301. Is the district north of the Hunter, between that point and Muswellbrook, given up to fattening stock? Yes.  
 302. And when it is fattened it has to be brought to Sydney? Yes.  
 303-4. Does it generally prefer to go by road? Yes.  
 305. It does not go by railway? Sometimes it does.  
 306. And the bridge is needed as the shortest cut to Sydney? Yes.  
 307. During the time you have been here, how often has that river been unfordable for stock? In the whole time it has been unfordable for seven or eight months altogether.  
 308. And this year it has been more unfordable than ever it was before? Yes.  
 309. And has the inconvenience been very great this year? Yes.  
 310. Are there many agricultural producers north of the river? Not many.  
 311. The land is principally in fairly sized estates? Yes.  
 312. It is nearly all given up to grazing? The greatest portion is.  
 313. And mostly for cattle purposes? Yes.  
 314. Very little sheep? Yes.  
 315. Have you the opportunity of seeing the travelling stock come down from the north? They come past my door.

Mr.  
H. Parker.  
8 Mar., 1890.

316. Which is the greatest—the travelling stock or the local stock? As a rule it is mostly northern stock.
317. It is principally as a high road that this road is used? Yes; it is the high road from the northern district to Sydney.
318. And it is to improve it that you want the bridge? Yes.
319. When you want to get to Sydney which way do you go? I should go to Singleton.
320. You do not go to Liddell? No.
321. It is a shorter journey to Liddell? It is, but it is a rough road.
322. Then even if a bridge were made, you would not care if the road were no better to go to Liddell to get to Sydney? No.
323. Then the bridge would not throw much passenger traffic on the railway—It would all go to Singleton—The chief value of this bridge, at present, would be that it would be a stock bridge? Yes; at present.
324. Where would the market for wheat be? It would come to Singleton to go to Sydney.
325. Would Sydney be the best market? Yes.
326. It is no good sending it north? No.
327. It is better wheat land up there than here? I do not think so.
328. How about Glen Innes? That is right enough.
329. You have wheat-growing land in the north as good as here? Yes.
330. Do you think it would pay to grow wheat here and send it to Sydney? Not with the present state of the haulage.
331. You would want cheaper railway freights? Yes.
332. If the Government spent money to make this bridge, they would have to reduce railway freights to enable farmers to live? Yes.
333. Are there many farmers at work? Yes.
334. And they make a living? Yes.
335. Could not a still larger number make a living? It is only a hand-to-mouth living that they make.
336. Would Maitland or Singleton be the market? Yes.
337. How much would you have to pay for that distance? I do not know.
338. Do you get goods by rail to Singleton? Yes.
339. How much a ton do you pay for them from Sydney to Singleton? I could not tell you.
340. How much from Singleton here? £1 a ton from here to Jerry's Plains.
341. Is that nearly one-half of what you pay for all the rest of the way to Sydney? No.
342. And the 26 miles costs you as much as all the rest of the way from Singleton to Sydney? No. We mostly get our goods from Maitland.
343. You do not deal with Sydney? Not of late.
344. *Mr. Trickett.*] Which do you think the best site for a bridge? I should be in favour of the old site. I consider the old site suits all the north-western requirements.
345. That is Bowman's crossing? Yes; it is the main stock route from the north to Sydney. To give you an idea of the number of sheep crossing, I may mention that 47,000 left one station alone in 1888, and they all went over Bowman's crossing. If they cannot get over they come by Singleton, which is a great deal further round.
346. Has the stock traffic fallen off much during the last few years? Not a great deal. Last year it fell off on account of the dryness of the season.
347. And on account of the diminution of stock generally? Yes.
348. Has it fallen off much by reason of railway competition? I do not think so; not a great deal.
349. Do stock-owners prefer the road to the railway? As a rule.
350. That is in favourable seasons? Yes.
351. Why is that? Because they seem to think that the cattle go to market better and they are not knocked about and bruised. I know that butchers would rather give from 4s. to 5s. a head more for road-driven cattle than for trucked cattle. There is a great deal of loss in cattle going by trucks.
352. How do you view the idea of sending the carcasses of cattle down under the freezing process? I fancy myself that that would be in favour of stock. I think it would suit better than taking them by road.
353. Will this bridge be of any local advantage? Yes.
354. In what way? For people in the neighbourhood of Jerry's Plains. A number of people who live just over the north of Bowman's crossing would come this way if there were a bridge.
355. They would come to Singleton? Yes.
356. Do you think stock-owners would pay a toll on a bridge? I should think they would be willing to do so. I think it would be a fair thing to charge a toll.
357. Supposing the Government decided to erect a bridge at Gee's crossing, do you think that the stock-owners would always go by Bowman's crossing if they could get over for nothing? I do not know. I expect they would if the river was down; but I do not think it would be right to allow them to come so close.
358. That could be dealt with by regulation? Yes. I know that we had to pay to go over the Richmond bridge. Some people went a mile to avoid it, and were charged all the same.
359. A bridge over Gee's crossing would necessarily interfere with Pearse's property? Yes.
360. Would it injure it much? I think it would cut a great deal of his frontage off.
361. Have you ever heard him say what he would want for compensation? No.
362. Could you give us any idea what the compensation would be? I could not.
363. Is there anyone who could give us information of that kind? Mr. Cousins might.
364. Is Mr. Cousins a landowner? Yes.
365. *Mr. O'Sullivan.*] If a bridge were constructed at Bowman's crossing it would have a tendency to take the local traffic to Muswellbrook, instead of Singleton? I do not think so.
366. Would it not bring the local people nearer to Muswellbrook than Singleton? Not the Jerry's Plains people.
367. If they had to cross at Bowman's they would be nearer then to Muswellbrook than Singleton? No, nearer to Singleton. It is 25 miles round by Bowman's crossing to Muswellbrook, and only 17 to Singleton—that is by way of Maison Dieu.

- Mr. H. Parker.  
8 Mar., 1890.
368. Do you think the wants of the district and of the travelling stock proprietors would be better met by having one large high-level bridge, or a fair sized bridge at Bowman's crossing, and a fair sized bridge at Maison Dieu? I think the public would gain an advantage by having the two, because it would give them the privilege of coming straight on, whereas they have now to come round.
369. One bridge might cost £25,000;—if a good bridge were constructed at Bowman's for £8,000 or £10,000, and another at Maison Dieu for £7,000—£17,000 in all—the latter work would be cheaper to the State, and give more accommodation to the residents generally? By far.

Mr. Walter Young Cousins, grazier, sworn, and examined:—

- Mr. W. Y. Cousins.  
8 Mar., 1890.
370. *Chairman.*] Where do you reside? Singleton.
371. What is your occupation? I am a grazier in the Upper Hunter, and a wine-grower in the Lower Hunter.
372. Where is your land on the Upper Hunter? Four miles distant from Denman.
373. Is the bridge at Denman much used by travelling stock? Yes, while the river is impassable.
374. Where does that stock come from? Mostly from the interior—from the north-west. It crosses the river at Denman.
375. What route does it take, then, to get to Sydney? Via Jerry's Plains.
376. Does it cross the Hunter again? Yes.
377. Then it crosses the Upper Hunter once at Denman and the Lower Hunter at Bowman's? Yes.
378. There is a bridge at Denman? Yes.
379. Is it a high-level bridge? Yes.
380. A good bridge? Yes.
381. Do you know what it cost? No.
382. Is it wood or iron? Wood.
383. Would a bridge of that quality be sufficient at Jerry's Plains? I think so. If the people get a bridge of this description at Jerry's Plains they ought to, and will, probably, be satisfied.
384. Do you think the cheapest description of high-level bridge which the engineers could put up would satisfy the people of Jerry's Plains? I would not say that. I do not know sufficient about bridge-making to form an idea.
385. All you want is the narrowest bridge which will take a vehicle across? Yes. We do not want it too narrow, because travelling stock require room; they do not require to be hemmed in.
386. What is the narrowest bridge which will suit travelling stock? About 15 feet or 16 feet.
387. They go through less than that to get into the yards? Yes; but stock, as a rule, when they get on a bridge, commence to rush, and if they have not room they might be injured.
388. But still you think a 15-foot bridge above flood would meet the requirements? I do.
389. Do you think a bridge of that kind at Jerry's Plains and another another at Maison Dieu would be preferable to one expensive bridge? I think it would suit the public better.
390. When you are coming from Denman to Singleton, do you pass through Jerry's Plains? Yes.
391. And in dry weather you go by Maison Dieu? Yes.
392. Looking at the question of convenience to Singleton, and the people of the north-west, two small bridges would be better than one big one? Yes.
393. If you live at Denman you know more of the traffic from the north-west than of that which comes from the north? Yes.
394. Have you heard people from the north complain of the crossing? I have heard complaints, and I have seen people who have had occasion to complain.
395. Do you really think there is any serious obstruction to the traffic to Sydney? I really do.
396. We are told that the cattle are seldom detained more than three days;—is that a serious matter on a long stock journey? Yes.
397. Would it not give the cattle a little spell? Yes.
398. It is no great harm to wait three days? But they are often inconvenienced by not being able to get on to a reserve. They may have to go back 10 miles or 12 miles to the nearest reserve.
399. But if a reserve is handy a delay does not hurt them? Yes, it does. The travelling backwards and forwards would do them harm.
400. That is if they had to go back? Yes.
401. If they are near a reserve three days' rest would not hurt them? I think not; but the owner might be affected by not being able to get to market.
402. The want of a bridge is more inconvenience to a man travelling sheep than cattle? Yes.
403. And as a rule the sheep take the railway more than cattle? Yes; but I do not think they would if they were not obstructed by the river. I do not think anyone would travel sheep by train in preference to the road.
404. You have not had much experience in travelling stock yourself? I have,—both cattle and sheep.
405. By this route? Yes.
406. Have you ever been stuck up at any time? Never. I never started if I thought there was a chance of being stuck up.
407. But the people coming long distances have to take their chance? Yes.
408. And if they know that the river is up cannot they stay at the nearest reserve? They can.
409. And they always do know in these telegraphic days? They certainly would know at Denman.
410. A man knowing that the river was impassable at Bowman's, would not start from Denman? I think not. Under the Reserve Act they are only allowed to remain a certain time on the reserve.
411. But if a man stays two or three days with cattle that is enough? I think twenty-four hours is the limit.
412. Still, even on the main roads, there is a good deal of grass? I do not think you will find much on a travelling stock road.
413. Not even in a season like this? I daresay you could find it now, simply because there is no traffic on the road on account of the river.
414. When you have once got across the Hunter, there is nothing to stop you between that point and Sydney? Nothing that I know of.
415. Do you think the traffic in this district is such as to justify an expenditure of £20,000 on a bridge or two bridges? I think so.

416. Do you prefer two bridges at £10,000 each, or one at £20,000? Considering that there was one bridge washed away at Bowman's crossing, I do not know how to reply to you.
417. *Mr. Trickett.*] Do you think the stock traffic has diminished during the last few years? I believe it has during the last twelve months.
418. For what reason? Owing to the impassable state of the roads and river.
419. Not by reason of the road being a bad one? I do not think so.
420. Do you know whether much stock is sent by train now? I believe there is not.
421. Sheep or cattle? Principally sheep.
422. It was given in evidence in Sydney that there was hardly a hoof mark to be seen on Sir Thomas Mitchell's line, and that on the other road, *via* Jerry's Plains, there was no evidence at all of stock traffic. What do you say to that? A statement of that kind would not be correct. I think Mr. Brown and Mr. Parnell know different.
423. Are you of the same opinion? Yes.
424. Any person who has been in the habit of going there frequently would not hazard such a statement? No.
425. You know Mr. Pearse's property? Yes.
426. And a bridge at Gee's crossing would necessarily involve the taking of some of his land? I believe it would.
427. It would be an advantage to us to know what the cost to the country would be. Could you give us any idea? I could not.
428. About 3 miles of road I believe would go through his place, and he would be deprived of some water frontage? He would.
429. Could not you give us an idea of the amount of compensation which would be required? Not the slightest.
430. Is Mr. Pearse in town? I really could not say.

Mr. W. Y.  
Cousins.  
8 Mar., 1890.

Edward Alford, Esq., Inspector of Stock, sworn, and examined:—

431. *Chairman.*] What position do you hold in the Public Service? Inspector of Stock for this district.
432. How far does it run? From Hall's Creek to Branxton.
433. And this is about the centre of your district? Yes.
434. Are you stationed here? No, at Warkworth.
435. You know the proposed sites for a bridge? Yes, I have heard of them.
436. Have you crossed Gee's crossing and Bowman's? Yes, hundreds of times.
437. Which do you think is the best for a bridge? I should think Bowman's. It has a good road to it, and is good on each side.
438. You do not profess to speak from an engineering point of view? No.
439. For stock purposes either would do equally well? Bowman's would be the best.
440. So far as the Jerry's Plains people require quick access to the nearest railway station, would not Gee's crossing suit better? Yes.
441. There is some advantage on that account? A little.
442. If the engineers said they could put up a cheap bridge better at Gee's than at Bowman's, you would accept that as a sufficient reason why their opinion should be carried out? I suppose it would have to be accepted, but I do not think it would be as good for stock traffic.
443. You know the stock passing down? Yes, when I am on the roads.
444. Is it mostly local stock, or stock from the north? It is decidedly not local, but from the north.
445. Then the bridge is not so much wanted for local purposes as for the stock road? No, it is wanted for general purposes for the northern district.
446. Has the stock traffic this season been much injured by the rise of the river? Yes, they had to come round by Singleton.
447. They can get round? Yes; by going to Muswellbrook round by Singleton, and then back again almost to Warkworth, which is a distance of 60 miles extra journey to Sydney.
448. Has much stock had to go that distance this year? Yes.
449. If a high-level bridge, 15 feet wide, were made, would it not be enough for all purposes? Yes.
450. For one buggy to drive over? Yes.
451. You do not want a magnificent bridge? No.
452. Simply a way across the river when the floods are up? Yes; and one which will not wash away.
453. The needs of the district do not require anything more than that? I do not think so.
454. Does much timber come down the river? Yes.
455. The span must be wide enough to let it through? Yes, or it will wash the bridge away.
456. What do you think "wide enough" means? I could scarcely tell you; but it would have to be some considerable width. Sometimes huge trees, 60 or 70 feet long, come down.
457. They go end on sometimes? Sometimes they go straight.
458. For purely local purposes would this bridge be any considerable convenience? It would indeed. There is a great lot of stock from Muswellbrook, Denman, and other places, which has to go all the way by Singleton and down this metal road, and it plays the mischief with them.
459. But the bridge is not so much required for the mere local traffic? It is not so much required as for other purposes, because they can get over by boat.
460. When you say that these people have to go round 60 miles, you do not mean that they have to go all the way to Bowman's crossing to find the river unfordable? They may. It rises very suddenly sometimes. I have known stock come there and then go back to Muswellbrook.
461. Do not you think the Muswellbrook people know, in these telegraphic days, whether it is passable? They do not come by Muswellbrook, but by Denman.
462. Would not they know it at Denman? I have been caught myself at Denman. The Goulburn has risen so rapidly that I have had to turn back and go to Muswellbrook.
463. You know as a fact that this season's stock has been turned back from Bowman's crossing to Muswellbrook? Yes.
464. Are they obliged to go all the way back to Muswellbrook? They cannot go any other way.
465. Why cannot they go across country? Because they have no road. It is all private property—Bowman's, Pearse's, and Parnell's property.

E. Alford,  
Esq.  
8 Mar., 1890.

- E. Alford, Esq.  
8 Mar., 1890.
466. They are obliged to stick to the stock roads? Yes.
467. Do you think the traffic is sufficiently important to justify the building of a bridge? From my experience, as a public officer, I think a bridge is really required.
468. Do you know the crossing at Maison Dieu? Yes.
469. Do you think a cheap bridge is required there? Yes; they cannot go over there with anything like a load on.
470. It is good enough for stock and buggies? Yes, when the river is down.
471. Buggies can get across? Yes.
472. But not teams? No, not if they are heavily laden.
473. You think, then, for the accommodation of the district, two bridges are wanted? Yes.
- 474-5. *Mr. Trickett.*] Have you any records of the stock which cross the river? Not here.
- 476-7. Where is your office? Twelve miles from here, at Warkworth.
478. You supplied some figures for Mr. Bruce? Yes.
479. Are they correct? They are. In fact they are under the estimate, if anything.
480. You stated in your telegram it was an estimate. Is there any check kept on stock? Yes; I know of lots of stock which I never see at all.
481. You gave the returns for 1888-9. Were the numbers for the preceding year more or less? That all depends on the season. In the bad seasons the stock traffic was very small indeed, but of course during these last two or three years it has increased wonderfully. But in the bad seasons there was nothing left up country to come down.
482. Do you see any indication of this being abandoned as a stock route? I cannot see it at all.
483. You say that it is still required and used? Yes, and will be used.
484. Do you see much diminution in the stock traffic since the railway was built? This last year it has not been so great, but of course the seasons are not so good up country.
485. You think that is the chief diminution? Yes.
486. Do stock-owners prefer the road or the railway for sending their stock? I think the road, because it is too expensive the other way. Of course, small stock-owners have to send by rail, because it will not pay them to send by road. Where they have considerable quantities they prefer the road, as being cheaper.
487. Any other reason? The butchers seem to like the road stock the best. It does not get so bruised and knocked about as stock carried by rail.
488. Do you think the stock-owners would pay a toll on the bridge if it were erected? I do not think they would have any objection, because there are reserves on both sides.
489. I suppose sheep are not so much sent this way, on account of having to cross the river? They must come round this way.
490. But even if the river has only 12 or 18 inches of water in it, it is difficult to get sheep across? It is.
491. Do you think more sheep would travel by this road if the river were bridged? Yes.
492. As a person having special knowledge of these matters, do you think the bridge would be of permanent utility? I do.
493. And it would not be merely for local people, but for the public generally? It is not for the local people at all, so far as I can see, because they can manage without it.
494. But, in conjunction with the stock routes, you consider it a necessity? I do.
495. *Mr. O'Sullivan.*] Why do you give preference to Bowman's crossing as a site for the bridge? Because it is on the main track.
496. Is there any other reason? Only because of the reserves at different places.
497. Are there any reserves near the old bridge? About 6 miles on one side and 5 on the other.
498. If they went to Gee's crossing would they have to go through private lands? Yes.
499. The Government would have to resume some land there to find accommodation for travelling stock? A great quantity. They would have to go 3 or 4 miles through Pearse's and also through Bowman's.
500. You are aware that one bridge has been already carried away at Bowman's crossing? I do not wonder at it.
501. Why? Because one thing was called a bridge which was not worth calling one. As soon as the first bit of fresh came it turned over.
502. Do you think if a bridge were constructed with iron pillars, with a good space between, to allow the logs to pass through, it would stand? Yes.
503. Do you think a safe bridge could be constructed there for £8,000 or £10,000? Yes.
504. How long ago is it since the bridge was last washed away? Twelve years.
505. Was it a very heavy flood? No.
506. It was a low-level bridge, I suppose? Yes. Two or three days after it was built I said to one or two gentlemen who were with me that when the first fresh came it would turn over like a table, and so it did.
507. A good high-level bridge, constructed with good approaches, would stand? I think so.
508. It would afford ample accommodation for travelling stock, as well as for people living in the district? Yes.
509. *Mr. Trickett.*] Could you tell us what compensation would be required if roads were taken through Bowman's and Pearse's property? I could not tell you. They would go through a lot of valuable land.
510. Do you think it would be a large amount? Yes.
511. Would it run into thousands? Yes, some thousands of pounds.
512. That is if it went over Gee's crossing? Yes; roads would also have to be made to allow Pearse's cattle to pass under the approaches—*i.e.*, bridges over the gullies and creeks which would have to be erected.
513. So that the other would be the cheaper as well as the better? I think so.

Mr. William Gillett, drover, sworn, and examined:—

- Mr. W. Gillett.  
8 Mar., 1890.
514. *Chairman.*] What is your occupation? A drover.
515. How many years have you been a drover? About twenty-five.
516. During that time you have frequently crossed the Hunter River? Yes.

Mr.  
W. Gillett,  
8 Mar., 1830.

517. Where has your usual crossing-place been? Bowman's.
518. Do you know Gee's crossing? Yes.
519. Have you crossed there with stock? Yes; but it is private property, and we are not allowed to cross.
520. If a public road were made there, would it be as good a crossing as Bowman's? I do not think it would; Bowman's is the place for the bridge.
521. Do you remember the old bridge at Bowman's? Yes, I crossed it with stock.
522. Was it a great convenience? It was. It is the worst crossing-place on the Hunter, and it is the deepest water. You cannot cross sheep at any time very well.
523. Could a punt be worked there at flood time? I think so.
524. You do not think the stream is too strong? No.
525. You have crossed in punts many times? Yes; I think, however, the current would be rather strong for punts. I do not understand much about them.
526. Have you found any difficulty in crossing rivers with punts, owing to the strength of the current? Yes.
527. What is the longest time you have been delayed in consequence of the water being up? I was delayed at Bowman's ten days with sheep.
528. And how long with cattle? Two days, and then I had to go and cross at another place. Cattle have been there five and six days, and could not get over.
529. What is the nearest reserve to Bowman's crossing? There are none about there.
530. If you are stuck there, what do you do with the cattle? We pay for the feeding, or go back to Ogelby's Hill, 8 miles back.
531. If you go back 8 miles you get a reserve, but if you stop you have to pay for the feed? Yes.
532. Would a bridge with a 15-foot roadway be wide enough for cattle to cross? Yes.
533. They would take no hurt? I think not.
534. Did you know the bridge at Denman which was washed away? Yes.
535. Was it a good bridge? It did not stand very well. It was not a good bridge for cattle. It was too narrow.
536. What was the width? I could not tell you, but I know it was in a bad place. You could not get cattle upon it. There was a house close to it, and that is a bad thing for sheep.
537. In your opinion Bowman's is the best crossing-place? Yes.
538. Where have you brought cattle from—the north or the north-west? I have been bringing cattle for thirty years from all directions. I have crossed every crossing-place on the Hunter for 50 miles around.
539. There is no other place that stock could cross with more advantage than Bowman's? No.
540. If you cannot get across there you have to go round to Singleton? Yes, if you cannot get over there you have 35 or 40 miles to go further. You would have to go to Muswellbrook.
541. Is the Jerry's Plains Road still much used for stock? Yes.
542. And there is great business going on along there? Yes; I came with 2,000 sheep last night and had to go through Singleton.
543. Where were you when you first knew the river was impassable? At Muswellbrook.
544. You knew it there? Yes, and I had to come to Singleton.
545. If you know at Muswellbrook that you cannot get across you have not to go 30 miles out of the way then? No.
546. How much out of the way would you have to go? About 15 miles.
547. Have you any feed upon the road, then? No, it is nearly all lane and no reserves. There are good reserves at Bowman's.
548. Is the track from Singleton to the Bulga Road as good a track as Bowman's? No, Bowman's is the best and has more reserves.
549. In spite of the railway the stock sticks to this road? Yes, this is the proper road for stock.
550. When you have crossed at Bowman's what is the place you make for next? Jerry's Plains, and then Warkworth.
551. When you get to Warkworth you are pretty near to Singleton? 8 or 9 miles away.
552. Where do you go to from Warkworth? Straight on to Maitland, and then by Bulga.
553. You go by Warkworth in any case? Yes.
554. From Muswellbrook to Warkworth, by way of Bowman's crossing, is nearly as long as Muswellbrook to Warkworth by way of Singleton? From Muswellbrook to Bowman's is about 16 miles; from Bowman's to Warkworth is about 9 miles. That is 25 miles altogether.
555. If you go from Muswellbrook to Singleton, how much is it? 30 miles.
556. What is it from Singleton to Warkworth? 10 miles.
557. That is 40 altogether? Yes.
558. It is a long way round then? Yes.
559. If you go that extra distance that is the worst that happens to you? Yes.
560. If you are forced to go by Singleton the drawback is simply a journey of 10 miles with no reserves on the road? Yes; and it is all lane.
561. *Mr. Trickett.*] How many stock cross Bowman's crossing per week? I could not tell you that; but it is the best road for stock. All the Muswellbrook people send their stock that way, because it is the cheapest and has good reserves.
562. You are up and down the road continually? Yes.
563. Have you noticed any marked falling off in travelling stock during the last year or so? No.
564. Do you think that the road is as much used now as it has been all the time you have been on it? Yes, I think it is as much used now as ever.
565. Which method of getting stock to market do graziers and others prefer—road or rail? The road.
566. For what reason? Because the train knocks stock about, and it is more expensive.
567. The butchers prefer stock that has travelled by road? Yes, any cattle driven by road always bring a better price at the yards.
568. *Mr. O'Sullivan.*] Where do you bring stock from? From wherever I can get it.
569. How far back into the country do you go? From 100 to 500 miles.
570. Do you bring any from Queensland? Yes.

- Mr. W. Gillett.  
8 Mar., 1890.
571. Is this the proper route for Queensland stock, and for stock in the north and north-west? Yes, it is the proper road for any stock to Sydney or Maitland.  
572. After you go over Bowman's crossing you have two roads—one to Sydney and one to Maitland? Yes.  
573. And this is the proper road leading to those two places? Yes.

MONDAY, 10 MARCH, 1890.

[The Sectional Committee met at the Court-house, Muswellbrook.]

Present:—

The HONORABLE ANDREW GARRAN (CHAIRMAN).

The Hon. WILLIAM JOSEPH TRICKETT. | EDWARD WILLIAM O'SULLIVAN, Esq.  
JOHN HURLEY, Esq.

The Sectional Committee further considered the proposed Bridge over the Hunter River at Jerry's Plains.

James Cobb White, Esq., sworn, and examined:—

- J. C. White, Esq.  
10 Mar., 1890.
574. *Chairman.* Where do you reside? At Edinglassie.  
575. How far from Muswellbrook? Four miles.  
576. Have you resided here many years? About 13.  
577. Are you thoroughly familiar with the stock traffic across the Hunter at or near Bowman's crossing? Yes.  
578. Is it your experience that the railway has so completely taken the stock traffic off the road as practically to render Bowman's crossing of no high value? From this district about 1 per cent. of the large stock goes by rail, and the balance by road, excepting, of course, in a drought.  
579. Why do the squatters give preference to the road? Because of its cheapness, and in a good season the cattle would arrive in Sydney almost in the same condition as when they left here.  
580. Would it require a considerable reduction in railway rates to induce you to leave the road and take to the railway? It would in a good season, but in a bad season, of course, they have to pay the present rates rather than go by road.  
581. Then all the stock fattened in this district north of the Hunter want to cross the river to get to the Sydney market? Yes.  
582. But we have been given to understand at Singleton that the great need for this bridge is on account, not so much of the locally fattened stock, as the stock coming from the north and going to Sydney? All the stock coming from the north have to go by Denman, and in flood times they have to come round here and go to Singleton.  
583. If they got as far as Denman, could they, by keeping to the westward of the Hunter cross to Goulburn easily? They cannot cross the Goulburn as easily as the Hunter. The Goulburn is a worse river than the Hunter in flood time. You can swim in the Hunter and get out, but you cannot in the Goulburn, because it is boggy.  
584. Then it is not correct to say that the Goulburn is easy to cross in flood time? It is very incorrect.  
585. And there is no open stock road that way? I think they only go that way on sufferance.  
586. If a road had to be opened out there, it would have to be through private property? I believe so, but I am not acquainted with the locality.  
587. There is a prescribed stock road from the north? Yes, through Muswellbrook.  
588. And through Denman also? Yes.  
589. Are there two roads then? Yes.  
590. And reserves on both? Yes.  
591. If fat stock is being brought down, the drovers know very well when they approach Aberdeen whether they can get across Bowman's crossing? They seldom come by Aberdeen. They turn off before getting to Aberdeen, and go round on the opposite side of the river, so as to utilise the bridge here.  
592. On the western side? Yes, they save all the metalled road coming down. There is no metal on the other road, and more feed and reserves.  
593. It is a great point to keep from the metalled road? Yes.  
594. But if they knew the river was unfordable at Bowman's, they would make for Singleton? In very few cases. They would mostly remain on the reserves until they could get over the river, because it knocks the stock about going through the town of Singleton.  
595. Are there any reserves upon the main road from Muswellbrook to Singleton? There are vacant spaces. I do not know whether they are reserves or not, but they can always get a feed.  
596. Without paying for it? Yes.  
597. What is the inconvenience, apart from the extra distance of going by Singleton? There is the metal through the town of Singleton. It is impossible when you get over the bridge at Singleton to avoid the town.  
598. Then for the sake of keeping the stock in good condition on the road, it is better to go through Bowman's crossing than through Singleton? Yes. Mr. Richards buys most of the stock about here, and never thinks of sending his cattle by Singleton, but always by Jerry's Plains.  
599. Is he the principal purchaser from the fattening people here? Yes, he buys about two-thirds of all the stock fattened about here.  
600. Have you any personal knowledge of the quantity of stock crossing at Bowman's? No, I see a great many stock going by, but I do not stop at the river to count them. I have a good idea how many cross.  
601. But if you live so near to Muswellbrook you are some distance from the stock route? I am constantly in Denman, where they pass through.  
602. And they must go as far west as Denman? There is no road for them to go between Muswellbrook and Denman.  
603. It is all private estates? Yes.  
604. Are you of opinion that a bridge over the Hunter is required for the existing traffic? Yes.

J. C. White,  
Esq.  
10 Mar., 1890.

605. Do many sheep come down by way of Denman? Yes, all except those that are trucked.
606. Will flood delay them longer than it will delay cattle? Yes, some days longer. Cattle can swim if the river is half a banker, but sheep have to wait until it is very low before they can cross.
607. Do you know anything of the relative merits of Bowman's crossing and Gee's crossing. I do not quite know the difference between them. The crossing I have been talking about all along is the one on the road between Denman and Jerry's Plains. That is Bowman's crossing. Where is Gee's crossing?
608. It is further down the river nearer to Jerry's Plains? I do not know anything about that one. That is not on the main stock road at all. I should not think you could get a much worse place than Bowman's crossing for a bridge, because it is very wide, and the bridge will be very costly.
609. There was a bridge there once? Yes; but it is not there now.
610. *Mr. Trickett.*] It was a low-level bridge? Yes; you would have to make a high bridge to get out of reach of the flood.
611. You yourself, though not an engineer, said that it would be difficult to cross? Yes.
612. Still the stock drovers seem to prefer the old place to the new one. Is there any reason for preferring Bowman's crossing, other than that it is the customary place? I do not see any objection to the other place. If they could get from the present road to the bridge, they could not have any objection to it.
613. We are told it would require a road to be made through private property? Yes.
614. Do you think there is any local necessity for a bridge apart from the stock traffic? No.
615. Do you think the people could always get into the town except in very bad weather, and then they could wait? I should think that not more than one person goes over the river a day, excepting those connected with stock traffic. Comparatively speaking, there is no traffic between Jerry's Plains and Denman.
616. They can always get into Muswellbrook or Singleton by going round? Yes.
617. Still, from your long experience of this road, you state that there is sufficient stock traffic to justify the Government in building a bridge? Yes. Until they can slaughter the cattle in the country, and get it conveyed to town in cooling cars, a bridge will be necessary.
618. What are your views as to the proposal to kill cattle in the country, to chill the meat, and send it to Sydney. Do you think it is desirable? I think it is most desirable, both for producer and consumer.
619. Is that the general opinion amongst stock-owners? I believe so.
620. If that were done the necessity for this bridge would be almost nil? Almost; unless the main slaughtering-place was at Singleton, or somewhere about there; and even then they could cross at Singleton. Of course you could not have slaughtering-places everywhere. There would have to be a main one.
621. In that case would the bridge be of utility? Only for the local traffic, because people would not hawk their stock to Sydney when they could get it killed here.
622. Have you thought as to how far these slaughtering-places should be apart? I should think they would not want to be nearer than 200 miles. That is 100 miles each way; and that is not much of a drive. If they were close together it would cut up the business, and make it too small to pay the companies running them.
623. I suppose you are of opinion, if a bridge is built at all, that it should be a high-level bridge? A low-level bridge would answer the purpose if it would stand; but I am not sufficient of an engineer to know whether it would stand or not.
624. Experience here has proved that the bridges have been washed away? All the low-level bridges we have had have gone.
625. Have you known of any great personal inconvenience to drivers of mobs of cattle, or herds of sheep, by reason of their being no bridge? Yes; I have seen drovers there for days trying to cross, and then they have had to turn back and go round to Singleton.
626. Is there any stock reserve near the river at Bowman's crossing? There is one between Denman and the crossing.
627. How many miles from the river? I do not know exactly, but I suppose about 6.
628. Then if they are stuck up at the river, the cattle have to be driven back 6 miles? Yes.
629. That is a detriment to them? It is a bad road, and in wet weather it is very heavy. There is no other reserve when they get across the river; but, of course, there is no stock coming back to use it. If they are stuck they have to go back to Denman.
630. Do you think the stock-owners would pay a toll for the use of the bridge? Yes, I should think so. We have to pay toll now to cross at Alford's.
631. They would pay whether they used it or not. Regulations could be framed to the effect that if they went within a certain distance they would have to pay toll? I think it would be quite fair. It would be far better to pay a toll than to go around 20 miles.
632. It has been stated by witnesses in Sydney that if a bridge were erected and a toll imposed, the toll would not be worth collecting, as so little stock pass over,—Is that correct? I should not think so. You could charge upon all stock going within a certain distance of the bridge. I suppose you could prevent owners of land from allowing stock to go through their property.
633. You stated a short time ago to the Chairman that you had a pretty good idea of the number of stock that went over the river,—What is your idea as to the number crossing per week? I have seen something like 1,000 fat cattle cross there in one week.
634. What about sheep? I have seen 4,000 stuck at the river at one time.
635. Was that during the late rains, or some time ago? About eighteen months ago.
636. Have you noticed any great diminution in the stock traffic there since the railways were opened? There is no perceptible diminution.
637. We are told that there has been a certain diminution in the stock traffic, but that it is attributable to bad seasons,—I suppose stock has fallen off a good deal in this district as in others? Bad seasons are the times when the railways ought to pay, the roads are then so badly off for grass that the stock go by rail. I truck all my stock in bad seasons, but now I send them by road.
638. You only use the railway when you are compelled to by the difficulty of travelling the stock? That is all.
639. *Mr. O'Sullivan.*] I suppose you may be considered as one of the large stock-owners in this district? I have about 5,000 cattle, usually.

- J. O. White, Esq.  
10 Mar., 1890.
640. Can you state how many cattle you send every year to the market? It depends on the season. Some seasons I send 6,000 and others not more than 2,000.
641. I suppose about 3,500 would be a fair average for ten years? About 4,000 a year, taking one season with another.
642. Are there many other stock-owners in this region who send about the same number as you do? There is Mr. Edward White, of Martindale.
643. But away to the north-west? There are plenty up there who send a good many more than I do.
644. You always take this road when grass can be obtained? Yes.
645. Do you think a bridge 15 feet wide would accommodate the stock traffic? Yes; I do not see why it should not.
646. You know the railway bridge at Singleton? Yes.
647. That is 14 feet wide on the traffic portion; I suppose a bridge as wide as that would do? Of course the cattle would have to pay toll, whether they passed the bridge or not. Cattle would not always have to use the bridge—only in floods,—and it would be quite wide enough for sheep at any time.
648. You said just now that you had to pay toll to Mr. Alford? Yes.
649. What is that for? Because the river bank is washed away, and we have to go about 100 yards on his land to find a crossing.
650. How much toll do you pay him? £1 for 200.
651. If you cross Mr. Alford's land, do you go off the ordinary stock route? Yes, for about 100 yards.
652. Then, if this bridge were constructed at Bowman's crossing, would it divert the toll? Alford would not get any of that, because it is a better crossing than that at Jerry's Plains. In preference to crossing at Jerry's Plains we go that way, and pay him the toll. The only reason for going there is to get a good crossing.
653. Why do you keep to the west bank of the river, and cross at Denman, instead of going across the Goulburn? There is no road.
654. The reason is, there is no stock route across the Goulburn? Going from here you would keep on the other side of Denman.
655. But the Goulburn runs close to Denman, does it not? About a mile away; but the lower Goulburn can never be crossed in flood-time. You cannot cross it for 3 miles up, except when the river is low, because it is so boggy.
656. Then there are two reasons why you do not cross the Goulburn—the first is, that there is no stock route across it, and the second is, that it is a dangerous crossing? Yes.
657. Then the natural stock route, which has been used for years past, is the one going by way of Bowman's crossing? Yes.
658. If you cross at Jerry's Plains, you have to deviate from the stock road? You cannot cross at Jerry's Plains; there is no road.
659. You cross at Bowman's? I have not a plan before me, but that is what I should say.
660. But if a bridge were constructed at Jerry's Plains, you would have to deviate from the stock road to reach it? Yes.
661. Would that lengthen the journey to Singleton or shorten it? It would not make more than a mile difference.
662. Do you know the crossing-place at Gee's? No. I have often crossed from Plashett's Homestead to Jerry's Plains. If that is Gee's crossing I do not know it by that name.
663. Do you think it would be a difficult work to put a bridge over Bowman's crossing? It would be rather expensive to make such a long bridge there.
664. What is the width of the river? I could not say to a hundred yards. I know the width of the water; but the banks are very low on either side for a long way back.
665. I suppose the banks have been worn by the river,—how long did the low-level bridge erected there last? I suppose about twelve months.
666. Do you know the reason why it gave way? I heard that it was because the bolts had heads and tails, and no middles.
667. And the bridge was badly constructed? Yes.
668. Do you not think a strongly constructed bridge, about 10 feet or 15 feet higher would be sufficient to ensure you against floods? It might stand, but I do not know sufficient about the matter to give an opinion.
669. Can you give a rough estimate of the number of stock which cross there in a year? I have been reading Mr. Alford's estimate for 1889. I think his estimate must be a long way under the right number. He numbers the cattle at 13,507, the sheep at 35,000, and the horses at 84. Fully 84 horsemen must have gone over the crossing in a month or two months in charge of stock. He gives 84 horses for the whole year. I have known of mobs of more than 84 go over last year at one time, so that he must be out of his reckoning. I should think that 20,000 cattle must have gone that way last year.
670. Mr. Hurley.] Then, practically, if this bridge were constructed at either of the places named, it would be merely in the interests of travelling stock? That is all. If people want to go in for the doctor or the post, there is a boat which they can use.
671. It would be little used by agriculturists, or any other class? If a bridge were made for agriculturists, a road would have to be made as well, because it is in such a bad state.
672. Leaving stock out of the question, there is no immediate necessity for a bridge at the present time? No; and there will not be at any time that I know of.

Mr. William Wood, drover, sworn, and examined:—

- Mr. W. Wood.  
10 Mar., 1890.
- 672½. Chairman.] What is your occupation? A drover.
673. How long have you been engaged in that business? About six or seven years.
674. Where do you mostly bring cattle from? Off the Hunter.
675. Cattle fattened in the district? Yes.
676. What is the natural stock road to the Sydney market for the cattle you drive? By Jerry's Plains—Bowman's crossing.
677. Do you know Gee's crossing? Yes.
678. Did you ever cross with cattle there? No; I have crossed on horseback.
- 679.

Mr.  
W. Wood.  
10 Mar., 1890.

679. Can you judge whether that is as good a place for a bridge as Bowman's crossing? I think it should be better for cattle.
680. But it would need a special road to be made for it? Yes; from Bowman's crossing, through Mr. Pearse's private property, and through Mr. Alford's.
681. If a bridge were built there it would be as convenient for stock traffic as one at Bowman's? More so.
682. And it would give the Jerry's Plains' people other access to the Liddell station? It would.
683. Do you think it would suit the district better than one at Bowman's? Far better.
684. Have you any idea of the quantity of cattle which crosses the Hunter at Bowman's in a year? I should think between 20,000 and 25,000.
- 685-6. How often in the year do you think people are stuck up because of the floods? I could not say. I have been stuck up twice at Bowman's.
687. How long had you to wait? A day and a night, and I had to swim it next morning.
688. Do you think the delays caused are so great that the country would be justified in going to the expense of a bridge? I do.
689. As a practical drover, do you think a 15-foot roadway would be sufficient? Yes, for stock, because you would have only to cross stock in time of floods. You could cross below when the river was passable.
690. Would there be much difficulty in getting the cattle to face the narrow roadway? Not with gradual approaches on each side.
691. Do you think the persons interested in stock would willingly pay a small toll to have the bridge available in bad weather? I should think so. It would be to their interests to do so.
692. If it pays them to go through a man's private land for a short distance it would pay them still better to have a bridge in wet weather? I should think so.
693. The cost of the toll would be less than the delay of three or four days? Yes.
694. And in the case of sheep a delay of more than a week? Yes.
695. You do not think the effect of the toll would be to send the traffic away from the district? No.
696. When you are once across the river at Bowman's is there anything to stop you on the road to Sydney? Yes; there are two rivers—the Branch and the Colo.
697. If you could not get across here you could not get across there? If you could cross the Hunter you could cross them.
698. How many days will it take between Bowman's and the Colo? About ten days.
699. Is that the first obstruction? No.
700. Which is the first? The Branch.
701. How far is that from Bowman's? Between 35 and 40 miles.
702. So that if there were a bridge at Bowman's, and the water was up, you would have five days for the water to go down in before you reached the first difficulty beyond Bowman's? Yes.
703. And except in continuous rainy weather you could always get across? Yes.
704. Is there any bridge over the Colo? No.
705. Is it often up? Yes.
706. Are you often delayed there? I have been delayed there once. You run a great risk in swimming cattle there, because of the current. You have to pay a woman, who keeps a boat there, to enable you to get across.
707. And you have to pay as much without a bridge as you would with one? More. You have, perhaps, to pay £1 or 15s.
708. What do you think would be a fair toll for a bridge? 1d. per head. Stock-owners would willingly pay. It would be to their interests to do so.
709. You say that as a practical man? Yes.
710. Do you know anything about crossing the Goulburn River, near Denman? Only on horseback.
711. Is it a boggy crossing? Yes; it is very bad.
712. You think that the taking of stock round Denman and crossing the Goulburn instead of the Hunter is not practicable? No.
713. You cannot avoid this bridge by adopting that route? No.
714. The better plan is to make a bridge over the Hunter? Yes.
715. And that would be an immense convenience to this district? Yes.
716. *Mr. Trickett.*] Do you meet with many difficulties between Bowman's and Gee's, and Singleton, after you cross the river? We do not go near Singleton, but by Jerry's Plains.
717. You go by way of Warkworth? No; you can miss Warkworth. If there is a bridge you can miss Jerry's Plains also.
718. You do not have to cross the Hunter River again? No.
719. Would it be an advantage if you could get through Singleton? No.
720. The reason I ask is because some of the witnesses have spoken of a bridge over Maison Dieu? I know it.
721. That bridge would only be for the benefit of the Jerry's Plains people who want to get into Singleton? Yes; it would be of no benefit to stock at all. A bridge at Bruncker's crossing would be of more advantage to stock; but that is out of the way too.
722. Do you know the number of stock which travel? Between 20,000 and 25,000 cattle a year. I could not say how many sheep, as I have not had much dealing with them; but in my time I have seen 12,000 or 15,000, or more.
723. At any rate, a large number of sheep go over Bowman's? Yes; all the sheep cross there, unless it is flood-time, and then we have to drive 75 miles round to get across the Singleton Bridge.
724. The Stock Inspector said that eighty horses went over in 1889;—is that an under-estimate? Yes; he would have been nearer the mark if he had said 800.
725. It would take over eighty horsemen to deal with the cattle? I should say it would take close on 200 horsemen to deal with the cattle and sheep.
726. *Mr. Hurley.*] Have you travelled to Sydney many times? Yes; over 100 times.
727. During that 100 times you have only been detained twice by the river being up at Bowman's crossing? Yes; but if I had stopped until it went down I might have been there a week. I risked my cattle, my horses, and myself.
728. But it is a fact that you have only been detained twice? Yes.

Mr.  
W. Wood.  
10 Mar., 1890.

729. Do you think it is absolutely necessary, in the interests of those connected with stock, that a bridge should be built? Yes; if I had stayed every time the river was up, I might have been detained fifty times. I have gone by way of Singleton Bridge, 75 miles round.
730. How often have you had to do that? Three times.
731. You have done that three times in seven years, and twice you have been detained at the river at Bowman's? Yes.
732. In your conversation with pastoralists and others, have you ever heard anything said as to the probability of chilled meat being conveyed to market in cars? Yes.
733. Do they look upon it as being more advantageous to the consumer and producer to have it conveyed by that means? Yes.
734. If the idea is carried out, will there be any necessity for a bridge? I do not think there would.
735. If facilities are given by the Railway Department for conveying meat to market, it would be better for the purchaser? It would.
736. And it would be more lucrative to the producer? Of course it would; the meat would be fresh and the cattle would not be harassed on the road.
737. Therefore there would be absolutely no necessity for the erection of a costly bridge? I do not think there would.
738. *Mr. O'Sullivan.*] Have you ever had to pay toll to Mr. Alford? Yes.
739. How often? Every time I go through.
740. Why do you cross his land? Because you cannot avoid it;—you must cross it. There is a crossing, but you cannot get up the bank, because it is all washed away. The water under the bank must be 12 or 13 feet deep.
741. You cross his land to get to a better crossing-place on the river? Yes.
742. What is the width of the crossing-place which you get to on the river after paying Mr. Alford? It is a very wide place, over 100 yards, but there is a good beach across.
743. What is the width of Bowman's crossing? About 200 yards.
744. What is the width of Gee's crossing? Not half that width.
745. Which do you think would be the best place to fix the bridge? I believe Gee's is the best place.
746. Would you have any reserves along that route? Not until you get across the river.
747. Will the system of chilled meat do away with the necessity for droving? Not altogether.
748. You will still require to drive cattle to the places where the meat is chilled? Yes.
749. Therefore, you will want these stock routes and bridges? Yes; that is if we are to drive stock, but if there is no stock going that way we should not require it.
750. *Mr. Trickett.*] You could not say whether it would be absolutely necessary or not until you knew where the stock would be slaughtered and chilled? No.
751. Supposing the stock were slaughtered at Liverpool Plains, there would be no necessity for driving beyond this place? No, not fat stock.
752. *Chairman.*] So far as the fat cattle of this district are concerned, the owners would not start them if they knew the river was up? I have started them when the river was up, expecting it to be passable when I got there, but it was higher.
753. But still you started in the expectation that it would be down? Yes.
754. If you knew the river were up you would not start? I have started when it was up, but it was inclining to fall. The night we left we had heavy rain.
755. Most of those who fatten stock in this district are within 20 or 25 miles of Bowman's? Yes.
756. And they would know pretty well the state of the river? I should think so.
757. Then it is really more for the through stock from the north that you want the bridge than the local stock? I should think the local stock want it as well as the north stock.
758. But they are not so likely to be stuck up? If there is a good market the owner likes to get his cattle there quickly.
759. But now that the markets are supplied by rail, the variations in the market are not so great as they used to be? I could not tell you.
760. *Mr. Trickett.*] Do you know of any low-level bridges which have stood the floods? I know of only one low-level bridge, and that was at Singleton, and it did not stand.
761. And the one over the Hunter, near Jerry's Plains, was washed away? Yes.
762. It was badly constructed? Yes, the piles were only 2 feet in the ground.
763. Do you think it desirable to erect a low-level bridge? No, I do not think it would stand.
764. Is the current very strong near Bowman's? Yes.
765. *Chairman.*] Do you think it would be possible to work a punt if the river were up 10 or 12 feet? I should think so.
766. The current would not be too strong? I do not think so.
767. Do you think a punt would do instead of a bridge? It would not be so convenient for stock. You could not punt stock very well. You would have to swim them.
768. But you could go across yourself in a punt? Yes.
769. *Mr. O'Sullivan.*] How much toll do you pay Mr. Alford? 10s. for 100.

Mr. Charles Smith, drover, sworn, and examined:—

Mr.  
C. Smith.  
10 Mar., 1890.

770. *Chairman.*] What is your occupation? A drover.
771. How long have you been a drover? Nearly thirty years;—over twenty years in this district.
772. Do you mostly take cattle fattened in this district? Yes; I have taken 2,000 in one year.
773. In the course of your journeys you have met a great many drovers who have come with cattle from the north? Yes.
774. You know their trade as well as your own? Yes.
775. Do you think the quantity of stock now crossing the Hunter is large enough to justify the building of a bridge? I think so. I think there would be more stock go that way if they had a bridge.
776. Which way do they go now? The best way they can. They have to go wherever they can cross best.
777. Where have you always crossed? At Jerry's Plains, and Alford's.
778. Do you know Gee's crossing? No; not well. I know there is a crossing there. 779.

779. Do you think it would pay stock-owners to pay 1d. a head to cross their cattle over a bridge? Yes.
780. Even if they did not use the bridge? I think so. It would pay them well. They might be stuck up there for four days. The cattle get knocked about and get into a state of perspiration. They are put into the water, and when they get on the opposite side the chances are that some of them die. When they get into the market they die as black as a coal, and are almost unfit for use.
781. They get chilled? Yes.
782. You think the cost of the delay is a great deal more than the 1d. a head? Yes.
783. If you were only delayed twice in the year it would pay you to give 1d. a head? I would freely do it myself.
784. For all you cross during the year? Yes.
785. Do you think 20,000 head of cattle is an excessive estimate of the number crossing Bowman's per annum? I could not tell you exactly, but I have been given to understand by a constable that he had instructions from head quarters to make an entry of all stock which passed through the valley. They could not pass without going from 200 to 300 yards of his house.
786. What was his estimate? He did not tell me; but he told me he could not understand the estimate given into the Government. He was prepared to show from his books that the number of cattle and sheep which had passed were far more than what were given in to the Government.
787. Presuming 20,000 cattle crossed at Bowman's every year, would it pay to pay 1d. a head on the whole number? I think so.
788. What is your next difficulty after crossing Bowman's? None that I am aware of.
789. One witness says the Branch and the Colo are troublesome? I have never had any trouble.
790. Is the Colo River difficult? Not very.
791. That is the greatest difficulty? Yes.
792. If there were a bridge here you would consider the route to Sydney practically open in all weathers? I would.
793. *Mr. O'Sullivan.*] Which ford have you been in the habit of using? Alford's.
794. Alford's lies between Bowman's and Gee's? I know nothing about Gee's.
795. Alford's Crossing, then, is nearer Singleton than Bowman's? Yes.
796. How far is it from Bowman's? I could not tell you exactly, but it is a good way.
797. You say you drive about 2,000 stock a year? I have done, but not a present.
798. Would that be a fair average for a year's work if you were fully employed? Not for me.
799. Do you think 1,500 would be a fair average? Some go by train.
800. How many drovers beside yourself follow this route? A great number. They are nearly all away now with stock.
- 800½. How many do you think? I could mention a good few. There are five or six here now. I know of one or two who were drowned at the crossing.
801. You think there are twenty drovers using that road every year? I daresay, but I would not like to swear it.
802. I suppose we can take it as a fair estimate that 20,000 or 25,000 cattle are driven down that stock route every year? I should say so.
803. *Mr. Hurley.*] Would this bridge, if erected, be used by any other class but drovers? I think so, by people going to and fro.
804. By farmers? Yes, and by Denman people.
805. Denman people would use the bridge in order to reach where? Going from Denman to Jerry's Plains.
806. Is there much trade between Denman and Jerry's Plains? There is not much at present, because they cannot get there.
807. Do any drays travel along that line now? There would be if a bridge were erected.
808. But do they do it at the present time? They cannot do it, it is impossible.
809. Practically the bridge would be in the interests of the persons interested in stock? And the general public as well.
810. Have you heard any talk as to the probability of meat being killed beyond here, or in Muswellbrook, and conveyed by rail to market? No.
811. Supposing that were done, would it not be carried to market in a better state? No, I don't think so.

*Mr. C. Smith:*  
10 Mar., 1890.

Reginald White, Esq., sworn, and examined:—

812. *Chairman.*] What is your occupation? I manage my father's estate.
813. Do you fatten cattle on the estate? Yes.
814. Do you send them to the Sydney market or sell them on the ground? We have lately sold them on the spot to Mr. Richards.
815. Then you do not trouble yourself about the droving? Yes, we do. Two or three years ago we did not sell any through Mr. Richards, but had to send them all by road.
816. If you are now selling to him, he takes the responsibility of the droving? Yes, but we would have to keep them for him if he could not get them across the river.
817. How far are you from the crossing? About 15 miles.
818. You would not start your cattle if you knew the river was impassable, so that the want of a bridge is not so much inconvenience to you? Well, we would be losing the market.
819. How many days' journey is it between here and Sydney? Fourteen.
820. Does the market keep steady for fourteen days? I think so.
821. Does not the market sometimes go up and down, like the river? Yes.
822. If the market were high, and you were fourteen days' journey from it, you could not guarantee to deliver the stock before it fell.
823. You have no knowledgo of the quantity of stock coming down by rail? No.
824. You could not tell whether a glut was likely to arise in fourteen days? No.
825. Excepting for the risk of losing the market, the keeping of the stock for two or three days on your land would not be any material hardship? No, not for that time, but if you keep them back you want other cattle to come on. The other cattle would come in and fill our paddocks and eat us out.

*R. White, Esq.*  
10 Mar., 1890.

- R. White, Esq.  
10 Mar., 1890.
826. If the rain was so heavy that you could not cross at Bowman's, you would not get the other cattle round very quickly? No.
827. So that these very heavy rains check traffic altogether? Yes.
828. It is a check all along the line? Yes.
829. Supposing you were sending stock to market, would you be willing to pay a toll of 1d. per head for a bridge? Yes.
830. Whether you use the bridge or not? Yes.
831. Do you think the other stock-fatteners in the district would be willing to do the same? I think so.
832. Do you think the estimate of 20,000 to 25,000 cattle crossing per annum is a fair estimate? Yes; we alone sent 4,000 within the last twelve months.
833. Have you ever heard your father speak on the subject of a toll? No; not lately.
834. Like most of the people of New South Wales, you would prefer a bridge without a toll? Of course.
835. But you would rather have the toll and the bridge, than no bridge and no toll? Yes.
836. And that, even though you only live so short a distance from the crossing, and need not start your stock unless you like? Yes.
837. Even then you would rather have the bridge? Yes.
838. From what you know of Mr. Richards, do you think he would pay toll? Yes.
839. When he buys he wants to get stock down pretty quickly? Yes. I know of an instance in which he had cattle drafted at my father's place, and the river came down, and we had to let him keep his stock there. I think he was a week before he got them away, and no doubt that was a great inconvenience to him.
840. How often have you known Mr. Richards stuck up after starting with stock? That is the only time I know of.
841. Then the number of times the stock are delayed in the course of a year are not so many, but the inconvenience is very great each time? Yes.
842. I suppose the river is passable about ten months in the year? Well, it has been, but in wet seasons it will be more frequently blocked.
843. Would you like to see more wet seasons? Yes.
844. Would you like to see the river impassable? Not altogether.
845. Are you well acquainted with the stock traffic from the north? No.
846. You only know the local traffic? Yes.
847. *Mr. Trickett.*] Do you know anything about the sheep traffic? I have seen sheep go through Denman very often.
848. Have you heard of them often being stuck up? Yes, I have heard of lots of sheep being stuck up at Bowman's, but I have never seen them.
849. Sheep are more trouble to get over a river than cattle? Yes, it must be a very wide crossing to get them across properly, and there must not be any banks about. If they get on each other's backs they drown.
850. Do you think Bowman's or Gee's the best place to cross the river? I don't know Gee's at all.
851. *Mr. Hurley.*] Do you think the bridge, in the event of its being constructed, will be used by many people besides drovers? I think so. In dry weather teamsters sometimes go that way.
852. What do the teams convey? Merchandise.
853. There is no wool conveyed to market? No.
854. Do you know anything about the routes spoken of across the Goulburn beyond Denman? Yes.
855. Do you think that would be a suitable route? No. I cross the Goulburn almost every day. You never put a valuable horse in there without being liable to get him drowned. It is very boggy. As long as he can swim he is all right. As soon as he gets a footing he is bogged.
856. Then the difficulties there are more than at the other places named? Yes. Besides, if you go that way you have to cross Gregg's Creek, which is more boggy, I think, than the Goulburn.
857. Would you prefer to have meat conveyed to market in cool cars, than by means of the present mode of driving? Yes.
858. Are you likely to avail yourselves of reaching market if it is introduced? Yes.
859. Then that bridge, excepting by a small number of the population, would not be used very much? I do not think it will be used so much when the chilled meat process is carried out.
860. *Mr. O'Sullivan.*] I suppose if the crossing over the Goulburn had been available to drovers, it would have been used and a track laid out. It goes through private property, and it would cost a lot of money to open a road.
861. But it has not always been private property. Do you not think a track would have been laid out before the ground was sold by the Crown? Of course it could have been laid out. There were not many cattle going that way when the ground was first purchased, so that it was not necessary to open one.
862. Do you think the cattle drovers generally, or those whom they represent, would be willing to pay a toll if the bridge were constructed? I think so.

Mr. Michael M'Taggart, drover, sworn, and examined:—

- Mr. M. M'Taggart.  
10 Mar., 1890.
863. *Chairman.*] What is your occupation? A drover.
864. How long have you been a drover? Going on for nine or ten years.
865. Do you take down cattle mostly fattened in this district? Yes, from here to market.
866. Have you brought cattle from the north? Yes.
867. And crossed them at Bowman's? I have not crossed them at Bowman's, but my brothers have. I have taken local cattle and crossed them at Bowman's.
868. How often have you been stuck up with the river? Not many times myself, but I know there are plenty who have been.
869. Do you think it will be worth while for the drovers to pay 1d. a head to cross their cattle over a bridge rather than do without it? I believe it would.
870. As soon as the river begins to fall, I suppose you are in a hurry to get across? Yes.
871. Do you find that you damage the stock in rushing them over the river? Yes, and it will damage cattle.

Mr. M.  
M'Taggart.  
10 Mar., 1890.

872. In what way? They get knocked about.
873. Do they suffer at all from getting wet? They do in winter time, when it is cold.
874. They fall off in condition? Yes.
875. But you have never had any of them die from getting cold? Not from swimming the river, but they go off in condition.
876. They suffer a great deal more than 1d. a head? I believe they do.
877. Do you think the traffic is sufficient to justify the building of a bridge? Yes, the traffic to the bridge would go from both roads if the river were up.
878. Do you think a 15-ft. roadway would be sufficient to get cattle across? Yes.
879. Would you only want it when the flood was up? That is all.
880. And you could push them across a roadway of that breadth? Yes.
881. You know the bridge at Singleton? Yes.
882. You know that stock often cross there? Yes.
883. There is no great difficulty? I do not think so.
884. *Mr. Trickett.*] Have you ever seen sheep stuck up at the river, and unable to cross? Yes.
885. Often? Not very often, but I have seen them. I have known them stuck up a few days, perhaps a week.
886. Are many sheep driven along that road? A good many.
887. In mobs of how many? I could not say, but I have known a good many come down.
888. When did you see the last mob? I could not say that I have seen any sheep going across the river since the last flood. That is within the last two months. They could often be there without my knowing any thing about it.
889. Have you not met or passed flocks of sheep on the road frequently? Yes; but I have not seen any sheep stuck up since the last flood.
890. When was that? Almost within the last month or so.
891. But you used to see them before that? Yes; I have known them stuck up at the river two or three days, and then, when they started to cross, they would run a great risk by swimming.
892. I suppose the bridge would be more used for crossing sheep than cattle? Yes.
893. Sheep are always difficult to get across water? Yes; cattle could walk when sheep would have to swim.
894. And your difficulty is to get them to take the water? Yes.
895. Could you tell us what number of sheep cross in a year? No.
896. How many have you seen on the road at a time? Of sheep travelling homewards there are generally from 1,500 to 2,000 in a lot.
897. You have seen droves of sheep of that number? Yes.
898. What would be a fair toll to charge for sheep crossing the bridge? I could not say.
899. *Mr. O'Sullivan.*] Do you know the crossing at Krust's lane? I do not know the crossing by that name.
900. Do you know any other crossing between Bowman's and Gee's? No, I do not, not for stock. The only crossing I know of is at Mr. Pearce's place.
901. That is called Gee's crossing, is it not? Yes, that is the only one I know of.
902. Were you one of the local residents who signed a memorial in favour of Bowman's crossing for the reasons stated? What was that for?
903. It says here, "In 1883 Mr. Gould forwarded a memorial from the residents in favour of a bridge at the old site (Bowman's crossing), because (1st), it was well known; (2nd), it was a direct route; and (3rd), that at that site only the direct expense of a bridge would be required." Were you one of those who signed that? I think I did sign something of that kind, but that was before this bridge at Gee's crossing was thought of.
904. You give your preference now to Gee's crossing? Yes.
905. What sort of a road leads from the stock route to Gee's crossing? Does it go over hills and gullies? There are hills and gullies down either ridge, but the traffic would go on to the bridge from both roads.
906. Did you sign a petition in 1887, asking for the re-erection of a bridge at Bowman's crossing? I could not say. Some of my brothers might have done that.
907. *Mr. Hurley.*] How many times do you think you visit Sydney with stock in a year? Do you go there six times a year? Some years I may go more, and some not so much.
- 908-9. Have you been there five times a year during nine years? I believe I have.
910. How many times have you had to remain at the river with your stock—Have you been delayed ten times—Do you think you have been delayed five times? I could not say that I have.
911. Could you say whether you have been delayed over five times through the river being up? Yes; I believe I could.
912. You have been delayed more than five times, but you are positive you have not been delayed ten times? Not during the year.
913. Of course you would not be stuck up ten times during a year; but have you been delayed at that river ten times in nine years—Have you been delayed once a year? It is like this; I am not going in every year.
914. Have you not gone to Sydney a score of times, and not been delayed by the river? Yes.
915. Then in ten years you may have been delayed ten times. Have you been delayed more than ten times in nine years? I could not say that I have; my brothers have been delayed more than I have.
916. In nine years you have not been delayed more than nine times, and you have been to Sydney with cattle at least 100 times in that nine years? Yes; somewhere about that.
917. Is that route used for any other purpose than for stock. Have you seen teams upon it? I could not say that I have seen teams, but I have seen other vehicles—carts and buggies—coming from Muswellbrook and that part of the district.
918. Light travelling? Yes; I could not say there have been teams travelling there.
919. The absolute necessity of this bridge is for the benefit of travelling stock? Yes, and for the traffic from Jerry's Plains to Muswellbrook, and Muswellbrook to Jerry's Plains.
920. Looking at the matter as a general tax-payer, would you feel warranted in recommending the construction of a bridge to cost £20,000 for the benefit of stock-growers? (No answer.)

- Mr. M. M'Taggart.  
10 Mar., 1890.
921. Have you ever given any consideration to the question of conveying stock to market by frozen meat cars? (No answer.)
922. Have you ever heard anything about that system being likely to be brought into operation? (No answer.)
923. Have you ever thought about it? I do not understand what you mean.
924. Have you heard squatters or drovers speak about the building of railway cars to convey dead meat to market in a frozen condition? No; not that I can recollect.

Alexander Rawson, Esq., manager of Woodlands, sworn, and examined:—

- A. Rawson, Esq.  
10 Mar., 1890.
925. *Chairman.*] What is your occupation? Manager of Woodlands.
926. What is the area of that property? About 9,000 acres.
927. How far is it from here? About 17 miles.
928. Between here and the Hunter? It is on the Hunter.
929. Do you send much fat stock to market? Yes.
930. On your own account, or do you sell it on the place? I send a great many in on my own account.
931. Where do you cross them? At Bowman's.
932. Have you been much inconvenienced at any time by the want of a bridge? Not myself.
933. Do you think there has been any inconvenience in the district? Yes; great inconvenience.
934. Sufficient to justify the Government in going to the expense of a bridge? Yes.
935. Would a bridge with a 15-foot roadway be sufficient for your purposes. Could you get your cattle across? You could; but it would be very narrow, I should think.
936. You would rather put them across a bridge of that character in flood-time, than keep them standing? Yes.
937. You would have no difficulty in crossing? You would have difficulty, but it would be better than waiting for the river.
938. Would you be willing to pay 1d. a head on your cattle if there was a bridge there, whether you crossed the bridge or no? Yes.
939. If you crossed 6,000 cattle in a year, and you only used the bridge for 500 cattle, would you be willing to pay on the whole quantity? Yes.
940. At 1d. per head? Yes; when the river is up.
941. I mean whether the river is up or not? Not when the river is down.
942. You would only pay when you wanted to use it? Yes.
943. And you would not at other times? No.
944. Do you think that would pay for a bridge under those circumstances? I do.
945. You only want to use it twice in a year? It has been wanted ever since I was there, or nearly so.
946. Once or twice in a year? Since May it has hardly been passable, except for vehicles.
947. But this is an exceptional year? I have only been here fifteen or sixteen months, and my experience is that it is badly wanted.
948. *Mr. Trickett.*] You said just now that personally you had suffered no inconvenience? With stock.
949. Your drovers have been able to get over? I have been able to cross, but I have seen numbers of drovers delayed for days, and then they had to swim their stock at a risk.
950. Have you ever seen any sheep delayed? Yes, I have seen sheep which have had to turn back and come round by way of Muswellbrook.
951. What quantities of sheep have you seen there? 2,000 or 3,000.
952. In one mob? Yes.
953. Can you say what quantity of sheep have gone over there during the time you have been here? No, I could not.
954. The property you manage adjoins Bowman's crossing, does it not? No; it is a bit above it. It joins Harrowfield.
955. The traffic is constantly under your observation? Yes, our property is on both sides of the river.
956. Could you not give us some idea of the number of sheep that cross? No, I could not. I do not see half the sheep that pass.
957. Will there be a mob a week? Yes, when they can cross, but there are not so many coming now, because they cannot cross.
958. Have you noticed much other traffic besides cattle and sheep crossing the river? There would be lots of other traffic if they could cross.
959. Of what character? There are vehicles constantly going between Jerry's Plains and Denman, but they have not been able to cross for months.
960. Which do you think the best crossing—Bowman's or Gee's? I could not state.
961. *Mr. O'Sullivan.*] Are you well acquainted with the various crossing places on the river? No, I know little about them.
962. Are you anywhere near what is called Gee's crossing? No, I am higher up the river.
963. Do you know Gee's crossing? No.
964. Do you know a place where there was once a wine shop? I have heard of it, but I have never been there.
965. Do you know Krust's lane? No.
966. The only crossing place you are acquainted with is Bowman's? Yes.
967. How wide do you consider that is? I could not say. It is a good width in flood-time.
968. Is it 200 yards wide in flood-time? Hardly that, but I have never seen the crossing at top flood. I have often seen it when it has been swimmable, and I have had to swim it with a horse.
969. Do you know any better place than Bowman's? Not myself.
970. You have not been there long enough to be thoroughly acquainted with the place? No, I am not acquainted with the crossings.
971. *Mr. Hurley.*] Why do you not avail yourself of conveyance by rail to market? It is too expensive.
972. What does it cost you per day to get your cattle to Sydney, by droving? That all depends.
973. Give us an average? I have never sent any stock to Sydney. I always send to Maitland.
974. You know the cost of sending 100 bullocks to Sydney? From our place we generally give the drover £30 a trip.
- 975.

975. That will embrace a good number of cattle? Yes, any number you like up to 200.
976. Have you given any consideration of sending stock to market by means of frozen cars? No.
977. If the Commissioners were to introduce a system of frozen meat cars, whereby you could reach the market safely and expeditiously, would it not be to the advantage of the producer, provided that the freights were of such a character that they did not come too much beyond the coast of droving? Yes.
978. If that were done would the necessity for a bridge exist? They want the bridge all the same.
979. Why? Heaps of stock must constantly go that way, no matter what methods are adopted of sending stock away by rail.
980. You will not be forced to the position of using any other facilities for market than the old system of driving over land? We may be. I cannot say. I think a bridge will always be wanted there, because there will be always stock going in.
981. Leaving stock out of the question, will it be used for any other purpose? Yes.
982. By large numbers? Yes, constantly and daily.
983. What for? For people travelling backwards and forwards.
984. Where to—between what places? Denman, Singleton, and Merriwa.
985. Do drays travel on that line now? They do not now, because they cannot.
986. Have they ever done so? Yes; when I first came there they were constantly driving.
987. Going to where? To Denman.

A. Rawson,  
Esq.  
10 Mar., 1890.

James Cobb White, Esq., sworn, and further examined:—

988. *Chairman.*] What is the cost of sending stock by train from Muswellbrook to Sydney? About £5 11s. 6d. per truck. J. C. White, Esq.
989. How much per head would that be? It depends on how many you put in a truck.
990. Say per cwt.? You can put 77 cwt. in a single truck.
991. Take it by bullocks? I send about eleven bullocks in a truck, but they would only be of moderate size, and would weigh about 7 cwt. If you put larger cattle in, you only put nine in a truck.
992. What is the cost of sending them by road? Mr. Richards pays £20 for sending 200 head from here to Riverstone. I pay £25 from here to Sydney,—that is about 2s. 6d. per head.
993. What do you estimate as a fair allowance for damage by train compared with travelling by road? Going by road the cattle deteriorates to a certain extent, but the butchers in Sydney prefer them to cattle travelling by train.
994. How much more is a bullock which travels by road worth than a bullock travelling by train? If it comes by train it loses nothing in weight, but if it comes by road it does.
- 994½. So that the two systems are pretty well balanced? The only difference is between the road and rail charges.
995. Will 2s. 6d. cover the difference? There is a difference between 2s. 6d. and 11s., of 8s. 6d. That is where the difference is.
996. You think there is a saving of 8s. 6d. in sending by road? Yes.
997. And unless the drought is very bad it is worth while to stick to the road? Yes. I sent by train all through the drought, and when it broke up I sent by road.
998. How many times in the course of the last ten years would the difference of 8s. 6d. be met by the drought? Seven years out of ten.
999. Then during only three years out of ten would this bridge have been of great importance? It is only in seasons when we can send cattle by road that the bridge is of importance.
1000. In spite of the fact that during the last ten years the bridge would have only been required for three years, you think the stock-owners would pay the toll of 1d. a head for a bridge? The last ten years have not been ordinary years. We have had a general drought during the last ten years. In ordinary years you would only, perhaps, want the train one year out of the ten.
1001. You think the chances for the next year are that the people who want to use the bridge would be willing to pay for it? Yes; if we cannot get our meat conveyed to Sydney in frozen cars. If we get that we shall not want the bridge, as far as I can see. The local traffic will only want the bridge.
1002. *Mr. Trickett.*] If the bridge went by way of Gee's crossing, the land would have to be resumed through Mr. Pearse's property? Yes.
1003. Could you give us any idea of what the cost of the resumption would be? About 30 acres would be required; but it is not the cost of the land so much as the damage done by cutting him off from his water frontage. I could not estimate what the damage would be.
1004. What would the land be worth? It is ordinary ridge land, I suppose it is only worth about £3 an acre.
1005. Is the portion which would be required improved land? It is only ringbarked. There are pretty rough ridges along there, and deep gullies.
1006. *Chairman.*] The ridges would be no obstruction to a cattle track? No; it would make the land cheaper to resume.
1007. And if there was water on the back part of the land, the cutting off from the river frontage would not be of importance? No.
1008. Would the whole cost of opening that road be £1,000? Of course the Government would have to fence it.
1009. Would it cost £1,000 altogether? There would be 6 miles of fencing that would cost about £400.
1010. Will the purchase of the land and compensation cover another £600? Hardly, I should think.
1011. Then £1,000 would really be an outside price? I should think £1,000 would set him right.
1012. If the engineer says it will cost £1,000 more to make the bridge at Bowman's than at Gee's, the extra cost of the road would be more than saved by the diminished cost of the bridge? Yes.
1013. And the bridge will be available for Sir Thomas Mitchell's Road very conveniently? If you look on the plan, I think you will see there is a road from Sir Thomas Mitchell's Road to Gee's crossing.
1014. Would not the road continuing due north from Gee's crossing hit Sir Thomas Mitchell's track? I should think it would.
1015. Would that be a convenient part of the road on towards Liddell platform? It would not be much of a round for the Jerry's Plains people to get to Liddell to go across Gee's crossing. It would be a great deal better than not having a road at all, and they would have only to use it in flood-times.
1016. Which way do they go now to Liddell from Jerry's Plains? They keep below my property. I do not know where they go exactly.

J. C. White,  
Esq.  
10 Mar., 1890.

Mr. John Frith, drover, sworn, and examined:—

- Mr. J. Frith. 1017. *Chairman.*] Where do you reside? In Muswellbrook, at present.
1018. What is your occupation? I have been a drover all my lifetime.
- 10 Mar., 1890. 1019. For how many years? Between thirteen and fourteen years.
1020. Have you frequently driven sheep or cattle? Both.
1021. At which place have you crossed the Hunter? At Bowman's.
1022. Do you know the present extent of the trade? Very little.
1023. Whilst you were conversant with the droving trade how many cattle crossed at Bowman's in a year? I have myself driven as many as 1,800 in twelve months.
1024. Would you think 20,000 an excessive estimate? Yes.
1025. You think there would be 20,000? I think there would be that, and more.
1026. How many sheep do you think crossed there in a year? I could not say.
1027. Where do the sheep mostly come from? From all stations on the Plains, and from the north-west and north.
1028. Do you think, since the railway has been opened across the Hawkesbury, and direct communication has been given to Sydney, sheep come here to cross? They would if they could cross the Hunter, but the Hunter has been in a very bad state.
1029. You think, ever since the Hawkesbury Bridge has been opened, the river has not been favourable? Very seldom.
1030. The stock-owners have an idea that if they send by road there is a chance that they may be stopped for weeks at the river, and for that reason they think it best to truck their stock? Some of the squatters have told me they would send more by road, but for the rivers.
1031. Do you think sheep suffer as much as cattle in the trucks? That depends on whether their fleece is on or off. If it is on, I think they suffer more.
1032. Do you think the gain of sending sheep by road is as great as the gain of sending cattle by road? I think it is.
1033. You think that for both kinds of stock the road is the best if there is feed? I am certain of it.
1034. If the road was good it would pay them to return to the road again? Yes; the butchers have told me at Homebush that they would allow almost 1 cwt. on every bruised beast.
1035. Do they allow anything for bruised mutton? I do not know, but I know that a lot of sheep going by road will not bring as much as a lot, equally as good, going by train.
1036. Do you think it would pay the owners of stock to pay a toll over the bridge? Yes.
1037. Would they pay 1d. per head on cattle? Yes; a drover would be willing to pay that himself.
1038. Do you think they would pay more? I am certain they would be satisfied to pay more.
1039. One penny per head on 20,000 head would only amount to £83 6s. 8d. in the year. That would not pay the toll-keeper's salary? No, I think they would not mind paying 2d. per head.
1040. Have you brought cattle down from Warrah? Yes, for twelve years.
1041. Long before you get within reach of Denman you know whether the river is passable? Yes, but you cannot stop to perish cattle on the road. You have to go on, to go round or to swim it.
1042. But if you knew the river was impassable at Bowman's, would you make for Singleton? You would have to go to Denman to do that.
1043. Cannot you go from Muswellbrook to Singleton. Do you mean to say that going from Warrah you would have to go altogether to Denman, and then north-east to Muswellbrook? Either that or travel along the metal road.
1044. The extra distance would not be so bad for stock as going on the metal? No.
1045. It is a great point to keep clear of the metal? Yes; I would rather go 15 miles on an ordinary road than 7 miles on metal.
1046. If you go from Muswellbrook to Singleton is it metal all the way? No, at odd places you can get off the metal a little, but not for long. I do not suppose you can get off more than 3 or 4 miles the whole distance.
1047. Is the metal as bad for sheep as for cattle? Hardly.
1048. How many miles a day do you travel cattle? That depends on the kind of country. If you are in lanes, or country where there is no feed, it is an advantage to go as far as possible, but the general average is about 9 miles.
1049. And for sheep? About 7 miles.
1050. Are there any feeding stations between Muswellbrook and Singleton? Not many. There are one or two little places.
1051. No reserves? There are one or two, but they are very small and badly situated. You cannot use them as you want to use them.
1052. Your evidence is that it is very inconvenient to be forced into the road from Muswellbrook to Singleton? Yes.
1053. And that this other route ought to be kept open in all weathers? I know of many men who would rather swim than go round.
1054. But you cannot swim your sheep? You can, but it is a great trouble to do so. I have known men stuck for four days at Bowman's trying to get 2,000 sheep over. They got them over, but the man had to swim and risk his life.
1055. Is there any accommodation at the crossing itself? No.
1056. Have you to go back? There is not a place where you can hobble your horse for a feed; there is no hotel or accommodation.
1057. Have you ever crossed the Goulburn near Denman? Yes.
1058. Is that a good stock crossing? Not as good as the others.
1059. Why not? Generally it is boggy and you have to go through Denman, and it knocks your stock about to get them through. The thistles are very bad on the road.
1060. Is the Goulburn often in flood? Yes; it has been impassable for some weeks.
1061. Is it at present as troublesome to get over there as Bowman's? Yes; it is worse, because there is bog and quicksand there.
1062. There is nothing to be gained by trying to make a road round there? No.
1063. You do not know any better stock route from the north than the one now used? No.

Mr. J. Fritch.

10 Mar., 1890.

1064. Do you know Gee's? Yes; I have been over it.
1065. Is it as good a place for stock as the other? I daresay it is, a little better if anything.
1066. If the engineers state that that is the best site for sheep, you, as a drover would have nothing to say against it? No; I myself would rather have it there.
1067. What is the highest toll you think it would pay a stock-owner to give for a bridge? I do not think any stock-owner would grumble at paying 3d.
1068. That is when he used it? Yes.
1069. But not if he did not use it? I don't think he would agree to it then.
1070. How often in the course of a year do you think he would want to use it? The A Company would want to use it a great many times if they sent their stock by road—I believe they have sent as many as 60,000 in twelve months.
1071. They have got regularly into the habit of using the railway? Yes; more on account of the river than anything else.
1072. You think if the bridge were put up, they would go back to the road? Yes.
1073. Even if there was a toll of 3d? Yes, they do not look at 3d. or 1s. on a lot of stock. They have told me to pay for whatever grass I wanted, and not to spare money in any way.
1074. Anything to get the stock to market in good condition? Yes.
1075. It pays better to get the stock to market in good condition than to save 1d. per head.
1076. What is the average depreciation of a beast travelling from Warrah to town, as compared with killing on the spot? That depends on the season. The better the season the less they lose.
1077. What is the greatest diminution you have known of? A great deal also depends on the drover. I suppose a lot of cattle, if they were not well driven from Warrah to Sydney, would lose 1½ cwt.
1078. That is the maximum loss you have known? Yes.
1079. What is the least? A lot of cattle should go down without losing ½ cwt.
1080. That is in a good season, if well driven? Yes.
1081. Do you lose anything by having to stay two days when the river is up at Bowman's? Yes; because you often have to stay when there is nothing to feed on.
1082. How much do they lose by that? By the time they get to the end of their journey, each beast would lose about ¼ cwt.
1083. Then you think they might lose 3s. or 4s. a head? Yes.
1084. Then you think it would be very little for a squatter to pay 3d. or 2d. per head to save 3s. or 4s. a head? I think no squatter would grumble to pay 3d. per head; if they did, the drovers would be glad to pay it.
1085. Do you think they would pay it on all stock crossing the river whether they used the bridge or not? I think they would be satisfied to pay for using the bridge.
1086. In dry seasons you would not use the bridge? No, we would rather not use it, on account of letting the cattle get a drink.
1087. Do you think your employers would willingly pay 3d. a head to know there was a bridge there if it were necessary to use it? Yes.
1088. Can you get your cattle over a bridge 15 feet wide? Yes, over 10 feet, if there are rails on each side.
1089. Fifteen feet would be ample for all requirements? I believe it would. It is not like a place where a lot of vehicles are travelling about. We could see each other and wait for each other.
1090. The river, in wet weather, is the principal obstruction between the north and Sydney? Yes.
1091. Is there any other place equally bad? There is the Colo River, but it runs down in a couple of days. At Bowman's it is different. If a lot of sheep get stuck at Bowman's, you have to take them back 8 or 9 miles before you can get anything to eat.
1092. If the Government were to build a bridge here, there would not be a clamour for one at the Colo River? No, there is a boat there, and it runs down very quickly. I have been within 20 miles of it with a lot of sheep when it has been half bank high, and when I got there it has been passable for a horse, and in two days more you could swim a sheep.
1093. You think the want of a bridge is a serious obstruction to the stock traffic of Sydney? Yes.
1094. Does a large quantity of sheep come down by this route? Not lately, because the rivers have been too high.
1095. How do they get to market? Most of them by train now, because they cannot get over the rivers.
1096. If there were a bridge the owners would sooner send by road where they can get plenty of feed? Yes, when the roads are good they benefit a lot.
1097. Can you tell us what number of sheep in any one year have gone down by road? No.
1098. Can you tell us the number that has gone from Warrah? I suppose about 60,000 have left there in twelve months.
1099. Would that be a fair average from that one place? I think an average of about 45,000 from there.
1100. When did you leave off droving? In July of 1889, I think.
1101. Were you often blocked at the river with your cattle? I have been blocked, not at the river, but further back, waiting for the river to go down. I always looked out to see that I did not get blocked. I have had to swim the river several times, and have had a lot of difficulty in getting across. I have had to pay men to come from Jerry's Plains to help me over. When I was living at Jerry's Plains I helped dozens of people across the river. I have never charged anything for helping sheep across the river, but others have done so.
1102. Would a punt be of any use across the river? It would be of use, but nothing like a bridge. When the river is up to any height at all you cannot work a punt.
1103. But it would be of no use for taking large quantities of stock over? It would take from daylight until dark to get 2,000 over, even supposing the punt would hold eighty sheep.
1104. You say that if a bridge were erected the traffic would be taken away from the train? Yes, a good deal would.
1105. From certain figures submitted to us, it appears that in 1888, 5,000 sheep, cattle, and horses went by train from Muswellbrook, and in 1889, 14,690 went. What is the reason of the large increase in the numbers sent by train in 1890, as against 1888? I think a great deal of it is due to the rivers being up. They could not get them across the river, and to have run them round to Singleton would have put them out of condition. I have known a man drown as many as twenty sheep when crossing Bowman's crossing.

- Mr. J. Frith. 1106. What is the charge for a truck of sheep? I do not know.
1107. You think, then, that it is not by reason of the railway being available that the traffic by rail has increased, but because of the want of direct communication over the river at Bowman's crossing? That has a good deal to do with it. I know Mr. Cooper, of Jenagong, has trucked a large number of sheep on account of the river.
1108. Where was your place of residence when you were a drover? At Redbank, and Hall's Creek, half-way between Warkworth and Jerry's Plains.
1109. Do you think the erection of a bridge there would be of any advantage except as a means of conveying stock over the river? Yes, it would, because when the river is up the Doyle's Creek, people cannot get across from Muswellbrook at all. Then there are the people going from Denman to Jerry's Plains, and they cannot travel when the river is up.
1110. What would you say to a statement of this kind. "From inquiry and present observation of the tracks it is plain that there is little or no traffic from Muswellbrook," and that the traffic from Denman has altogether dwindled into insignificance? Well, the traffic has gone off a good deal lately.
1111. Why? Simply because they cannot get across the river. I have been wanting to go down to Jerry's Plains during the last two months with a dray, but I could not get there.
1112. And you, as a practical stock-drover, maintain that if this river was at all passable, the stock would again go to the road? A great deal of it would.
1113. In preference to the railway? Yes, a great deal of it.
1114. *Mr. Hurley.*] You say that on account of the river being swollen, you could not get across the river to Jerry's Plains? No.
1115. Could not you get round by Singleton? Yes, but look at the distance.
1116. What would the distance be? To go from my place direct to Jerry's Plains would be 31 miles. It would be 74 miles to go round the other way.
1117. You have been droving on the roads for thirteen years? Yes.
1118. How many times during those thirteen years have you been detained at Bowman's crossing? I never was detained at the river myself, but I have been kept back waiting for it to go down. I have often been detained at the station for a week on account of the river being up.
1119. Have you been kept back once a year during the thirteen years except on the station? Yes, more than that.
1120. Have you been detained twenty-six times? I cannot say, of course I drive more cattle than sheep, and if the river is a good height, I would rather swim than be delayed.
1121. It would not average twice a year? No, it would not.
1122. The road is exclusively used, is it not, for taking cattle to market? Yes.
1123. You have never seen any waggons or drays on it? Yes, plenty.
1124. What doing? Travelling up and down.
1125. Carrying general merchandise, store goods, or station supplies? I cannot say they were store goods, but I have seen dealers and people travelling from Jerry's Plains, and so on.
1126. There is not a great deal of traffic? There is a good deal.
1127. Could you count ten vehicles a week upon it? No.
1128. Could you count five vehicles a week upon it? Yes, on an average you could. Then there is a good deal of traffic from Jerry's Plains to Muswellbrook.
1129. Did you ever see anything other than drovers and cattle beyond Jerry's Plains to Colo Valley? Yes.
1130. What? Teams.
1131. What did they do? The people who live along there have to come over for their provisions, and the produce they grow there has to be brought away to be sold.
1132. They are small farmers? Yes.
1133. Would they use the bridge at Bowman's? No.
1134. There would be no necessity for the bridge for them? No.
1135. Therefore the bridge, apart from the cattle it would accommodate, would be of use to about five persons in the district? Yes, but that does not include teams or horsemen.
1136. You know the depreciation in the value of beef taken by rail to Sydney, and conveyed by road? I consider the rail knocks 1 cwt. off every beast trucked.
1137. Therefore the meat driven to market is better for the consumer and purchaser than that taken by rail? Yes.
1138. Have you read, heard, or thought of the question of taking meat to market in a chilled condition? I have heard of it.
1139. Have you heard that it is likely to be successful, and that it will give facilities to the pastoralist to get his meat to market in a better condition than if it is taken by rail or driven? I believe it would be better.
1140. If it is taken down at 8s. or 10s. per head, do you not think it will be more to the advantage of the pastoralist? It might for the big squatters, but not for the smaller ones.
1141. Do you not think it would be better in the interests of the consumer, and that the beef would be more healthy? I do not think it will make any difference if the stock are driven.
1142. If cattle are driven in wet weather, and put into rivers, do not some of them die? An experienced drover, who understands anything about his business, would not put the cattle into the rivers when they were warm. He would wait until they were cold.
1143. It would be injurious on the part of the drover to do such a thing? Yes.
1144. Supposing there was a chilled meat industry here, and another up the line, and others at several places where cattle could be brought, and supposing they were put into trucks and carted direct to Sydney, would it not be better for the consumer and the seller? If it did not cost them too much to get them chilled and carried down, no doubt it would be better for the butchers.
1145. Supposing that they took them down at 8s. a head from here. You charge 5s.? Yes, but I drive them nearly 100 miles further than here.
1146. But supposing that were done, there would be no necessity for a bridge? Yes, there would, for the Jerry's Plains, and other people, would travel backward and forward.
1147. You think it is necessary for the general public? Yes.

1148. You stated just now that twenty sheep were lost crossing Bowman's. Do you mean by that Bowman's crossing on the Hunter River? Yes. Mr. J. Frith.  
10 Mar., 1890.
1149. Have not the Government a man stationed there? Only in flood-time. I have known that number of sheep to be drowned there when the river was only up to the saddle-flaps.
1150. What is the man doing when he is not engaged at the crossing? Maintaining the road.
1151. Would he have to be in the district if he had not to attend to the crossing? He would have to be kept on the road. When he is at the river for weeks the road is neglected.
1152. The watching of the crossing is an intermittent source of expenditure to the Government? Yes.
1153. If a bridge were constructed the man's pay for attending the bridge would be saved? Yes.
1154. Do you know the Jerry's Plains district well? Yes.
1155. How many people are residing on the south side of the river—say within 10 miles of Gee's crossing? I could not say.
1156. Are there a number of farmers there? Yes, a good many.
1157. Where do they go for stores? They often get them at Jerry's Plains and Singleton, but they have to go a long way round to get to Singleton.
1158. Then the people who live on the south side of the river would be greatly accommodated if a bridge were constructed to give them access to the railway station at Liddell? Yes; it would be a lot nearer for them and more convenient.
1159. You have stated that trucked cattle would sometimes lose 1 cwt.? Yes; they allow that. Sometimes a whole bullock is lost.
1160. I suppose it would depend on the state of the market what the amount of loss would be? Yes.
1161. Sometimes it might be 12s., and at others, 25s.? Yes.
1162. Have you noticed that since the opening of the Hawkesbury Bridge there has been a large increase of cattle sent down by rail? Yes.
1163. I understand you to prefer the crossing at Gee's to Bowman's? I believe it would be better for the Jerry's Plains people, but no better for travelling stock. It would be more handy and more direct for the Jerry's Plains people to go to Liddell or Ravensworth.
1164. Do you think the travelling stock is likely to cross at Gee's if the bridge is constructed there? Yes, they would go there.
1165. Would they go there if the river was down? If there was a man to collect the toll, he would catch them one way as well as the other.

Mr. William Hobden, grazier and farmer, sworn, and examined:—

1166. *Chairman.*] Where do you reside? Between Jerry's Plains and Singleton. Mr.  
W. Hobden.  
10 Mar., 1890.
1167. What is your occupation? Grazing and farming.
1168. As you live on the south side of the river, is this bridge of any great importance to you? I have an interest on both sides. On the south side particularly, because I have a great lot of fruit which requires to be taken to market.
1169. What kind of fruit? All kinds.
1170. Do you send it to Singleton? Yes, to Singleton, Sydney, and out as far as Armidale.
1171. When you send it northward what station do you deliver at? We have to deliver at Singleton.
1172. But in dry weather you can get across Gee's crossing? No.
1173. Not with a cart? Not with any safety. It would be far better to go round than run the risk.
1174. Are you likely to get stuck in the bed of the river? Yes, and the bank is not safe.
1175. How many miles is it from your place to Liddell platform? About 15.
1176. And what is it to Singleton? 16 miles.
1177. Then you only save a mile by going to Liddell? Yes.
1178. And then you save the extra trainage? Yes.
1179. Is there any considerable demand on the part of the Jerry's Plains people for a bridge to enable them to go north? Yes, I think so. I think if they could get to the Liddell platform, or station, they would do most of their business there.
1180. In any case a storekeeper at Jerry's Plains would lay in his stocks from Singleton? Yes; at the present time.
1181. But even if there was a bridge? I could not say.
1182. How many people are living at or near Jerry's Plains? There are between thirty and forty houses. There may be more.
1183. Are you on the main road from Bowman's crossing through Jerry's Plains? Yes.
1184. Do you see all the stock which comes down? I live within 2 miles of the road, and the road goes through our land. I see a great deal of the stock coming down.
1185. Do you think on an average there are 20,000 cattle a year coming down? I think there are.
1186. How many sheep? Not so many as there have been.
1187. What do you attribute that to? I don't know. Some people say one thing, and some another.
1188. Then, in wet weather, you can always get to Singleton by Warkworth? Yes, by going 23 miles.
1189. Would a bridge at Maison Dieu be a great help to you? Yes.
1190. But only in wet weather? Yes; it is a bad crossing.
1191. You can get your fruit carted across there in dry weather? Yes.
1192. Is there any worse crossing there than at Gee's? It is better.
1193. Gee's is a bad crossing even in dry weather? Yes, at any time.
1194. If a bridge is to be built at all, which site would suit Jerry's Plains best—Gee's or Bowman's? I think Gee's would be the best.
1195. Do you really think there is any need for a bridge at all? I think so.
1196. Altogether apart from the fondness of people generally for getting money spent in their district? Yes; I think so. People will not go 20 miles round if they can get to a railway by going 9 miles.
1197. Is there any road laid out at present from Jerry's Plains to Liddell or Ravensworth? Yes; part of the way.
1198. And you have to trespass on people's property? Yes.
1199. Is there any trouble about it? Well, neighbours are very agreeable.
1200. If you do not do damage, they do not grumble? No. 1201.

- Mr. W. Hobden,  
10 Mar., 1890.
1201. If a bridge were made here there would be a demand for a straight road through? No doubt.  
 1202. Would it go through Liddell or Ravensworth? Liddell.  
 1203. How much new road would have to be made? About 2 miles at the most.  
 1204. Is it a fairly good road? It is only a bush road.  
 1205. Is it boggy in many parts? Yes; at the present time.  
 1206. Even in wet weather that would scarcely be a practical track for vehicles? It would be very bad.  
 1207. It would do for horsemen? Yes.  
 1208. When the weather is wet, does not everybody stop at home and put off their journeys as much as possible? They do if they have to go a long distance round, and they often lose a great deal by that.  
 1209. People only turn out if it is a case of necessity? That is all.  
 1210. So that, practically, until the river is down, people stay at home? Yes.  
 1211. But when you are taking stock to market, you go along in very bad weather? Yes.  
 1212. It does not make any difference to you? No.  
 1213. *Mr. Trickett.*] For obtaining access to Singleton is not the road by Maison Dieu better than any other? Yes, it is 5 or 6 miles shorter.  
 1214. The distance is only about 12 miles is it not? Yes; from Jerry's Plains to Singleton by Maison Dieu.  
 1215. What is the distance from Jerry's Plains to Liddell? Nine miles or a little more.  
 1216. How often do you go or send in to Singleton? Nearly every day in the fruit season, or about twice a week on an average.  
 1217. Are there many other people there who grow fruit and produce? There are small farmers with orchards.  
 1218. Where does their produce generally go to? Singleton.  
 1219. Is the district likely to increase as an agricultural district? I think so—I do not see what is to prevent it. It possesses as good cultivation land as any on the Hunter.  
 1220. Have you had any experience of river bridges? Not much.  
 1221. Was the bridge which was built at Bowman's crossing a good one, or a bad one? It was badly constructed. Low-level bridges will not do here.  
 1222. You do not think it is advisable to build low-level bridges? It is not advisable.  
 1223. The river is very rapid? Yes; and there is so much drifting timber about.  
 1224. Do you think a high-level bridge, about 15 feet wide, would be sufficient to answer requirements? I think so.  
 1225. *Mr. O'Sullivan.*] Upon which side of the river is the polling-place for Jerry Plains? On the south.  
 1226. How many votes are recorded at an election? Over eighty, I think.  
 1227. Are there not some German farmers down there? There are all kinds, I think.  
 1228. But is there not a German settlement? Not that I know of.  
 1229. Who carries on the fruit business besides yourself? It is carried on by all classes.  
 1230. Has vine cultivation been started? Yes; by the Germans. They started it, and they give instructions to others as to how to carry it on.  
 1231. Then we can regard Jerry's Plains as a permanent and growing settlement? I think so.  
 1232. Is there much room there for agricultural settlement? Yes.  
 1233. Is there more land to be taken up? There is more to be cultivated. There is not much Government land available there now; only on the town common.  
 1234. You have a very large town common? Yes; about 3,000 acres.  
 1235. A temporary common? Yes; and permanent, too.  
 1236. Have you petitioned to have it thrown open to selectors? I am not interested in it at all.

Mr. Richard T. Keys, grazier, sworn, and examined:—

- Mr. R. T. Keys,  
10 Mar., 1890.
1237. *Chairman.*] Where do you reside? At Bengalla. I am the owner of the Bengalla estate.  
 1238. How far from this township? About 5 miles.  
 1239. What is your occupation? A grazier.  
 1240. Do you send your own stock to market at your own risk? Very frequently, if it is not sold privately to Mr. Richards.  
 1241. Have you any interest in the proposed bridge? None, beyond the fact that it will be a great convenience to me in sending stock to Sydney and Maitland markets.  
 1242. How long have you been sending stock to market? About thirty years.  
 1243. How often have you been inconvenienced, and stuck up by floods? I have never made a proper calculation, but it has been very frequently. It must have occurred about a couple of times a year. Last week I sent a drove of 100 cows to Maitland, and they were stuck up at this very spot, and had to be brought along the metalled road to Singleton.  
 1244. Do you not know before they leave your place, whether the river is fordable or not? No. It was the Goulburn River. The Goulburn is more subject to floods than the other.  
 1245. Then you may sometimes be deceived when you start your stock from your place? Yes.  
 1246. Do you think it would be worth the while of the stock-owners of this district to pay a toll on the bridge? Yes, it would. I would willingly pay 8d. a head.  
 1247. Would that be only when the bridge was used, or for all that crossed the river? The stock would always cross the bridge if it was there.  
 1248. The evidence is that they would not. They would prefer to go through the water for the sake of a drink, and to avoid being knocked about on the bridge? Probably they would. I, of course, speak more from the grazier's point of view, but I do not suppose I could add anything to what Mr. Frith has stated.  
 1249. You only know it would be a great convenience to you? Yes.  
 1250. You would always like to know when the road is open? Yes.  
 1251. It would be worth something to you? Yes; we frequently send stock to catch a certain market, and they are stuck up at the bridge.  
 1252. Would it be £10 a year in your pocket to have a bridge there? Yes; no doubt it would.  
 1253. Would it be £50 a year in your pocket? I do not know that it would. No one is more concerned in the matter than Mr. Richards. He takes three-fourths of the stock from this district. I should say he takes about 10,000 stock a year.

1254. And if there was a toll he would pay the most? Yes.
1255. And he would be the best witness as to what it would be worth his while to pay? He would. I know he is constantly hindered by the crossing.
1256. Speaking as a citizen, apart from your personal interest in the matter, do you think it would be a fair national work to put up a bridge? Decidedly. It would be a benefit to the whole of the population from here to Moree.
1257. And enough people would be benefited by it to justify the expenditure? I do not think there is any place on the waters of the Hunter where a bridge is more required.
1258. And one bridge between Denman and Singleton would be sufficient? I think so.
1259. You do not think there would be any need of a second at Maison Dieu? I do not think so. When they once cross Bowman's the road is free to Maitland and Sydney.
1260. And it would only be the people who want to go from Jerry's Plains to Singleton who would be greatly benefited by a bridge at Maison Dieu? Yes.
1261. That is a much smaller population than those who are interested in getting to Sydney straight? Yes; living at Muswellbrook. I am not acquainted with the exact position of Maison Dieu and Gee's.
1262. You have no notion as to what are the relative merits of Bowman's or Gee's crossing? I certainly think Gee's site would be the best to the greatest number, because it would benefit the people of Jerry's Plains; they would get from Jerry's Plains to the railway, and the stock could use that crossing equally as well as the other; the position would suit both residents and graziers.

Mr.  
R. T. Keys.  
10 Mar., 1890.

Mr. John Mason, drover, sworn, and examined:—

1263. *Chairman.* Where do you reside? Denman.
1264. What is your occupation? Drover.
1265. If you live at Denman you know the Goulburn River, where it joins the Hunter? Yes.
1266. Have you ever crossed that river with stock? I have.
1267. Would it make a good crossing-place for stock in bad weather? No; it is bad.
1268. Why is it bad? It is boggy.
1269. It would not save the making of a bridge at Bowman's crossing to open a stock route that way? I think it would cost as much to make a bridge there as at Bowman's.
1270. Is the Goulburn a difficult river to cross? Very bad.
1271. As bad as the other? Worse. There is more timber in flood time.
1272. And you do not recommend it as a crossing-place for stock? No.
1273. You think the present stock route is as good a one as we can have? It is.
1274. You think it would be a pity to divert stock from the present road? Yes; you would have to purchase property to do so.
1275. All that is wanted is to make the present route available in all weathers? Yes.
1276. Do you think the quantity of stock coming down is sufficient to justify the building of a bridge? Yes; 6,000 stock go over from within 10 miles of my neighbourhood yearly, and more.
1277. Do you think a bridge 15 feet wide would be sufficient? Yes.
1278. You only want a bridge above flood-water? Yes; the bridge we had before was only an artificial bridge. I was the second to take cattle across it, and it shook the moment I went on it.
1279. Then it was not a bridge built to live? No.
1280. Do you think a fairly well-built bridge would stand the timber drift which comes down? Yes; it is a bad crossing at Bowman's at any time. It is a very wide crossing. It is a good crossing in one way for cattle when the water is low, but when it is high it is very bad; and when it is low—at summer level—it is bad for sheep.
1281. Is Gee's a good crossing? Yes, in one sense; but Bowman's crossing is the worst I have ever crossed.
1282. You would rather cross Gee's than Bowman's? Yes.
1283. If a bridge were made at Gee's, would it serve stock as well as at Bowman's? Yes; but Bowman's is more direct.
1284. If it is a bad season you get stuck up at many other places besides the Hunter? I think you can travel from here right out to the Warrego, and there are bridges everywhere.
1285. Then this bridge is the worst between Warrego and Sydney? Yes, I am certain it is. More stock have been delayed and turned back there than anywhere else.
1286. Of course in dry weather you are never stuck up? No, unless there is a fresh. I have known sheep to be stuck up there.
1287. Even in a bad season? Yes, it must be 80 yards across there at any time.
1288. Then if it is 2 feet deep you are stuck up? Yes, with sheep. On the banks of the Goulburn River there is quicksand, and it is very bad.
1289. There is no road open that way at present? No, you would have to go through Mr. White's property, and through Mr. Ellis' property. You have a good reserve on the other road, and it is only 2½ miles from Denman to the reserve.
1290. If the country were unfenced and unpurchased as in the early days you would not in a bad season try to take your stock across from Denman over the Goulburn? Well, it would be a good road, but you would not have the same feeding ground as on the other road, and it would be a great deal further round.
1291. The banks would be boggy? Yes; and I believe there would be a great difficulty in putting a bridge there.
1292. You could not dodge the river altogether by getting round to the west of Denman? I often have got permission when the Hunter has been up, and the Goulburn down, to go round that way with sheep.
1293. Then sometimes one river is up and the other not? Yes, but the Goulburn is very bad in flood.
1294. If the Goulburn is up, it is practically as impassable as the Hunter? Yes.
1295. *Mr. Trickett.* Would you prefer Gee's crossing to Bowman's? I would prefer Bowman's crossing.
1296. You think it is the better crossing? Yes, it is the shortest and best road.
1297. You would not have to go through much private land to go across Gee's crossing? Yes, you would have to go through purchased property. Years and years ago we used to go that way with stock, and I did not prefer it at all. Three years ago I got 300 or more signatures in favour of Bowman's crossing—from every stock-owner and drover in the district.
1298. They were all in favour of Bowman's crossing? Yes.

Mr. J. Mason.  
10 Mar., 1890.

- Mr. J. Mason  
10 Mar., 1890.
1299. Have you heard what is the feeling lately? I hear that some of the Jerry's Plains people want it at Gee's crossing, but I think the other crossing is the better one.
1300. Because it is on the main road, and follows the stock route? Yes; a large quantity of stock passos through Denman. This last week, seven lots of fat cattle passed through. I have left a lot to come to this meeting, and I will cross them at Bowman's to-morrow.
1301. Mr. Hurley.] Can you give an idea of the number of stock which pass over Bowman's? I suppose there must be some thousands yearly.
1302. Over 20,000? Yes.
1303. Have you suffered any inconvenience between the Hunter, Bowman's crossing, and your market? The Colo River is a bad place, and it wants a bridge, but you can get over it better than you can over Bowman's.
1304. Have you ever been detained there at all? Yes; I was detained there the other day.
1305. You have been twenty-eight years on this route? Yes.
1306. How many times have you been stopped through the river being flooded at Bowman's? I was detained there with a lot of Mr. Douglas' cattle for five days, and had to bring them on the Ogilvie's reserve. They were store cattle going to Goulburn. They were very weak at the time, and if I travelled them down the main road I might have lost half of them. I have been detained with Tyson's cattle on another occasion. I had 200 bullocks, for Martindale, going to Sydney, and we drowned five bullocks at £9 a head at Bowman's. We had to bring the rest back and put them in the paddock. I have been detained seven or eight days.
1307. In how many years? Seven or eight years.
1308. Have you been detained once a year during the time you have been droving? I would not say that.
1309. There were years when you were not detained at all? Yes, when we know the river is up, the drover engages men, and it costs him a good deal to get the stock over.
1310. So that on an average you have not been detained once a year in twenty-eight years? I would not say that, but I have helped stock over which have been detained, many times.
1311. At any rate some years you are not detained at all? Yes, some years we have had nothing to detain us, but when we get a season like this we are detained very often.
1312. Have you heard anything about chilling meat and taking it by rail to Sydney? Yes.
1313. Do you think that will interfere with your vocation? No.
1314. Why? Because they charge too high for everything on the railway. People send stock to market to make a little profit out of them.
1315. What do you receive per head for taking stock to market? Generally 6d. a head for sheep from Liverpool Plains, and 3s. a head from this district for cattle.
1316. Do you think if the Railway Department made low charges on meat taken to market in a chilled condition, there would be any necessity for a bridge, or that there would be any droving on the road at all? You would do a lot of poor men out of work. I have driven stock for agents in Sydney for many years, and I know they like to get them to market as cheaply as possible.
1317. It would interfere with your trade? Yes.
1318. Since the railway has been opened across the Hawkesbury, have not a large number of the stock been sent by rail? Not from here.
1319. Leaving outside the question of the stock traffic which would be served by a bridge, is there any other public convenience which would be served? Yes. There are the squatters about Jerry's Plains, and the cattle buyers who come in and by cattle. When the river is up they cannot take them over without going down to Singleton.
1320. But the population of Jerry's Plains is not sufficient to warrant the construction of a bridge for the purposes of the cattle they purchase? There are a good many people around Jerry's Plains and Denman, who would not come to Muswellbrook if they could get a bridge erected to take them to Jerry's Plains.
1321. Did you ever lose any bullocks? Yes, I drowned five on one occasion, and they cost £9 a head.
1322. Mr. O'Sullivan.] Why do you prefer the bridge at Bowman's crossing, because you tell us it is the worst crossing between the Warrego and Sydney, and then you say you prefer it to the one at Gee's? I do prefer Bowman's crossing, if a bridge is erected.
1323. Which one do you prefer? Bowman's crossing.
1324. Why do you prefer the bridge at Bowman's crossing? Because it is only about 7 miles from the reserve, and if you take them off the reserve, and have to drive them 3 miles further, they do not look as well.
1325. But all this time you say this is the most dangerous crossing between the Warrego and Sydney? It is.
1326. Then why do you want the bridge to be put over this most dangerous crossing instead of it being at a less dangerous place lower down? It is a very wide crossing, and that makes it dangerous. You can get sheep over a narrow crossing. I have been there for days with 6,000 sheep, trying night and day to get them over.
1327. But why do you prefer the bridge to be at Bowman's, instead of at Gee's crossing? Because it is on the straight route.
1328. Then you prefer it because it is the ordinary stock route? It is, and it is the oldest route in this part of the colony.
1329. That is your chief reason for wishing the bridge to be there. You want to follow the old route? Yes, by going the other way you would have to cross the ridgy country as well as private property, and you would have more lanes.
1330. Then you prefer the present stock route because you are nearer the reserves, and would have more room to drive your cattle on the route? Yes, it is a good road to Jerry's Plains crossing and to Bowman's crossing, and when the bridge is erected there it is good travelling. We were detained there, and I think it is the proper place for a bridge.

Mr. Thomas Cook, grazier, sworn, and examined:—

- Mr. T. Cook.  
10 Mar., 1890.
1331. Where do you reside? At Turanville, near Scone.
1332. What is your occupation? A grazier.
1333. Are you well acquainted with the stock travelling from your place to Sydney? Yes, with my own stock traffic.
- 1334.

1334. Do you send your own stock across at Bowman's? Yes, when I send any down. A few years ago I used to send 3,000 a year. Mr. T. Cook.  
10 Mar., 1890.
1335. Do you give a preference to the railway since it has been opened? Yes; for small lots.
1336. What do you call small lots? Thirty or forty. They go in very much better. I pay 2s. per head droving 200 head to Homebush—over 10s. per head by rail.
1337. On the whole, you make more per beast if they go by road? Yes; the butchers prefer them.
1338. What difference does it make to your pocket if you get them down by road? I could not say, but the butchers have a preference for road cattle. Stock are considerably bruised in trucking.
1339. Butchers are apt to express their preference in money? I suppose so.
1340. How much more do you reckon you would gain? It would be difficult for me to say.
1341. Do you think the opening of the railway has superseded the necessity of a bridge over the river? I should think the bridge is necessary for every kind of traffic. There is no way of getting over. My cattle, years ago, were stuck at the bridge nearly a week in flood-time.
1342. Do you find that cattle owners and drovers complain very much? Yes.
1343. You look upon the road as one of the great high roads to Sydney? Yes.
1344. Looking at the extent of the traffic, do you think the expenditure of £10,000 on a bridge would be reasonable? I do, it would be an expenditure for all time.
1345. As a cattle-owner, and a resident in the district, do you think a bridge with a roadway, 15 ft. wide, would be sufficient for all purposes? That is rather narrow.
1346. It is wider than the bridge at Singleton by the side of the railway? It would possibly do, if the cattle were taken over carefully.
1347. Practical drovers say it would suit them? If it would suit them it would suit me, so long as cattle could go over it.
1348. The project, as originally put before the Standing Committee, was for a bridge to cost over £20,000. If a bridge, 15 feet wide, could be built for £10,000, do you not think that would satisfy the legitimate wants of the district? Quite so.
1349. There is no need to waste £10,000 extra on a grand structure? No.
1350. If it is above flood-level, a buggy at a time can go across, and that is all that is wanted? That is all. Cattle can be taken over in little lots at a time. They need not be crowded unless they liked.
1351. You are further away from this place than most of the local witnesses. I suppose the bridge would not be of so much importance to you as to many living nearer? It is of importance to me in regard to the stock traffic generally.
1352. Do your stock come down there now? Yes, occasionally.
1353. How often have your stock been stuck up there? The drovers could tell you better, I had four going continually a few years ago.
1354. You do not go into details as to how they are stuck up? I suppose they have been stuck up hundreds of times. Of course, it is a matter of thirty or forty years droving. They have often been stuck there a week, and sheep have been kept a fortnight or three weeks.
1355. *Mr. Trickett.*] Have you a special knowledge of the locality? Yes.
1356. Which do you think would be the best site for the bridge—Bowman's or Gee's? I do not know Gee's crossing; others can speak of it, the most suitable place would be the best one for everybody.
1357. *Mr. Hurley.*] You prefer to send your stock to market by the route spoken of, on account of it commanding a more ready market? It cost me less money. It costs me over 10s. a head to take cattle to Sydney, and I can get them driven in for about 2s. to 3s., according to number.
1358. At all events, the buyers prefer driven stock to those sent in by rail? Butchers prefer driven stock to train stock which get fearfully bruised, if taken only a short distance.
1359. What is the cost per head for taking stock to market by the Colo Valley? 2s. to 3s.
1360. I suppose you have heard that the Railway Commissioners have been thinking of constructing chilled meat cars for the conveyance of meat to market? Yes.
1361. Have you given the matter any consideration? I have thought about it.
1362. You know that in other parts of the world—America for instance—the system is practised to a large extent. Do you think that if chilled cars are built, and the freights are lower than the present freights, the pastoralists and graziers are likely to send their meat to market in that way? It will all depend on the question of carriage.
1363. You recognise the fact that you would reach the market more speedily than otherwise? The idea would be very good if it were carried out.
1364. It would be better for the consumer as well as for the producer? Yes.
1365. If the freight charges were sufficiently reduced you would always prefer to send your meat by train? Yes, if it were convenient to do so.
1366. *Mr. Trickett.*] But even if that means of carriage were provided, the stock would have to be driven to some centre for slaughter? Yes.
1367. That would not do away with the necessity for a bridge? Apart from the chilled meat question, the bridge is required for the general traffic of the public.
1368. *Mr. Hurley.*] Outside the question of droving you think the bridge is a national necessity? I think so.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

Bridge Over the Hunter River at Jerry's Plains.

APPENDIX.

A.

PRECIS OF PAPERS IN RELATION TO THE PROPOSED BRIDGE AT JERRY'S PLAINS.

BRIDGES erected for the accommodation of the traffic at Denman and Bowman's Crossing were carried away by a heavy flood in the year 1879.

The bridge at Denman was replaced, and steps were also taken in the direction of rebuilding the other bridge, either at the old or at a better site.

17/3/81.—Mr. Laurensen, Road Superintendent, reported on a proposal to place the bridge at Krust's lane, stating that a high-level bridge, with road and fencing, would cost £5,600; and that compensation for land required would cost £2,000 or £3,000 more.

4/4/81.—Mr. John Brown, M.P., wrote to the Minister in advocacy of the same site, intimating that it would be a great convenience to the residents if the bridge were re-erected as near the Jerry's Plains township as possible. At present the people had to go to the station at Singleton, 20 to 26 miles away, whereas if the bridge were put up on the site suggested they could get to Liddell Station (9 miles).

Mr. Wells reported that the site recommended by Mr. Brown had, as he had supposed, much in its favour; but its chief advantage—ready access to the railway—would not justify the payment of the heavy compensation mentioned by Mr. Laurensen.

22/4/81.—Mr. Bennett minuted that, with a view to avoid the heavy compensation referred to, it had been decided to rebuild the bridge on the old site.

So far as the papers show, the matter then slept until June, 1883, when Mr. A. J. Gould wrote to the Commissioner for Roads, asking what steps had been taken with reference to the erection of the bridge across the Hunter River, at Jerry's Plains.

Mr. Bennett replied that Mr. Wells had been instructed to visit the locality and make a final report, and when that was received definite action would be taken.

Mr. Gould thereupon forwarded a petition from residents of Jerry's Plains, Warkworth, Singleton, Ravensworth, Camberwell, &c., setting forth that a road had been opened from Liddell Station, for several miles, in the direction of Jerry's Plains; that the Minister had favourably received a petition for an extension of such road, to join the main road from Denman somewhere near Gee's wine-shop; that to render this road of use to the public, a bridge across the Hunter at or near Gee's was required; that a sum of £6,000 was placed on the Estimates for a bridge at Bowman's Crossing; but that the site at Gee's was in every way better, as it would admit of a high-level bridge which would avoid the flat which was almost impassable in bad weather; the expense of a second bridge also would be saved. They therefore prayed that steps might be taken towards the erection of a bridge at Gee's.

Mr. Wells reported that some years before he reported in favour of this site, but the heavy compensation demanded for the land was too extravagant to be entertained. Time, however, might have changed the views of the persons concerned, and the local officer might make inquiry on this point.

Mr. Earngey, the local officer, reported strongly in favour of the site at Gee's, and intimated that he had arranged to go over the ground with Messrs. Pearce and Parnell, the land-owners concerned, and would report further.

16/10/83.—Mr. Gould, M.P., forwarded a memorial from residents of Jerry's Plains, in favour of the erection of the bridge at the old site (Bowman's Crossing), because—(1) It was well known; (2) it was the direct route; and (3) at that site only the direct expense of a bridge would be required. They also protested against the Gee's and Krust's lane sites, because the road leading thereto would be a most expensive one, passing over numerous creeks and gullies, and through private properties, to which latter, moreover, it would do much injury in cutting them off from access to the water.

10/12/83.—Mr. Earngey submitted his promised report. He had, he said, been over the various roads with Mr. Pearce, and had proved to him the indisputable advantages of the site at Gee's; but he still stoutly objected to any resumption of a road through his property, maintaining that no money would compensate him for the severance of his land and cutting him off from the water.

14/12/83.—Mr. Wells, in view of the manifest advantages of the site at Gee's, recommended that inquiry should be made at the Surveyor-General's office whether, under the terms of the grants, a road could not be forced through.

18/12/83.—Mr. Wells minuted further that he had ascertained that the terms of the grants admitted of roads being made through the land, with interdict presumably of passage within 200 yards of main homestead, and that Mr. Earngey should ascertain whether severance close to the river was absolutely necessary, and if the road could be kept 200 yards away from the homestead.

Mr. Earngey replied that it was absolutely necessary for the road to follow a leading range through Mr. Pearce's land, which would therefore of course be subdivided, and that the road could be kept 200 yards away from the homestead.

Mr. Wells suggested that the papers should be sent to the Surveyor-General for his opinion. Mr. Bennett minuted for the plans of the bridge to be put in hand; but what further action (if any) was then taken the papers do not show, and nothing more is recorded until November, 1884, when Mr. Narden reported that he had examined the various sites proposed for this bridge, and that at Gee's was better than Krust's, but the site near Rock's was better still. If the latter were adopted the properties of Mr. James Bowman and Mrs. John Bowman would be interfered with instead of those of Messrs. Pearce and Parnell. The expenditure required on the road was hardly justifiable in view of the smallness of the interests involved, and it was to be borne in mind that if a railway were made from Muswellbrook to Cassilis a good deal of the sheep traffic, upon which so much stress had been laid, would be diverted from this route.

19/1/85.—Mr. Gould drew the attention of the Minister to the necessity for a bridge at Maison Dieu or Dight's Crossing; also asked when a bridge would be erected across the Hunter at Jerry's Plains.

25/9/85.—Colonel Wells reported that Maison Dieu was the best site in respect of shortness of span, but for suitability for traffic lines Dight's Crossing might be preferable. Probably an intermediate site might be better than either, but the erection of a bridge at Jerry's Plains had a bearing on this question, and a proper judgment could not be formed until the river had been examined from Dight's Crossing to Bowman's Crossing.

November, 1889, to April, 1897.—Several letters of reminder in regard to proposed bridge at Jerry's Plains were received from Mr. Gould, M.P.

20/10/87.—The same gentlemen submitted a petition, praying for the erection of this bridge, and pointing out that although so many years had elapsed since the destruction of the two bridges, only the one at Denman had been replaced.

9/1/88.—The annual report of Mr. W. S. Wells spoke in favour of the Bowman's Crossing site, as much less expensive than the others and equally serviceable.

In the Draft Estimates for the year 1890 the sum of £20,000 was entered for this bridge\*, and the Minister minuted as follows:—"Jerry's Plains bridge, to replace low-level bridge at Bowman's Crossing washed away by a flood, and to give access from the west side of the Hunter to the railway at Liddell."

1/10/89.—The Minister moved in the House,—“That the bridge in question be referred to the Public Works Committee for consideration and report.” The motion was carried.

10/2/90.—Mr. Jackson minuted, referring to four bridges which it had been proposed to refer to the Public Works Committee, that Jerry's Plains and \* \* \* bridges should be withdrawn, as they could be erected for an amount under £20,000, and in any case further investigation was necessary as to whether any expenditure at these places was justifiable.

11/2/90.—The Minister minuted to withdraw the proposals for all the iron bridges except Cowra from the Public Works Committee, and to explain the change of proposal.

C.A.B., 14/2/90.

## B.

### REPORT BY COLONEL FREDERICK WELLS, ENGINEER FOR ROADS.

#### *Bridge over the Hunter at Jerry's Plains.*

THE demand for a bridge over the Hunter at or near the locality of Jerry's Plains arose in 1876, when, contrary to the opinion of the late Commissioner and Engineer for Roads, it was decided, at the urgent instance of the Member for the district, to build two low-level bridges, one at Denman and the other at Bowman's Crossing, to meet the requirements of the then existing large stock traffic which came from the north and north-western country through Jerry's Plains to cross the bridge at Warkworth over the Cockfighter Creek, and travel by the Wollombi-Wiseman's Ferry Road or the Bulga Road, *via* Richmond Bridge, to the Sydney market. These two low-level bridges have both been swept away, as was anticipated—that at Bowman's Crossing in 1879, that at Denman standing two years longer.

No low-level bridge will, under ordinary conditions, stand in the bed of the Hunter River, which is quite unsuitable to afford holding under the extreme pressure of the heavy rafts of timber that come down in flood, the first one erected from my design at Luskintyre being the only one that has stood of all those seven in number that have been built. This is due to its very low-level, and the fact of its piles being driven through a solid stone weir that had been a crossing for many years. The plea put forward for the Denman and Bowman's Crossing bridges was for stock accommodation principally, and on the proposal for re-erection another element was introduced, *viz.*, if possible also to serve the interests of Jerry's Plains town and settlement, by securing the residents short access to the railway at flood seasons. With this view, after inspection of many sites, that at Gee's Crossing was selected as most suitable for the stock traffic from Muswellbrook and Denman, as also for the access from Jerry's Plains to the railway at Liddell, causing no material difference in stock route from Muswellbrook and that from Denman. The selection of this site (Gee's) was long debated, and much impeded from the first inception by the opposition of land-owners, which has since been mollified.

The site at Bowman's Crossing would only have served the stock routes and was a most unsuitable one for a bridge of any kind on the ground of construction. It was then finally proposed to build a high-level iron bridge at Gee's, for which purpose a vote of £20,000 has been taken; but circumstances connected with the principal factor, *viz.*, the travelling stock, have changed so much that, after my late inspection, I do not think the large outlay above quoted is warranted. From inquiry and personal observation of the tracks, it is evident there is little or no traffic from Muswellbrook by Sir Thomas Mitchell's line, and the traffic from Denman has also dwindled into comparative insignificance. Since the opening of the Great Northern Railway Bridge over the Hawkesbury, the bulk of the stock traffic is taken by rail from Muswellbrook. I append a return from the Railway Department, showing stock sent down from the Muswellbrook Station during the past three years, the result since opening of the railway bridge over the Hawkesbury being 14,690 in 1889 against 4,992 in 1888, and 6,775 in 1887. It must be remembered that the Hawkesbury Bridge was only opened in May, 1889, so that the increase is due only to about half of that year.

The other grounds on which a bridge is demanded, *viz.*, for facility of communication with Jerry's Plains township, certainly are not sufficient to warrant an expensive bridge. The distance from Jerry's Plains, by way of a bridge at Gee's Crossing to Liddell Platform, would be some 13 to 14 miles; by the fair-weather road, *via* Mason Den, it is only 17 miles to Singleton and would always be preferred. In flood the access to Singleton is always maintained by the Warkworth route, the distance being 21 miles. The northern communication from Muswellbrook and Denman to Jerry's Plains cannot at present be very important, still it is worth while considering whether the opportunity now afforded of dealing with landholders for roads of access to a bridge should not be taken advantage of, and whether a timber bridge might not be erected, the cost of which I estimate at £6,550; road approaches and resumption would probably cost £3,450 more; or a total of £10,000 in all.

This estimate is for a timber bridge, 15 feet roadway; but the cost of a composite bridge on iron piers, with 20 feet roadway, approaches, &c., included, Mr. M'Donald estimates at £17,000.

F. WELLS,  
Engineer for Roads.

#### RETURN of Live Stock forwarded from Muswellbrook Station from May to December, 1887, 1888, and 1889.

1887.					1888.					1889.					Total.
May to December.					May to December.					May to December.					
Horses.	Cattle.	Calves.	Sheep.	Pigs.	Horses.	Cattle.	Calves.	Sheep.	Pigs.	Horses.	Cattle.	Calves.	Sheep.	Pigs.	
228	563	415	5,245	324	172	789	603	2,931	497	175	2,627	517	1,1054	317	26,457
Horses .....	228 .....					172 .....					175 .....				
Cattle .....	563 .....					789 .....					2,627 .....				
Calves .....	415 .....					603 .....					517 .....				
Sheep .....	5,245 .....					2,931 .....					11,054 .....				
Pigs .....	324 .....					497 .....					317 .....				
Totals .....	6,775 .....					4,992 .....					14,690 .....				26,457

THOS. G. WARDEN,  
10/2/90.

## C.

\* Described as a continuous girder, 560 feet long, with timber deck; roadway, 13 feet; piers, iron filled with concrete.

## C.

## SUPPLEMENTARY REPORT BY COLONEL FREDERICK WELLS.

*Re Jerry's Plains Bridge, at Gee's Crossing.—Stock traffic.*

SINCE writing my last report, I have made further inquiry as to the stock traffic likely to use a bridge over the Hunter, near Jerry's Plains, if one were erected; and the result is confirmation of my opinion that the Northern cattle traffic is now principally conducted by railway, and that all the A.A. Company's stock is now so travelled. I hear of a large increase, however, in the number crossing Richmond Bridge. This is, I believe, owing to the Riverstone Meat Works, and a large proportion probably travels Bell's Line from the West. It is hoped by the Stock Department, that ere long, fat cattle will be slaughtered in the country, and still further diminish the droving of stock. It might be advisable to take the evidence of Mr. Alford, Stock Inspector, of Singleton District.

F. W. 18/2/90.

Commissioner and Engineer-in-Chief.

[One Plan.]



1890.

NEW SOUTH WALES.

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PARLIAMENTARY STANDING COMMITTEE ON  
PUBLIC WORKS.

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REPORT

TOGETHER WITH

MINUTES OF EVIDENCE, APPENDICES, AND PLANS,

RELATING TO THE

PROPOSED IRON BRIDGE AT COWRA.

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Presented to Parliament in accordance with the provisions of the Public Works Act,  
51 Vic. No. 37, section 8.

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1890.



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## LEGISLATIVE COUNCIL

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 The Honorable FREDERICK THOMAS HUMPHERY.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 The Honorable GEORGE HENRY COX.

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## GENERAL INDEX.

Report by the Committee.  
 Minutes of Evidence taken by the Committee.  
 Appendix to Evidence taken by the Committee.  
 Report by the Sectional Committee.  
 Minutes of Evidence taken by the Sectional Committee.  
 Plans.

## LIST OF WITNESSES.

	PAGE.
<i>[Examined before the Committee.]</i>	
Joseph Barling, Esq., Under Secretary for Public Works .....	1-2
John Alexander M'Donald, Esq., M.I.C.E. and M.I.M.E., Engineer for Bridges .....	2-7, 12-23
Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges .....	7-11
<i>[Examined before the Sectional Committee.]</i>	
John Vigar Bartlett, Esq., Superintendent of Roads and Bridges, Cowra .....	1-4
John Alexander M'Donald, Esq., M.I.C.E. and M.I.M.E., Engineer for Bridges .....	4-7
Arthur Samuel Hamand, Esq. ....	7-9
Mr. Robert Daly, Innkeeper, Cowra .....	9-10
Mr. Henry Dennis, Innkeeper, Cowra .....	10
Mr. Dennis Cornelius Joseph Donnelly, Storekeeper, Cowra .....	10-11

## APPENDIX.

[To evidence taken by the Committee.]

<i>Précis</i> of Papers in relation to the proposed new Bridge over the Lachlan River, at Cowra .....	A
To evidence of John Alexander M'Donald, Esq.—Appendices to Paper read before the Committee, and published with Mr. M'Donald's evidence .....	B
Report by Arthur S. Hamand, Esq.—Cowra Bridge .....	C
Statement from the Commissioner and Engineer-in-Chief for Roads and Bridges on Mr. Hamand's Report .....	D
Leading type designs of Iron and Timber Bridges throughout the world .....	E

## PLANS.

[To accompany the Departmental Proposal.]

Plan of proposed Bridge Site.

Design No. 1.

Design No. 2.

Design No. 3.

No. 5—Cross-section of Deck.

No. 6—Cross-section of Deck.

No. 7—Elevation of Timber Pier.

No. 8—Diagrams showing the total relative values of various Designs of Bridges.

[To accompany Mr. A. S. Hamand's Report.]

Plan IX.—Plan showing proposed Bridge of concrete.

Plan X.—Amended Design.

# PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## IRON BRIDGE AT COWRA.

### REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, appointed during the first Session of the present Parliament, under the Public Works Act of 1888, 51 Vic. No. 37, and the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, to whom was referred the duty of considering and reporting upon the expediency of "erecting an Iron Bridge at Cowra," have, after due inquiry, resolved that it is not expedient the proposed bridge should be erected, but that a composite bridge, as since recommended by the Department of Public Works, should be constructed; and in accordance with the provision of subsection IV, of clause 13, of the Public Works Act, report their resolution to the Legislative Assembly:—

1. The bridge referred to the Committee by the Legislative Assembly was to be constructed of iron, the estimated cost of the structure being £69,971, but since that reference the Department of Public Works has placed before the Committee, as a result of a revision of the system of bridge construction in this colony, a proposal for a composite bridge of iron, steel, and timber, to cost £26,538. This composite structure consists of three truss spans of 160 feet, four truss spans of 90 feet, and four 35 feet, and two 30 feet, plain beam approach spans, measured from centre to centre of piers and abutments. The minimum clear carriage-way is 20 feet, and the maximum 21 feet 6 inches, the two footways having each a width of 5 feet. A technical description of this bridge is given on page 5 of the evidence before the Committee, but it may be stated here that the piers carrying the 160-ft. spans are composed of wrought-iron cylinders, 4 ft. 6 in. and 6 ft. diameter, respectively, in land and river piers, stiffened with wrought-iron diaphragm bracing, and founded on cast-iron cylinders filled with cement concrete, the land and river piers being 7 ft. 6 in. and 6 ft. diameter, respectively, at base. The piers carrying 90-ft. spans are built of timber, piers 4 and 5 consisting of nine vertical piles arranged in groups of four, and piers 3 and 10 consisting of five vertical piles arranged in pairs under heels of trusses and one in centre; there are also two short vertical piles to carry up-and-down stream struts; the piles to be rigidly stayed with wales, braces, and compression struts. The piers and abutments carrying approach spans are of timber, each pier consisting of four piles (two vertical and two with a rake of 1 in 12) 18 in. diameter, stayed with wales and braces; the abutments to consist of five vertical piles and two wing piles 17 in. diameter. Piles of piers carrying truss spans will be driven 25 ft.; piles carrying approach spans 20 ft. The bridge has been designed to carry a live load of 84 lb. per square foot of carriage and foot way; the cross girders and longitudinal girders have been designed to carry a traction engine of 16½ tons.

2. The estimated prime cost of the design for the composite bridge complete, and including carriage (which totals £3,386), is stated as £26,538, assuming the life of the steel chords and cross girders to be one hundred and fifty years, the timber

Description of  
the bridge.

Estimated  
cost of the  
bridge.

in

in trusses at twenty-five years, and in decking at twelve and a half years, and the money borrowed at 4 per cent. Extending the cost over 150 years, it would mean, it is represented, an annual charge of £1,735 against the revenue, and this charge would provide for keeping the bridge in thorough repair, the timber in trusses being renewed every twenty-five years, and decking every twelve and a half years, and it would provide also for a sinking fund and for interest on capital. It is further stated in the technical description referred to that by substituting timber piers for the iron piers carrying 160-ft. spans, the prime cost would be reduced to £20,822, and the annual charge to £1,565; that by omitting footways, and still retaining the iron piers, the prime cost would be £23,894, and the annual charge £1,529; that by omitting footways, and substituting timber piers for iron piers carrying the 160-ft. spans, the prime cost would be £18,178, and the annual charge £1,359; and that, should it be possible to obtain the money at  $3\frac{1}{2}$  per cent., the annual charge, with cylinders and footways included, would be reduced to £1,624. Omitting footways, if money could be obtained at  $3\frac{1}{2}$  per cent., the annual charge would be £1,427. The annual charge of the same design with timber piers instead of iron would be, including footways, £1,486; and by omitting footways, the annual charge would be £1,289.

Nature of  
the inquiry.

3. The inquiry into this proposed bridge has been one of more than ordinary importance, inasmuch as the composite structure is put forward as a type of bridge likely to be preferable in many instances in which, under the system hitherto followed, iron bridges would be erected. The value of timber as material for bridge construction is in this proposal specially considered, and though in some cases of bridge-building in the future iron bridges will doubtless be found most suitable, timber or composite will under the new plan be substituted for iron wherever practicable, by adopting which course both durability and economy will be secured. These considerations led to the inquiry assuming a more elaborate form than under other circumstances it would have done, and the amended proposal representing the composite bridge was explained to the Committee in a very comprehensive paper, which is included in the evidence given by the Engineer for Bridges, Mr. J. A. McDonald. Another feature in the inquiry has been a special examination of the proposal before the Committee by an engineer outside the Public Service (Mr. A. S. Hamand), and a report, with accompanying estimates and plans, from that gentleman, to enable the Committee to understand whether masonry would be a cheaper and better material for the proposed bridge than either iron, timber, or composite, an offer to furnish this report, together with estimates and plans, having been made by Mr. Hamand to the Committee at an early stage of the inquiry and accepted by them.

Necessity for  
a new bridge.

4. The site of the proposed bridge is the Lachlan River, at Cowra, and the necessity for a new bridge arises from the old and practically worn-out condition of the present structure. The present bridge, a wooden one, is not beyond repair, but inasmuch as the piers and the approach spans are in a very bad state it would not be economy, it is considered, to repair it. In 1886 it was ascertained that to properly repair the bridge the main piers in the river and the approach piers and spans would have to be renewed, the deck of the bridge widened, and footways fixed to provide for increased traffic; and as the cost of this was estimated at £12,550, and there was a probability of other portions of the bridge requiring to be renewed within ten years, it was decided to prepare designs for a new structure.

Types of  
bridges  
submitted  
to the  
Committee.

5. Admitting that to provide a new bridge is preferable to repairing the old one, it becomes necessary to consider whether the new structure proposed will be suitable for requirements, and is the best type of bridge to erect. It will be seen from the evidence and from the plans appended to it that three designs, each representing a certain type of bridge, were submitted to the Committee by the Engineer for Bridges, and that a carefully-prepared comparison of the three is given, in order that their individual and relative merits may be properly understood. No. 1 design is for an iron bridge of the lattice type, the estimated prime cost of which, with an iron deck, is £69,971, and with a timber deck £54,959; the annual charge against revenue, calculated on an assumption that the life of the bridge would be 150 years, the money expended in its construction borrowed at 4 per cent., and the cost extended over the period representing the bridge's life, £3,054 with iron deck, and with

with timber deck, £2,811. No. 2 design, which is that recommended by the Department, is for the composite bridge, already described in a previous part of this Report. No. 3 design is for a timber bridge of nine 90-ft. truss spans and four 35-ft. and three 30-ft. plain beam approach spans; the minimum clear carriage-way being 20 ft., and the maximum 21 ft. 6 in.; the two footways having each a width of 5 ft. The estimated prime cost of this design is £21,392, and the annual charge, £1,576.

6. From a consideration of these estimates of cost, the Engineer for Bridges concludes that the Department would not be justified in recommending the construction of the iron bridge shown in design No. 1, the annual charge connected with which would be £2,811, when the traffic can be equally well served, or nearly so, by the composite bridge (design No. 2), at an annual charge of £1,735. The timber bridge, he states, would, in flood-time, be liable to have its piers carried away by drift timber, and, in addition to this, at the end of twenty-five years, the whole bridge would have to be renewed, the renewal of the bridge rendering it necessary to stop the traffic for about twelve months, unless the new bridge were built on a different site. The composite bridge would provide sufficient waterway for drift timber to pass, and, therefore, the risk of damage from floods would be obviated. Permanent piers are provided for the main spans in order to facilitate renewals, and, with a similar object, provision is made for a permanent lower chord; and it is contended that the estimated cost of the bridge is not extravagant, considering the large traffic which the bridge is required to carry.

Reasons of the Department for recommending a composite bridge.

7. The Engineer-in-Chief for Roads and Bridges states in his evidence that the composite type of bridge is an outcome of consultations with the Engineer for Bridges, with a view to economy in future bridge construction. The Engineer for Bridges says the composite structure is the cheapest, and that a bridge of the size represented in the design for this composite structure is necessary for the traffic. The Superintendent of Roads and Bridges in the district of Cowra is of opinion that a good and substantial bridge is necessary, independent of questions arising out of railway construction; and the evidence generally is in this direction.

Evidence in support of the proposed bridge.

8. A Sectional Committee having been appointed to inquire into the proposed railway from Molong to Parkes and Forbes, and it being therefore necessary for them to visit Cowra, they were authorized to inspect the site of the proposed bridge at Cowra, and take evidence respecting it from local residents. This they did; and the evidence taken, together with the Sectional Committee's report, is published with this Report of the Committee. The Sectional Committee strongly recommended the construction of a new bridge, but did not express an opinion in favour of any design, as at the time their report was written Mr. A. S. Hamand had not carried out the commission entrusted to him by the Committee.

Visit of a Sectional Committee.

9. In consequence of certain letters to the Committee, Mr. A. S. Hamand was authorized to proceed to Cowra, and report with reference to the proposed bridge. On the 10th February, 1890, he wrote to the Chairman as follows:—

Mr. A. S. Hamand's examination of the proposal before the Committee.

59, Castlereagh-street, Redfern, 10 February, 1890.

Dear Sir,

In view of the Public Works Committee having presently to consider some bridges proposed by the Works Department, I should like to be allowed to remind you that they have been hitherto almost exclusively constructed of either iron or timber, and that both these materials entail expensive maintenance.

Iron girders require periodical cleaning and painting, and their floors of timber need frequent renewal.

It seems a pity that with such abundance of excellent material for masonry that structures composed of stone, brick, or concrete are not designed and erected. In respect of prime cost they generally stand between timber and iron; they cost nothing for annual maintenance; they present a more solid and artistic appearance than either wood or iron; and they have the additional merit that the materials and labour are wholly within the colony.

With respect to the use of cast iron for piers and columns, its use has been abandoned in Great Britain for the last ten or twelve years, the Board of Trade requiring the substitution for it of wrought iron in all piers and weight-carrying positions.

There may be positions where masonry cannot be used, or wholly used, but in nine cases out of ten that I have seen I should have used it in lieu of timber or iron.

I can imagine the official answer to questions on the subject. The same arguments apply to bridges and viaducts on the railways.

This

This is how it appears to me to affect the colonial pocket :—

Assume a bridge, on a given site, to cost—in Timber	... ..	£40,000	
Masonry	... ..	60,000	
and Iron	... ..	80,000	
The annual charge on the colony for each would be :—			
Timber (extreme life twenty-five years)—Renewals	... ..	£1,600	
Interest at 3½ per cent.	... ..	1,400	
			3,000
Masonry—Interest at 3½ per cent.	... ..		2,100
Iron—Repairs and renewals	... ..	£200	
Interest at 3½ per cent.	... ..	2,800	
			3,000

I am very doubtful if twenty-five years, as an average life for the whole of the timber in a bridge, is not at least five years too long.

Anyhow, if I am correct in my views, masonry is a more judicious material, and saves the colonial pocket nearly one-third the annual charge entailed by iron or wood.

I do not intend this as an official letter, but you will use the contents in your discretion, the main point being to improve the engineering economy of the Government.

I am, &c.,

ARTHUR S. HAMAND.

J. P. Abbott, Esq., M.L.A., Wentworth Court, Elizabeth-street, Sydney.

This letter was brought before the Committee, and acknowledged. Subsequently a second letter was received from Mr. Hamand, offering to inspect the site of the proposed bridge, and, if in his opinion a masonry bridge was feasible, to prepare, in the course of from ten to fifteen days, a working drawing, specification, and estimate, without making any professional charge to the Committee. Upon this it was resolved that the offer be accepted "on the understanding that only his travelling expenses be charged to the Committee"; and Mr. Hamand thereupon undertook his proposed commission. The result of his visit to Cowra, and his examination of the proposal of the Department before the Committee, will be seen in his report, which is published in the Appendix, and in two plans with which his report was accompanied. A careful consideration of these, and of evidence in reference to them given by the Engineer for Bridges, has led the Committee to the conclusion that the proposal, as submitted by the Department, should be adopted.

Question of site.

10. Some difference of opinion exists amongst those interested in the bridge as to the site where it should be erected. The site of the present bridge faces a street called Bridge-street, which is not the best to meet the requirements of the traffic; and if it were adopted for the new bridge the traffic would have to be provided for elsewhere while the old bridge was being removed and the new one erected. The proposed site faces Kendal-street, the main street of the town, and this, it is generally considered, is preferable to any other.

Decision of the Committee.

11. Viewing all the circumstances of the case, the Committee are of opinion that the composite bridge proposed by the Department should be constructed, and on Wednesday, 7th May, 1890, they expressed this opinion in the following resolution, which was moved by Mr. Tonkin, seconded by Mr. Lee, and passed unanimously :—

"That, in the opinion of the Committee, it is not expedient that the proposed Iron Bridge at Cowra, at a cost of £69,971, as referred to the Committee by the Legislative Assembly, should be carried out; but in the opinion of the Committee a composite bridge, at a cost of £26,538, as now recommended by the Department of Public Works, should be erected."

J. P. ABBOTT,

Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Sydney, 21 May, 1890.

# PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## MINUTES OF EVIDENCE.

### IRON BRIDGE AT COWRA.

WEDNESDAY, 12 FEBRUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).	
The Hon. JOHN LACKEY.	HENRY COPELAND, Esq.
The Hon. ANDREW GARRAN.	JAMES EBENEZER TONKIN, Esq.
The Hon. FREDERICK THOMAS HUMPHREY.	WILLIAM SPRINGTHORPE DOWEL, Esq.
The Hon. WILLIAM JOSEPH TRICKETT.	EDWARD WILLIAM O'SULLIVAN, Esq.
JACOB GARRARD, Esq.	CHARLES ALFRED LEE, Esq.

The Committee proceeded to consider the proposed Iron Bridge at Cowra.

Joseph Barling, Esq., Under Secretary for Public Works, sworn, and examined:—

1. *Mr. Lackey.*] You are Under Secretary for Public Works? Yes.
2. And have been for some time? Yes, for about two years.
3. What is the estimate for the proposed bridge over the Lachlan at Cowra? The estimate given to Parliament, and which was really referred to this Committee, was £69,971, but as the result of the revision which has taken place in our system of bridge making, we now wish to put before the Committee a proposal for a composite structure of iron, steel, and timber, at an estimated cost of £26,538. We have also prepared an estimate for a timber bridge amounting to £21,392, but there are very cogent reasons, which I think our engineer will be able to give, showing why it is not desirable in this particular place to build simply a timber bridge. The bridge recommended by the Department is a composite structure, consisting of 3 truss spans of 160 feet, 4 truss spans of 90 feet, and 6 plain beam timber approach spans; the carriage-way is 20 feet, and each of the two foot-ways has a width of 5 feet. The piers under the heels of the 160-ft. spans are of iron filled with concrete, the remaining piers and abutments being of timber.
4. This is to take the place of the bridge at present in existence at Cowra? Yes.
5. Do you know if that is a wooden bridge or an iron bridge? That is, I believe, wholly timber. I have a *précis* of the case, which I now hand in. [The *précis* was read by the Secretary.]
6. Does it state in that *précis* the approximate cost of the bridge? Yes, the estimate is given—£26,538.
7. That is for the alternative project? That is the project before the Committee now—a composite bridge, the description of which I read a short time ago.
8. I suppose the Department considers the present bridge a timber bridge only? Yes.
9. That has been up about twenty years? It is stated in the *précis* of the case.
10. How long ago did the Department come to the conclusion to adopt wooden bridges instead of iron bridges hitherto recommended? It would be misleading to answer the question put in that bold way—viz., that we have cast aside iron bridges and have determined to build timber bridges in every case.
11. Is not that the purport of the recommendation you are making in withdrawing these bridges? In these particular cases.
12. Then it applies to these bridges specially and not to bridges generally? It applies in this way—that in view of the desirability of substituting timber for iron where practicable, we should consider in every case of a proposed bridge whether timber would not answer all the requirements; but it does not follow that in every case we should come to the conclusion to adopt timber. In this case it is proposed to have a composite bridge.
13. In some instances I see that wooden bridges have been built heretofore by the Department? Yes.
14. That is as in the case of the Cowra Bridge? Yes; but, as I pointed out, in many cases where before we would have constructed iron bridges, we would now, under the revision alluded to, substitute timber or composite.
15. That would be for ordinary traffic only; I take it you would not include railway traffic? No, I am not dealing with railway traffic at all.
16. Is it fair to ask if this is the recommendation of the professional head of the Department? The professional officer will follow me, but I think I am correct in saying decidedly yes. There is one other thing I wish to add, as being interesting to the Committee with regard to the existing Cowra bridge, and which has been ascertained by actual observation. I thought the Committee might like this information, and I therefore asked the Engineer for Roads to obtain it. In the week ending 25th December, 1889

J. Barling,  
Esq.  
12 Feb., 1890.

- J. Barling, Esq.  
12 Feb., 1890.
- the following traffic passed over the bridge:—Foot passengers 2,092, daily average 300; horse-back passengers 1,057, daily average 150; carts and buggies 709, daily average 101; drays 186, daily average 26; waggons 63, daily average 9; sheep 450, daily average 65 (much below the average for the year—about 200,000 sheep pass over annually, being a daily average of 600).
17. Are tolls collected at the bridge? There are no tolls collected anywhere now.
18. How were the figures ascertained? I asked Mr. Hickson to send an officer to take special observations with regard to it. I thought the Committee would like to have some definite statistics before them, and I suggested to Mr. Hickson the desirableness of taking them.
19. *Mr. Copeland.*] This officer was there all the week? These statistics are for the week ending 26th December, 1889, and they were ascertained by actual observation that week. The number of cattle and horses that passed over the bridge was 1,818—daily average, 260; bales of wool, 382—daily average, 55; bags of grain, 1,321—daily average, 190; general goods, 41 tons—daily average, 6 tons. In regard to the bales of wool, bags of grain, and the general goods, there is a foot note, which says: "This is also much below the average for the year." As a further index to the amount of traffic passing over the Cowra Bridge a return has been obtained from the Railway Department of the tonnage received at, and sent from, the Cowra Station in the year ending 31st December, 1889, viz.: Inwards, 6,603 tons; outwards, 4,633 tons, nearly all of which comes and goes by way of the bridge.
20. *Mr. O'Sullivan.*] Is that bridge intended to carry a railway as well as the ordinary traffic? No.
21. Are you not aware that there is an agitation for a railway from Cowra to Forbes? I am aware there is such an agitation.
22. Would it not be well to keep this back and see if you will have to build a railway bridge as well? I can hardly answer that question immediately. The officer who will follow me has the requisite local knowledge to do so.
23. I suppose you are aware of the big blunder made at Nowra by constructing a bridge that will not carry a railway? I think you will not ask me to make an admission that the Department made a blunder there.
24. *Dr. Garran.*] Can you tell me whether this wooden bridge was built out of revenue or out of loan money originally? I suppose it was built out of loan money, but I should like to verify that statement.
25. Can you tell me whether at the time the vote was submitted to Parliament the Minister promised that there should be a toll to pay interest upon it? We know that tolls are abolished.
26. Was there ever a toll collected on this bridge? That I cannot say for certain. I will find out.
27. Is the old crossing passable now? The old bridge is used now.
28. I mean the old ford? That I cannot answer. I have not the local knowledge to enable me to answer.
29. The railway crosses the river at Cowra now? Undoubtedly.
30. Was there ever a proposal for combining a traffic bridge with that at the time it was made? I cannot answer that question, but I will ascertain.
31. Do you know what that railway bridge cost? No.
32. The traffic that you spoke of as passing over the bridge now is coming from the west into the town of Cowra? Undoubtedly.
33. Supposing there were a platform on the other side of the bridge would not all the heavy traffic be taken to the railway there? That would practically be making another station and town there.
34. We have got to build a bridge, costing £26,000, to bring the traffic across the river into Cowra when the railway crosses the river to the other side from which the traffic comes,—is it not so? Yes, I think so.
35. We have got one railway bridge that takes the traffic and have got to build another bridge to bring the traffic to the railway? Quite so.
36. You do not know whether there is possibly any accommodation on the other side of the river for the traffic? I cannot say for certain, but Mr. McDonald will be able to answer that question.
37. Do the sheep and cattle that come there come to take the train at Cowra and go on to Bathurst or Sydney—those large mobs of sheep you spoke of? I see in the railway traffic returns which I have that is not specified. I have merely the details of tonnage, &c.
38. If these sheep are going to take the train at Cowra, they could all be put in trucks on the other side of the river? I should imagine they could.
39. If less than £10,000 built a bridge originally, which lasted over twenty years, and which is still big enough to take the traffic if it were strong enough, why do we want to spend £20,000, when the railway will relieve the traffic? It is of immense inconvenience to the traffic to have to renew a bridge, and a timber bridge would require renewing after a certain number of years, whereas this bridge would last a much greater number of years.
40. This will be a timber bridge on iron supports? Under the wide spans there will be iron supports.
41. It will want repairing? Yes.
42. Where would the money for that come from? From the general revenue.
43. There is no toll to be collected? No.

THURSDAY, 13 FEBRUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHREY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

JAMES EBENEZER TONKIN, Esq.

WILLIAM SPRINGTHORPE DOWEL, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

CHARLES ALFRED LEE, Esq.

The Committee further considered the proposed Iron Bridge at Cowra.

J. A.  
M'Donald,  
Esq.

John Alexander M'Donald, Esq., M.I.C.E. and M.I.M.E., Engineer for Bridges, sworn, and examined:—  
44. *Dr. Garran.*] What position do you hold in the Public Service? Engineer for Bridges in the Roads and Bridges Department.

13 Feb., 1890. 45. Have you any statement you wish to make before being examined? Yes.

46.

46. Will you kindly read it, so that the members of the Committee can all hear it? Yes. It is as follows:—

J. A.  
M'Donald,  
Esq.

13 Feb., 1890

#### COWRA BRIDGE.

##### *Introductory.*

AFTER consultation with the Engineer-in-Chief for Roads and Bridges it has been decided to submit the following designs to your Committee. It may be thought at first sight that the time of the draftsmen of the Roads and Bridges Branch has been wasted in preparing so many designs, and that the Department should have brought forward only the one design recommended. It is not desired that the Committee should form the impression that every—or, in fact, any—bridge designed by the Department has involved so many calculations and designs, but this being a comparatively large bridge, and one for which some provision must shortly be made, it was found necessary to investigate carefully the merits of various types; and having done so, it was thought the information accumulated should be submitted in full to your Committee.

The main point I wish to give prominence to in my evidence is not only a technical one, but one of commercial economy, and a point that requires careful consideration in a new country. I refer to the relative costs of construction and maintenance of timber, composite (timber and metal), and metallic (iron or steel) bridges. The timbers in these colonies differ so much in character from those of other countries, and are so much superior for bridge-work; and the cost of iron bridge-work delivered *in situ* is so high, that it becomes a matter for careful investigation as to when it is advisable and economical to use timber or composite structures, and when to use iron and masonry. It is in roadway bridges in these Colonies inadvisable to blindly follow the practice of English and American Engineers, as the materials and costs are so different.

It is usually considered where the traffic is large and heavy that a permanent structure should be erected (by "permanent" I mean a structure that should last at least 100 years). But I would argue that if the "capital value" of the permanent structure far exceeds the "capital value" of a "temporary" structure (I here use the term "temporary" to refer to a structure lasting not more than 25 years); then for the country districts the "temporary" structure should be adopted, and it is this point I would wish to bring prominently before your Committee.

##### *Old Bridge.*

The cost of the Cowra bridge completed in 1870, and built entirely of timber, was £9,120. The funds provided were £5,000 on 1862 loans and £3,000 on 1866 loans, and balance from road votes. It consisted of three M'Callum truss spans, each 130 ft., and the remainder simple beam spans. Four months after completion several of the simple beam spans were carried away by flood, and were then replaced by three truss spans, each 65 feet, at a cost of £1,715.

The cost of repairs previous to 1885 have been charged to the general vote "Repairs to Bridges," and so cannot be separated, but from 1885 to date the repairs have amounted to £1,220—(see *Appendix 1*)—or at the rate of £244 per annum. Excluding repairs for the fifteen years, 1870 to 1885, the value of which are unobtainable, the total expenditure on this bridge to date has been £12,055.

In 1886 it was reported by the Local Road Superintendent that the timber piers were in a very unsafe condition, due to decay, and an amount of £3,000 was placed on the 1887 Estimates for renewing the main piers in the river. Borings were then taken, and further examination showed that the approach spans and piers would have to be renewed, and the deck widened and footways fixed to provide for the increased traffic; the only sound timber remaining in the structure being the M'Callum trusses. An estimate was got out for this work, and it was found that the new iron piers and concrete abutments would cost £6,750; and the renewal of approaches, widening deck and fixing footways, would cost £5,800, or a total of £12,550. It was then decided to get out designs for an entirely new structure, as at the end of ten years the M'Callum trusses would probably have to be renewed also.

##### *Survey.*

Survey plan No. 4 was then made, and sections taken.

##### *Selection of site.*

The previous papers of this Department do not show the reasons which led to the adoption of the present site for this bridge. A road—Bridge-street—10 chains long and 50 feet wide, was specially resumed as an approach, and this street has of course since been considered as a permanent main thoroughfare. Now that a new bridge is required the question of site has been reconsidered, and four distinct sections have been taken, viz.:—On line of old bridge, on line of proposed bridge as marked on plan, and two lines intermediate. Sections have not been run on any line down stream of present bridge, as not only would such a line still further divert the traffic from a direct line, but as a heavy flood might at any time carry the old bridge away, it would be dangerous during construction to erect the new structure on the down stream side.

From an engineering point of view, and apart from land resumption, the four sites surveyed are fairly equal as to length and cost, and the main point then to consider is the most convenient and direct route for the traffic. The site recommended and marked on plan at the foot of Kendal-street forms a direct and almost straight line from the Railway Station to the opposite bank of the river. The present route takes two right angle turns on to a road only 50 feet wide, whereas Kendal-street is 99 feet wide, and no alienated land need be encroached upon on either side of the river. Again, if the old route were adhered to, the old bridge would have to be removed and the traffic completely stopped for about eighteen months. In addition, the roadway would have to be raised about 9 feet, which would probably lead to litigation with the owners of properties on each side of the road. The narrow width of the road, however, is the most fatal objection to retaining the present line of traffic. Viewing the matter as one of public convenience rather than of private interests, there can, I think, be no doubt that the Kendal-street site is by far the best of any in the town.

##### *Traffic.*

Returns of the present traffic over the Cowra Bridge have been obtained from the local Road Superintendent for one week [*Appendix 2*], and this has been taken as the average traffic, and worked out at per annum in *Appendix 6*.

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J. A.  
McDonald,  
Esq.  
13 Feb., 1890.

As by far the greater part of the goods trucked at Cowra Railway Station pass over the Road Bridge, a return has been obtained from the Railway Traffic Department [see Appendix 3], which gives the total of goods inwards and outwards at 11,236 tons per annum. The local Road Superintendent estimates the goods outwards only at 9,390 tons per annum, over the bridge; so that probably the traffic may be estimated at 10,000 tons per annum for inwards and outwards.

Tolls on all bridges abolished in December, 1882, excepting Hay Bridge, at which place cost of wages, maintenance, and repairs, are deducted from tolls received, and balance handed over to Council.

As no tolls are charged on bridges (except on the Hay Bridge) these works cannot make any direct return to revenue, and cannot therefore be considered as directly reproductive. However, in order to give some idea of the value of the traffic I have in Table Appendix 6 adopted, as a basis for valuation, the lately reduced ferry rates. [See Appendix 4.] The result after deducting all costs incurred in collecting these tolls is a credit balance of £3,000 per annum, exclusive of the returns due on about 10,000 tons of goods, and the necessary horses and drays conveying same. If therefore it is admitted that the present ferry tolls are a fair estimate of the value of the convenience given by a bridge, then whether these rates are paid directly or indirectly by the individuals or districts concerned will not affect the question materially, but I submit that if the above premises be granted and the actual traffic returns show a credit balance, then the Department is justified in recommending the construction of the required works if the interest and depreciation and maintenance account does not exceed the returns from traffic.

#### *Designs submitted.*

I shall now proceed to a detail description of the different designs submitted. The section of the river is the same in each case, being taken at the foot of Kendal-street, as shown on plan of site.

As so many estimates for variations in design have been made, I propose to give only the results in evidence, and submit the details as an appendix.

#### *Cost diagram.*

To facilitate the comparison of these various designs, I have had a diagram, No. 8, prepared, showing at a glance the total relative values of each, every item being represented by a distinctive colour.

#### *Explanation of terms.*

I might here be allowed to explain some terms which I shall presently use:—

- By "Prime Cost," I mean the first cost of the bridge without any reference to future maintenance or renewals.
- By "Annual Charge," I mean the amount required annually to pay interest on first cost including a sinking fund for life of bridge (depreciation) and maintenance, including renewals and painting.
- By "Capital Value," I mean the capital required to pay interest, depreciation, and maintenance, or the "annual charge" capitalized.

#### DESIGN I.

No. 1 design is for an iron bridge of the lattice type, and consists of one 216 ft., two 168 ft. 11½ in., two 111 ft. 9 in., and two 110 ft. 10½ in. spans, measured from centre to centre of piers and abutments. The clear carriage-way is 20 ft. between kerbs, and the two footways have each a width of 5 ft. 2 in.

The girders are continuous over the three river spans, and independent over the four remaining spans, and are 12 ft. 6 in. and 10 ft. deep respectively. The booms of main girders are of trough section, formed of boom plates and stringer plates connected with double L irons. The webs are formed of vertical struts, over bearings, of flat diagonal lattice bar and diagonal channel iron struts set to an angle of 45°, and stiffened with ladder bracing.

The cross girders are of wrought-iron, the ends projecting so as to form cantilevers for carrying footways.

The deck on carriage-way is formed of wrought-iron buckled plates, rivetted to wrought-iron rolled girders secured to cross girders, the footways are formed of buckled plates rivetted to steel beams resting on cantilevers.

The spaces between crowns of buckled plates are to be filled with tarred metal and bluestone screenings thoroughly rolled.

The piers carrying the continuous girders are composed of wrought-iron cylinders 7 ft. diameter, stiffened with wrought-iron diaphragm bracing, and founded on cast-iron cylinders, filled with concrete, 7 ft. and 8 ft. 6 in. diameter respectively in land and river piers.

The piers and abutments carrying independent girders are composed of cement concrete.

#### *Pressures.*

Pressure on foundations of river cylinder pier	is	13.33	tons per square foot.
"	"	land	" 13.35 "
"	"	land concrete pier	" 3.5 "

#### *Calculations.*

The bridge has been designed to carry a live load of 84 lb. per square foot of carriage and footway, the cross girders and longitudinal girders have been calculated to carry a traction engine of 16½ tons.

#### *Iron Deck.*

The estimated prime cost of this design complete, and including carriage which totals £7,540, will be £69,971. Assuming the life to be 150 years, and money to be borrowed at 4 per cent., and extending the cost over that number of years, it would mean an annual charge of £3,054 against revenue. This charge would provide for keeping bridge in thorough repair, and for sinking fund and interest on capital. This annual charge capitalized would represent £76,350.

The

The cost of above design could be reduced by omitting footways, which would bring the prime cost to £65,196, the annual charge to £2,862, and the capital value to £71,550.

Should it be possible to obtain the money at  $3\frac{1}{2}$  per cent., the annual charge, footways included, would be reduced to £2,711, and that capitalized would be £77,457.

Omitting footways, if money could be obtained at  $3\frac{1}{2}$  per cent., the annual charge would be £2,543, and that capitalized would be £72,657.

J. A.  
M'Donald,  
Esq.  
13 Feb., 1890.

#### Timber Deck.

The prime cost of same design, with timber deck instead of iron, and money borrowed at 4 per cent., would be, including footways, £54,959, the annual charge £2,811, and the capital value £70,275.

By omitting footways (£4,385), the prime cost would be £50,574, the annual charge £2,540, and the capital value £63,500.

Should it be possible to obtain the money at  $3\frac{1}{2}$  per cent., the annual charge, footways included, would be £2,552, and that capitalized would be £72,914.

Omitting footways, if money could be obtained at  $3\frac{1}{2}$  per cent., the annual charge would be £2,301, and that capitalized would be £65,743.

#### DESIGN II.

No. 2 design is for a composite structure, and consists of three truss spans of 160 ft., four truss spans of 90 ft. each, and four 35 ft. and two 30 ft. plain beam approach spans measured from centre to centre of piers and abutments. The minimum clear carriage-way is 20 ft., and the maximum 21 ft. 6 in., and the two footways have each a width of 5 ft.

The 160 ft. spans are 27 ft. deep, between centres of triangulations. The top chord principals and diagonal bracings are of ironbark timber, the bottom chord is of steel formed of stringer-plates and L bars top and bottom, stringers to be laced together with flat bars. The suspension bolts are of wrought-iron, placed in groups of four, and connected with wrought-iron washer-plates.

All the timber members are adjustable by means of wedges, so that any shrinkage that occurs can be taken up.

The cross-girders, spaced 20 ft. apart, are of steel, to be "fish-bellied" and formed of web-plates, connected to flange-plates top and bottom by double-angle bars; the ends of cross-girders to project so as to form cantilevers for carrying footways; the webs of cross-girders are stiffened by T bars and packing-plates, and the whole rivetted with wrought-iron rivets.

Longitudinal girders, forming carriage and footway, to be of sawn timber resting on the cross-girders as shown.

Deck on carriage and foot way to be of tallow-wood, laid diagonally on carriage-way, and transversely on footway.

Top and bottom booms to be stiffened with wind-bracing, formed of timber transverse struts and diagonal wrought-iron tie-rods.

The 90 ft. truss spans to be built of timber, the main cross-girders to project so as to carry the deck of footway, the clear width of carriage and foot ways being the same as on the 160 ft. spans.

Piers carrying the 160 ft. spans are composed of wrought-iron cylinders, 4 ft. 6 in. and 6 ft. diameter respectively in land and river piers, stiffened with wrought-iron diaphragm bracing, and founded on cast-iron cylinders filled with cement concrete, the land and river piers being 7 ft. 6 in. and 6 ft. diameter respectively at base.

The piers carrying 90 ft. spans are built of timber, piers 4 and 5 consisting of nine vertical piles arranged in groups of four, and piers 3 and 10 consisting of five vertical piles arranged in pairs under heels of trusses and one in centre; also two short vertical piles to carry up and down stream struts. The piles to be rigidly stayed with wales, braces, and compression struts.

The piers and abutments carrying approach spans to be built of timber, each pier consisting of four piles (two vertical and two with a rake of 1 in 12) 18 in. diameter, stayed with wales and braces. The abutments to consist of five vertical piles and two wing piles 17 in. diameter. Piles of piers carrying truss spans to be driven 25 ft. Piles carrying approach spans to be driven 20 ft.

#### Pressures.

Pressure on foundations of river cylinders (on rock)	...	14.6 tons per square foot.
" " land pier (on clay)	... ..	6 " "

#### Calculations.

The bridge has been designed to carry a live load of 84 lb. per square foot of carriage and foot way. The cross girders and longitudinal girders have been designed to carry a traction engine of  $16\frac{1}{2}$  tons.

#### Cost.

The estimated prime cost of this design complete, and including carriage (which totals £3,386), is £26,538, assuming the life of the steel chords and cross girders to be one hundred and fifty years, the timber in trusses at twenty-five years, and in decking at twelve and a-half years, and the money borrowed at 4 per cent. Extending the cost over one hundred and fifty years, it would mean an annual charge of £1,735 against the revenue. This charge would provide for keeping the bridge in thorough repair, the timber in trusses being renewed every twenty-five years, and decking every twelve and a-half years; also for sinking fund and interest on capital. This annual charge capitalized would represent £43,375. By substituting timber piers for the iron piers carrying 160 ft. spans, the prime cost would be reduced to £20,822, annual charge to £1,565, and the capital value would be £39,123.

By omitting footways, and still retaining the iron piers in above design, the prime cost would be £23,894, the annual charge £1,529, and the capital value £38,225.

By omitting footways, and substituting timber piers for iron piers carrying the 160 ft. spans, the prime cost would be £18,178, the annual charge £1,359, and the capital value £33,975.

Should it be possible to obtain the money at  $3\frac{1}{2}$  per cent., the annual charge, with cylinders and footways included, would be reduced to £1,624, and that capitalized would be £46,400.

Omitting

J. A.  
M'Donald,  
Esq.  
18 Feb., 1890.

Omitting footways, if money could be obtained at  $3\frac{1}{2}$  per cent., the annual charge would be £1,427, and that capitalized would be £40,771.

The annual charge of same design with timber piers instead of iron would be, including footways, £1,486, and the capital value £42,457.

By omitting footways, the annual charge would be £1,289, and the capital value £36,829.

#### Alternative Piers.

These timber piers, consisting of thirteen piles 14 in. x 14 in., arranged in groups of six under heels of trusses, and one in centre, also one up-stream and two down-stream short vertical piles to carry wales and up and down stream struts, the whole pier to be stayed with wales, braces, and internal compression struts. Pressure per square inch of pile will be 439 lb. Cost of piers complete, £2,450, as against the cost of iron and concrete piers, £8,160—or a reduction of £5,710.

#### DESIGN III.

No. 3 design is for a timber bridge of nine 90-ft. truss spans and four 35-ft. and three 30-ft. plain beam approach spans.

The minimum clear carriage-way is 20 ft., and the maximum 21 ft. 6 in.; the two footways have each a width of 5 ft.

The cross-girders are of timber throughout, the main cross-girders projecting so as to carry deck of both footways.

The river piers (piers 8 and 9) carrying 90-ft. truss spans are formed of wrought-iron 4 ft. 6 in. diameter, stiffened with wrought-iron diaphragm bracing, founded on cast-iron cylinders 4 ft. 6 in. diameter filled in with concrete. The remaining piers are of timber. Piers 4, 5, 6, 7, 10, and 11, carrying 90-ft. truss spans, consists of nine vertical piles, arranged in groups of four, and piers 3 and 12 consist of five vertical piles, arranged in pairs under heels of trusses, and one in centre, also two short vertical piles carrying up and down stream struts; the whole pier stayed with wales, braces, and compression struts.

Piers 1, 2, 13, 14, and 15, and abutments A and B, carrying plain beam approach spans, to be of round timber 18 in. and 17 in. diameter respectively. The piers to consist of two vertical and two piles with a rake of 1 in 12, stayed with wales and braces. Abutments A and B to consist of five vertical piles and two wing pieces.

#### Pressures.

Pressure on river pier cylinders ... ..	14.5 tons per square foot.
"    "    piles ... ..	385 lb. per square inch.

#### Calculations.

This bridge has been designed to carry a live load of 84 lb. per square foot of carriage and foot way.

#### Cost.

The estimated prime cost of this design is £21,392; the annual charge being £1,576, and the capital value £39,400.

By substituting timber piers for iron the prime cost would be reduced to £19,531, annual charge to £1,543, and capital value to £38,575.

By omitting footways, and still retaining iron piers, the prime cost would be £18,690, annual charge £1,363, and capital value £34,075.

By omitting footways, and substituting timber piers for iron, the prime cost would be £16,830, annual charge £1,330, and capital value £33,250.

Should it be possible to obtain the money at  $3\frac{1}{2}$  per cent., the annual charge with cylinders, footways included, would be £1,495, and that capitalized would be £42,714.

Omitting footways, if money could be obtained at  $3\frac{1}{2}$  per cent., the annual charge would be reduced to £1,290, and that capitalized would be £36,857.

The annual charge of same design, with timber piers instead of iron, would be, including footways, £1,473, and the capital value £42,086.

By omitting footways the annual charge would be reduced to £1,268, and the capital value £36,229.

#### Recommendation.

It will be seen from the cost diagram that:—

The cheapest iron bridge has capital value of ... ..	£70,275
The composite design recommended has capital value of ... ..	£43,375
The cheapest timber bridge has capital value of ... ..	£38,575

#### Iron.

It will therefore be seen that the cheapest iron bridge, *i.e.*, with timber deck, would be 63 per cent. above the capital value of the composite structure; and that the capital value of the composite structure would be about 13 per cent. more than the cheapest timber bridge that could be built over this river suitable for traffic.

I think it will be patent from these figures that the Department would not be justified in recommending the construction of an iron bridge at this place, and incurring such a heavy annual charge as £2,811, when the traffic can be equally well served, or nearly so, at an annual charge of £1,735 with a composite bridge. If this be admitted, there remain then only two for consideration.

#### Timber.

The timber bridge diagram No. 3 is not considered suitable for this site, as the spans not being more than 90 ft., there would be a risk every flood of the piers being carried away, as large quantities of drift

drift timber come down during flood-time, and in great lengths. In addition, at the end of 25 years the whole bridge would have to be renewed, and the traffic completely stopped for about 12 months, unless the next new bridge were built on a different site. Though this design is not considered suitable, it was thought advisable to submit it for the sake of comparison only.

J. A.  
M'Donald,  
Esq.  
13 Feb., 1890.

#### Composite.

The design recommended by this Department is the composite one shown in elevation on diagram No. 2.

The piers for the main spans are permanent, the remaining piers, which can more easily be renewed, are of timber.

The bottom chord is of steel, the suspension bolts of scrap iron, and the remainder of the superstructure is of ironbark timber.

It is found in truss bridges that the bottom chord or tension member is the first to decay, consequent on the number of joints and keys required to give the necessary tensile strength, and the chances thereby given for water to find its way in. When any part of this chord decays it is most difficult to renew it, without expensive staging under the whole truss, and again, on the completion of the life of the truss, scaffolding has to be erected, the whole of the old truss removed and new truss complete erected in its place. This work causes considerable and lengthened interruption to traffic.

To overcome this difficulty to a great extent, I have on the design before you provided for a permanent steel chord, which, of course, slightly increases the cost, but with this arrangement any part of the timber-work in the truss can be renewed with only very slight interruption to the traffic; and when the renewal of the whole of the timber in the truss is necessary only very slight staging will be required to support the chord during re-erection, the traffic going on all the time.

#### Strength and Cost of Ironbark and Iron.

At this point it might be of interest to give a few facts bearing on the relative strength and cost of ironbark and iron in construction.

Best ironbark half tensile strength of bridge iron for same area.

Weight of bridge iron  $3\frac{1}{4}$  times weight of best ironbark for same strength in tension.

Best ironbark  $\frac{1}{4}$  compression strength of bridge iron for the same area.

Weight of bridge iron  $1\frac{1}{2}$  times weight of best ironbark for the same strength in compression.

Taking ironbark erected at 5s. per cubic ft. and bridge iron erected at £24 per ton, then—

In tension a ton of ironbark costing £7 10s. is equal in strength to 3.23 tons of bridge iron costing £77 10s.

In compression a ton of ironbark costing £7 10s. is equal in strength to 1.61 tons of bridge iron costing £38 12s.

The above give the comparative *ultimate* strengths, viz.:—Tension, ironbark 11 tons, iron 22 tons; compression, ironbark  $4\frac{1}{4}$  tons, iron 17 tons.

#### Conclusion.

To recapitulate, the cost of the design recommended No. 2 is 13 per cent. above the timber design No. 3, and the advantages claimed are:—

1st—Sufficient waterway for drift timber to pass, and risk of damage from floods obviated.

2nd—Permanent piers to facilitate renewals.

3rd—Permanent lower chord to facilitate renewals.

The annual charge for this design is £1,735, and under the head of "traffic" I have argued that the value of the convenience given by the bridge exceeds £3,000. I would therefore submit that the design recommended is not extravagant in cost considering the large traffic the bridge is required to carry.

#### Summary of Appendices.

No. 1.—Cost of repairs, Cowra.

No. 2.—Traffic returns by Mr. Road-Superintendent Bartlett.

No. 3.—Traffic returns by Railway Department.

No. 4.—Ferry Tolls.

No. 5.—Bridge Tolls.

No. 6.—Estimated value of Traffic.

Nos. 7 to 22.—Designs 1, 2, and 3.

No. 23.—Summary of Capital Values.

WEDNESDAY, 19 FEBRUARY, 1890.

Present:—

The HONORABLE JOHN LACKEY (VICE-CHAIRMAN).

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

The Hon. GEORGE HENRY COX.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

JAMES EBENEZER TONKIN, Esq.

WILLIAM SPRINGTHORPE DOWEL, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

CHARLES ALFRED LEE, Esq.

The Committee further considered the proposed iron Bridge at Cowra.

Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges, sworn, and examined:—

47. Mr. Copeland.] You are the head of the Roads and Bridges Department? Yes.

48. Have you personally inquired into the necessity for the building of the Cowra bridge? Yes.

49. And you are satisfied that it would be better to build a new bridge than to attempt to patch up the old one? Yes; I examined the old one very carefully.

50. Have you personally inspected it? Yes.

R. Hickson,  
Esq.  
19 Feb., 1890.

R. Hickson,  
Esq.  
19 Feb., 1890.

51. I suppose you did not happen to notice the letter in one of yesterday's morning papers with reference to this bridge, in which the writer attempted to make it appear that a very slight expense in repairs would make the existing structure a serviceable bridge for a good many years? No, I did not notice the letter.

52. Are you satisfied, from your own inspection, that the bridge has gone beyond repair? It has not gone beyond repair, but I do not think it would be economy to attempt to repair it. It cannot be said to have gone beyond repair, but I do not think it would be economy to attempt to repair it.

53. You think it would be cheaper, as a matter of expenditure, to build a new bridge? Yes. The great difficulty in connection with repairing that bridge is that the piers—the most important portion—are in a very bad state indeed. If it were only the girders and the top work it would not matter so much, but the piers are in a very bad state.

54. The reason it is proposed to build a new bridge is not that the present bridge will not accommodate all the traffic, but because it is practically worn out? Yes, that is the reason.

55. I suppose if it were not worn out the present bridge would be sufficiently large for all traffic purposes? I think it would, except that it has no foot-way, the absence of which is a great inconvenience.

56. Do you remember how long the bridge has been built? It was built in 1870.

57. Is a period of twenty years considered the usual life for a wooden bridge? It is a long life I think for the piers of a wooden bridge.

58. But have not some repairs to this bridge already taken place? Yes, considerable repairs.

59. Have any of the piers been replaced? I do not think any of them have been actually replaced, but several props have been put up alongside the piers.

60. What do you say is the usual life for a wooden bridge? For the piers of a wooden bridge twenty years is a long life, but that period is a short life for the superstructure.

61. Do you know of what kind of timber the piers are composed? As far as I could judge they were ironbark, but it is very hard to say, because they are in a very bad state, and quite hollow.

62. What part of the piers is found to be the most decayed—between wind and water? Along the edge, where the pier enters the ground.

63. And is all above that sound? No, not all sound. The decay in some of the piers extends upwards for a considerable distance.

64. About how far? As far as I could strike the pier with my stick; I suppose 7 or 8 feet high. I could feel that the wood was quite hollow. The piers had gone altogether, and especially in one span.

65. Do you find that these piers generally go at the junction with the ground? Yes; that is the place where they are more liable to go.

66. Would it not be possible to protect them in some way by coppering them, or burning them? I do not think that would have any effect in preserving the timber, unless where it is attacked by cobra, which of course is not the case here.

67. Is not that generally the place where they go first, between wind and water, or where they enter the surface of the soil? This is not exactly between wind and water. The reason why piers go between wind and water is that they are sometimes dry and sometimes wet. In this case, where they meet the natural surface of the ground, they are, except in times of flood, always dry, so that coppering them, or putting any outside coating on, would have no effect in preventing decay taking place.

68. Are these piers painted or tarred? They are tarred.

69. Have you tried soaking them in oil? I am not aware that that has been tried.

70. Then, so far as this bridge is concerned, you are quite satisfied that a further expenditure is necessary in the form of a new bridge? I am.

71. And a bridge that would give more accommodation than the old one? Yes. When we are putting it up it is just as well to give a little more accommodation than that afforded by the old one.

72. Do you approve of the suggested position for the new bridge as being more convenient than the site of the old one? Yes. The old site is very inconvenient on account of the narrow street approaching to it. The railway station is up here [*pointing to the map*], and this is the main street of the town. The principal traffic is down Kendall-street and across the bridge, out in this direction. They have now to turn up here to Lachlan-street, past this narrow street—Bridge-street—and then get across the bridge. It is proposed now that the bridge should practically be a continuation of Kendall-street, though it will not be exactly in the same line. I propose moving the position of the bridge slightly, so as to avoid destroying certain frontages, for which compensation would have to be given.

73. On the question of the composition of the bridge, I suppose you are satisfied that a composite bridge would be better than either an iron one or the old wooden one? Very much better than the old wooden one, and, I think, under the circumstances, considering that it is so much cheaper, quite as good as an iron one.

74. Can you say what has been the cause of this sudden new departure by the department in favour of wooden bridges, considering that for many years past all the bridges that have been constructed have been made of iron, notwithstanding the fact that plenty of timber was in the immediate neighbourhood? All the bridges formerly were not of iron. There were a good many, no doubt. I think this new departure, if it may be called so, is mainly due to conversations that have taken place between the Engineer for Bridges (Mr. M'Donald) and myself, with the view of economising, if possible, in the construction of these bridges.

75. And are you quite sure that it will be economy? I think so.

76. I suppose you cannot inform the Committee how it was that when they were building a railway bridge they did not make it capable of carrying traffic? I do not know. I may say, from my own observation, that it would have been a very inconvenient site for a traffic bridge. It is too far away from the town, but I do not know whether or not that was the reason they did not make it capable of carrying traffic.

77. What distance is the railway bridge from the site of this proposed bridge? About 3 miles. I drove up to it, and I think that is about the distance.

78. What distance is the railway bridge from the town? About 3 miles.

79. You are satisfied, I suppose, that this is the best site for the new bridge? Undoubtedly.

80. And you are equally satisfied that it is a necessary expenditure, and that a new bridge should be built? I am.

81. As the permanent head of the department, you favour this proposal for a composite bridge? Yes.

R. Hickson,  
Esq.  
19 Feb., 1890.

82. *Mr. Cox.*] You said that some of the timber in the piers was hollow;—must it not have been hollow when it was first put up? Not necessarily. I presume it was not.

83. Can the timber get hollow after it has been erected? Yes.

84. *Mr. Copeland.*] What form does the decay assume—dry rot? Yes. The outside surface appears all right, but if you tap the pier, or insert a knife into it, you can see that it is perfectly hollow.

85. Was the timber cut from young trees? I could not say. It was covered with tar, and it was impossible to say what the timber was originally.

86. Do you think it likely that the piers were made out of small trees with heart in the middle? It is quite possible they may have been.

87. Because an ironbark log would scarcely decay above the surface in twenty years? If you get a thoroughly sound log—a thing it is most difficult to ascertain when you are putting up a structure—it will not decay; but it is practically impossible when you are erecting a bridge like that, to say that every log is thoroughly sound right through, and if there is the slightest symptom of unsoundness, dry rot will of course ensue.

88. But would you not be able, when a squared log was lying on the ground, by looking at both ends, to say whether or not it was sound right through? I have seen logs which have been passed as sound timber by some of our best inspectors, and which in three and a half years' time have been attacked with dry rot, and become almost entirely shelled.

89. Was that redgum or ironbark? Ironbark.

90. *Mr. Cox.*] The decay was not owing to the white ant? No. You can easily tell the difference.

91. *Mr. Dowel.*] When were instructions received to prepare plans and specifications for the iron bridge? I could not say when the instructions were originally given. The Engineer for Bridges would be able to give you that information.

92. Can you say when steps were first taken in the department to prepare plans and specifications? I could not.

93. Had they been commenced before you took charge? I do not know exactly how far the work was in progress before I came, but I know there was some work done in connection with it.

94. How long have you had charge of the department? Since the 1st of July last.

95. Then something had been done before then in the direction of preparing plans and specifications? I could not say with any degree of accuracy.

96. Can you say how long it generally takes in your department to prepare the plans and specifications for a bridge? It depends altogether on the magnitude of the work.

97. Such a work as this iron bridge at Cowra? The survey had to be made, the section had to be made, and the borings had to be taken in the first instance.

98. Can you say how long it generally takes to get that preliminary work done? It is very hard to lay down a rule, because there are so many contingencies. For instance, you may not be able to get to work for some time on account of the flooding of the river. If everything went right, I suppose the preliminary work ought to be done in two months or two and a half months.

99. Or three months? Yes, if everything went right.

100. How long after that would it take to prepare the calculations and the strain sheets? A month ought to do the plans after that.

101. After your calculations and strain sheets were prepared, how long did it take you to prepare the plans and specifications for this iron bridge? It would take longer than a month to prepare the strain sheets for the iron bridge. The plans would involve two months' work.

102. Did it not really take over three months to prepare the calculations and the strain sheets? I could not say.

103. How long did it take to prepare the plans and specifications? I could not tell you from memory, but Mr. M'Donald will, no doubt, be able to give you the information.

104. And you cannot say whether twelve months have elapsed since instructions were first received to prepare the plans and specifications for this bridge? I could not.

105. How many draughtsmen have you in your office engaged upon bridge work? I could not tell you the exact number without looking at the pay-sheets.

106. What test do you employ in regard to the wrought iron and steel used in the construction of these bridges? The tests are all in the specification. I have not a copy here, but I can get a copy.

107. By whom are the tests made? If the ironwork is obtained from home the test is made under the supervision of the superintending engineer in England. If the test is made here it is done by the University, under Mr. M'Donald.

108. At the University, by Professor Warren? Yes.

109. Does the Government or the contractor pay for the tests? I could not tell you without looking at the specification. I think the contractor pays for them, but I am not sure.

110. In your specifications for the bridge I notice that you have inserted certain sizes of iron, and I wish to refer you to one or two of them, for the purpose of ascertaining whether it is desirable or absolutely necessary that these particular sizes should be used, or whether they are marketable sizes, as sold by general ironmongers. For instance,—for your main girders you specify that the channel iron bracing shall be 8 in. x 3½ in. x ½ in. Is it absolutely necessary that that particular piece of iron should be 3½ in. Would not 3 in. have answered the purpose? 3½ in. gives the sectional area we require, and that is a very marketable size. I might say that, generally speaking, we try as much as possible to arrange that all our iron shall be of marketable sizes.

111. Is this a marketable size—6½ in. x 2½ in. x ½ in.? I think it is.

112. There is also specified another size of iron for the channel iron bracing, namely, 5½ in. x 2¾ in. Is it absolutely necessary that these unusual sizes should be specified? I am not prepared to say that they are unusual sizes. As I said before, as far as possible, we make all our iron of marketable sizes. There may be a few exceptions to that rule, and perhaps the few instances you have named may be exceptions, but I could not tell you whether they are or not unless I saw the trade list.

113. Take another instance—longitudinal girders to be rolled, 9½ in. x 4½ in.—is not that an unusual size. Is not 9 in. x 4 in. a trade size? 9½ in. is not an uncommon size to use at home. I have used it.

114. Then take the wrought-iron rolled girders. Is not this an unusual size—20 in. x 7½ in.—is the one-eighth put in for any special reason? Yes, you want the proper strength.

- R. Hickson, Esq.  
19 Feb., 1890.
115. It is absolutely necessary that the one-eighth should be there? That is in thickness; the iron increases in thickness by sixteenths.
116. But the girder you have in your specification is 20 inches deep by  $7\frac{1}{2}$  inches, and the flanges are 7 inches thick—is that a usual marketable size? I should say that was a very usual size.
117.  $7\frac{1}{2}$  inches? Yes.
118. Do you think it is good policy on the part of the Government that the expensive tests applied to the iron should be paid for by the contractor—do you think it is desirable? I think the contractor should bear the total expense of putting up the bridge.
119. But, with regard to the tests applied to the iron before it is used, do you think it desirable that the contractor should be called upon to bear that expense—would it not be better for the Department to pay for the test? My opinion is that it would be better for the contractor to pay; but it is a matter of opinion.
120. You visited the site of the proposed bridge? Yes.
121. And your Department recommend the composite bridge, with piers of wrought-iron, and timber superstructure? Yes.
122. Is there any stone in the locality suitable for the construction of piers? I believe there is no stone about there at all suitable for piers.
123. No stone within a reasonable distance of Cowra suitable for the masonry required for that bridge? Not as far as I am aware.
124. Would the cost be increased to any considerable extent by the use of stone piers instead of iron cylinders? Yes, the cost of the main piers would be increased. It would be a very difficult thing to put in stone piers in the river.
125. For what reason? You would have to build cofferdams, and pump the water out.
126. Could not a foundation be obtained by driving piles and piers, and then build on the piles? It could be done, but I do not think it would be desirable to put a stone structure on a timber foundation, which would be liable to decay. I think the stone and the iron works should be brought down to the solid.
127. Can you say to what depth the cylinders would be taken down? It is shown on the plan.
128. Is it a rock bottom? Yes.
129. You would not recommend that a foundation of piles should be used in the construction of the bridge? No.
130. And you say there is no stone in the locality suitable for building the bridge? Not as far as I am aware.
131. Did you make any calculations as to the difference in the cost of wrought-iron cylinders and stone or brick work for the piers? I did not, because I thought it would be utterly useless, as nobody would attempt to put in stone piers when constructing a bridge like that.
132. You have informed the Committee that it takes a considerable time to prepare the calculations and strain sheets for these iron bridges? Yes.
133. Would it not be possible to adopt a certain type of bridge and have all the strain sheets already prepared? Yes; if you had all the spans the same.
134. I mean a strain sheet applicable to a variety of spans—a table? It is not at all a desirable thing to do. I may say I have had a great deal of experience in bridge-building at home, and it is the universal practice of engineers there to take out the strains for all bridges, unless of course there happen to be some of exactly the same design. But if the span varies the strains are always taken out afresh.
135. Do you consider the lattice girder type a good type? It is considered the best.
136. The department having determined that that is the best type that could possibly be used, would it not be just as well to have a table of strain sheets prepared so as to obviate the necessity of taking them out for every separate span? I have just said that I do not think it would. It is not the custom at home for engineers of standing in connection with bridge work to do it, and I do not think there would be very much gained by it.
137. The practice at the present time is then, that if a span varies by 1 or 2 feet, entirely fresh calculations have to be made? No, not at all.
138. What is the difference in span which necessitates a fresh strain sheet? You cannot lay down a definite rule. Nobody would be stupid enough if there was only a difference of 2 feet in a span of 100 feet or 200 feet to calculate a fresh strain, but when you come to a difference of 50 feet in a span of 100 or 150 feet the custom is, and I think it is the proper course to adopt, to calculate your strain out afresh.
139. Have there not been numerous complaints to your department about the delay that has occurred in the designs for these bridges? Some complaints have been made, but they have been fully met by the fact that there were not sufficient hands in the office. So far as I am aware, no complaints have been made since we have increased our bridge staff.
140. *Mr. Trickett.*] Is it your opinion that the present bridge might be washed away at any time by a heavy flood? I think it is most unsafe.
141. It is liable to be washed away by a flood at any time? If a heavy flood occurred, bringing down any quantity of timber, I think it is more than likely that the bridge would be carried away.
142. Is it proposed to erect the new bridge above or below the site of the old one? Above.
143. Would not any attempt to improve the present bridge cause great inconvenience in regard to levels, for Mr. McDonald in his evidence says: "If the old route were adhered to, the roadway would have to be raised about 9 feet, which would probably lead to litigation with the owners of properties on each side of the road." Have you inquired into that matter? If we adhered to the old route we would have to provide for the traffic during the time occupied in the erection of the new bridge, and that would be a most inconvenient thing; but, quite apart from that, supposing the old bridge were a mile away, the new site is by far the better one.
144. Mr. McDonald in his evidence says:—"Again, if the old route were adhered to, the old bridge would have to be removed and the traffic completely stopped for about eighteen months. In addition, the roadway would have to be raised about 9 feet, which would probably lead to litigation with the owners of properties on each side of the road;"—have you considered that question? Yes, that is one of the reasons, though I do not know that it is a very important reason. The new bridge is higher. But there would be great complications in making a bridge on the present old site, and the main complication would be that provision would have to be made for the traffic during the erection of a new bridge.

145. One of the reasons I presume why the present bridge might be washed away at any time is because the piers are close together? Yes, and the bridge is not high enough. The piers are in the bed of the river, which is a great mistake.

R. Hickson,  
Esq.  
19 Feb., 1890.

146. Will that objection be obviated by the proposed composite bridge? To a great extent.

147. And you have made the openings as wide as is consistent with safety? Yes.

148. Are the approaches on either side of the proposed new bridge easy or complicated? Quite easy. The grade on either side is 1 in 25. The earthwork approach would have to be constructed.

149. Could it be made perfectly safe with no possibility of it being washed away? Yes. It will be pitching, and the material will be obtained from Kendall-street, where some levelling work has to be done.

150. Mr. McDonald says that £12,550 would be required for the purpose of making the present bridge anything like serviceable;—do you agree with that? The estimate is right, but I do not think the bridge would be very serviceable after the work was done.

151. You even think that that would in a great measure be money thrown away? Yes, I think it would be. Nearly every pile is more or less decayed, and very little pressure on the top would break them.

152. You say that when that was done the M'Callum trusses would be the only sound part of the bridge left? Yes.

153. And how long do you think they would last? They ought to last for eight or ten years.

154. Not more than that? I do not think so.

155. They would then have to be renewed at considerable expense? Yes.

156. Mr. Tonkin.] Are we to understand that if the piers gave way the M'Callum trusses would support the bridge for eight or ten years? No.

157. Dr. Carran.] Does this line on the plan denote the flood level? Yes.

158. Does it show the highest flood level? Yes.

159. And if another flood of that kind occurs the bridge will be impassable—even the new bridge? Yes. In a big flood the approaches are under water, and to make a bridge that would be passable in a high flood you would have to spend thousands of pounds in carrying the structure a considerable distance back.

160. Then it is just a question of how far you should go in regard to the cost of the bridge? These floods occur so seldom that it would be hardly worth while to go to the expense of so much filling up on the town side, and on the other side, where an embankment would have to be made for a great distance.

161. Suppose you were to build the bridge and let the water go over it, would an open approach of that kind be liable to be carried away by the flood? Yes.

162. Then your object in putting it above the flood-level is to secure the safety of the bridge? Yes.

163. Or you could not make it approachable except at an enormous expense? No.

164. With regard to the two piers in the composite bridge—one goes down to the rock, but the other is not marked as going to the rock? It would have to go to the rock.

165. Can you tell us how often these very high floods occur? I could not say without looking up the records. Not often.

166. Can you tell me for how many months in the year the river is fordable there? I could not say. It is fordable during the greater portion of the year.

167. Nine months? Perhaps so.

168. And for nine months in the year the people could do without an approach at all? I do not think they could, because the ford is very bad for heavy teams. Very heavy teams go across with wool, and it would be most inconvenient for them to go down the bank and cross the river, even if it were dry.

169. It would not be an absolute obstruction to the traffic? Well, I think it would, because you can never tell when a flood may come. It may come in the middle of the season, and stop the whole traffic for weeks.

170. When one of those heavy floods does occur how long does the river remain high? It goes down very quickly; that is to say, the top water goes down very fast, but it may be a fortnight or more before the river is fordable.

171. Then if one of these floods were to occur again the traffic on the bridge would not be stopped for more than three or four days? That would be the outside, I should think. I should say not more than two days.

172. Do you know what is the nearest railway station to Cowra on the other side of the river? I do not remember.

173. Suppose the bridge were not usable at a time of flood, could the teams unload at the railway station on the other side of the river? There is no railway station on the other side of the river.

174. But supposing a platform were placed at the bridge on solid ground above flood reach, could the teams unload there and cross the river? Of course they could.

175. Teams coming from that side of the country—from the west? Yes.

176. The principal traffic crossing the bridge now consists of stock, wool, and other produce coming from the west, and going to Sydney? Yes.

177. Could not all that traffic hit the railway at some other point on the west of the river? No doubt it could.

178. Are we not making a very expensive bridge simply for the sake of taking traffic across the river to a railway station, which traffic could hit the same railway on the western side of the river? That is looking at it from the point of view only of the railway traffic. Yes, a station could be made there, no doubt.

179. Would the cost of such a new station be more than the cost of a bridge? No, not so much.

180. Supposing it were so made to ease the traffic from the bridge, would a lighter bridge then do? I do not think so, because you want the span. This bridge has a span of 160 feet, and you must have a certain height of girder to correspond.

181. But that would only apply to the central span? No, it would apply to the whole. The great object, of course, is to have as few piers as possible, so as to offer the least obstruction to the river, and if you have a span of 160 feet the upper structure must correspond in strength.

John Alexander M'Donald, Esq., M.I.C.E., and M.I.M.E., Engineer for Bridges, sworn, and further examined:—

- J. A.  
M'Donald,  
Esq.  
19 Feb., 1890.
182. *Dr. Garran.*] From your printed statement it appears that £8,000 was provided out of loan for the construction of the existing bridge? Yes.
183. And the bridge is now worn out? Yes, with the exception of the M'Callum trusses.
184. The debentures being issued for thirty years the bridge for which the money was borrowed has disappeared, we may say, in twenty years, and the loan will fall due ten years hence? Yes.
185. And there has been no revenue from the bridge to pay either principal or interest? The revenue has been very small. Tolls were collected for nine months, and that was all the revenue.
186. And it is now proposed to add £26,000 of loan money on the top of £3,000. That will debit this bridge with £34,000 in our books? Yes.
187. And I understand you to say that the woodwork will require replacing in twenty-five years, and the decking in 12½ years? Yes.
188. And we have no provision at all for meeting either interest or principal unless it is done out of some local vote, or road and bridge vote? Yes.
189. To make these loan-built bridges sound in their finance we ought to have some replacement fund, ought we not? Well, I suppose to make them sound in their finance, we ought, properly speaking, if the composite design were adopted, to borrow £43,000 odd. That is the capital that is required to carry on the bridge.
190. But why do you want to borrow all that money? That will repay the capital required to carry it on without taking money from any road vote or special vote.
191. But if £26,000 is enough to build the bridge, all we want is revenue from some source—either local rates or road votes—to pay the principal and interest during the life of the bridge? Certainly.
192. I understand that the paper you read to the Committee is a review of our policy in the light of finance? Not exactly that.
193. And that your opinion is that wherever a replacement would be cheaper than going into a heavy loan vote, a replacement is the true policy? Yes.
194. And it is for that reason that you recommend this composite bridge? Yes.
195. Because you think it comes nearest to that idea? It is the cheapest.
196. You say you reckon that the iron piers will last for 120 years? I put the period down at 150 years.
197. Do you include in that all the other ironwork of the bridge? Yes.
198. The girders, stringers, plates, bolts, nuts, and everything? Yes; all the ironwork.
199. And the woodwork will last for twenty-five years? I have no doubt that timber-work like that will last for more than twenty-five years, but twenty-five years has been the average life of the timber bridges built in this country, and I have taken that period in this case.
200. You stated that the existing bridge was under water very shortly after it was built? No. I stated that some of the spans were washed away by the flood of 1870, which was the high flood.
201. Do you know if there has been as high a flood since? I do not think so.
202. Have you any idea what it would have cost to build the original bridge 6 feet higher? It would not have cost anything very considerable. But I do not imagine that the spans were carried away because the water was over the bridge, but because the spans were too small to allow the drift timber to pass through. They were 30 feet spans at that time, and the timber coming down in the flood formed a raft above these narrow spans which carried the piers away. Still, if the bridge had been 6 feet higher, and if the spans had been larger, very likely nothing would have been carried away.
203. If the bridge had been higher it would have been out of danger? Not necessarily. The timber could have formed a raft up against the narrow spans just the same.
204. You mean if the trees brought down by the flood had been longer than the span? Yes, which they generally are.
205. It was not done by the battering of the timber? No; a raft was formed against the bridge, and the pressure thus caused carried it away.
206. Since then you have widened the span? Yes, we have put larger spans in.
207. At a cost of £1,715? Yes.
208. And if that £1,715 had been spent on the original bridge the damage would not have been done? Probably not. We have not had such a flood since.
209. How many broad spans do you think it is necessary to have in a bridge of this kind to keep clear of the timber? I think three is a suitable number for a river like that, where there is an enormous amount of drift timber coming down with the floods.
210. But does not the drift timber generally come in the deep channel where the current is strongest? No. It comes under the three spans, as shown in the design.
211. Do you think it necessary to have three broad spans, to make sure? Yes.
212. The approach to the proposed bridge is much longer than the approach to the existing bridge, is it not? About 200 feet longer.
213. But practically the extra water-way would not be of much use in letting the drift timber go that would be concentrated in the length of the old bridge? Yes, there is great risk, even with the old bridge, in regard to timber coming down. Whenever there is a flood they have to have men down on the bridge with ropes and grappling irons, to guide the timber through the big openings.
214. Do you think there will be any necessity for that with the larger openings you now propose? No, I do not think there will be any risk then.
215. With these broader spans you increase the expense of your bridge in proportion to the width of each span, do you not? Yes, within certain limits. When you get beyond a span of 30 feet the cost of the bridge increases according to the width of the span.
216. But you are obliged to go to that extent here, for the sake of safety? I consider so.
217. Otherwise it would be cheaper to have shorter spans and more of them? Yes.
218. You give a preference to iron piers over wooden piers? Yes.
219. But if it is cheaper to make an iron pier would it not be cheaper to make an iron pier just a foot above the ground, so as to keep your wood out of the ground altogether? But the iron piers are not cheaper than wood.
220. Is it cheaper to renew your timber piling all through? It is cheaper to renew the timber piling  
221.

221. Even if the iron pier only just comes above the level of the ground? Yes.
222. The weak part of your timber pile is just where it comes out of the ground, is it not;—I mean for decay? Yes, generally.
223. And if you could avoid putting any of your timber into the ground at all you would get rid of that element of decay? Well, the timber would have to rest on something, and if it were resting on a concrete wall, or sunk into a concrete box, the timber would begin to decay just at the junction with the concrete or stone.
224. In any case, whether it was above ground or not? Yes.
225. You cannot get rid of that element of decay? I do not think so. The decay in the Cowra piers themselves is chiefly at the scarfs. The piles were driven to a great depth, and the timber was not long enough to stand a sufficient height out of the river, and they had to be scarfed.
226. How high above the ground? About from 4 to 8 feet.
227. And the wet got in at the junction? I presume it was the wet that caused it.
228. Do you think that the wet of an occasional flood, which we are told only lasts three or four days, is more injurious to the timber than the wetting of heavy rain? No.
229. Not a bit? No.
230. And if the wood is properly painted or tarred the wet ought hardly to get at the fibre of the timber at all? No; but if the timber is painted or tarred when it is green it is very likely that dry rot will afterwards occur.
231. Do you think that any part of the decay in the present bridge is due to the timber having been cut in the wrong season? The timber in the piers is very poor timber, and in the bridge spans it is very poor, but the McCallum trusses consist of what was undoubtedly well-picked timber, and it is to a great extent owing to that fact that they have lasted so much longer than the rest of the timber.
232. Did you think that if the piles had been as well selected as the trusses they would have lasted longer? They certainly would. The piles themselves are too small, and they are not well braced. The piers were weak when they were new, considering the weight they had to carry.
233. What timber are they? I do not know.
234. But you know that the trusses are ironbark? No; I do not know that; I believe they are.
235. Should a truss made of ironbark which is quite out of flood reach decay in twenty-five years? I do not think it should if the timber is well picked; but I have given twenty-five years because that has been the average life of our bridges.
236. When you compare the cost of iron with wood, and give the preference to the former, largely on account of the cost of carriage, do you recognize that in a case like that of the Cowra Bridge, where you have a railway, the cost of carriage is minimized with regard to your iron? The railway carriage comes to something considerable.
237. If you were building a bridge in a part of the country far away from a railway the cost of your iron would be much greater than the cost of local timber? Yes.
238. But where you are putting up a bridge at Cowra and can carry everything by railway the cost of your iron is proportionately less than that of timber? Whether we put up an iron bridge or a timber bridge there, we shall have to get the material through from Sydney.
239. Where will you get the timber for this bridge from? From Sydney.
240. And you have the same length of railway carriage for both material? Yes.
241. Have you taken all that into consideration? Yes.
242. And you are quite of opinion that short iron cylinders will be much dearer than driving in piles and replacing them every twenty-five years? When you speak of short cylinders I presume you suppose that there is rock for them to rest on, or a sufficiently solid bottom, so that even piles would not have to be driven far to reach a solid bottom. The cost would be pretty well proportionate whatever was the length of the cylinder.
243. You mean that you would not have to drive piles as far as you would have to push the cylinders down, if the rock is a considerable distance below? The third cylinder on the plan from this end is sunk a great deal deeper than we should have to drive piles if we were to put a timber pier there.
244. You mean that you do not want to drive your pile upon the rock? No.
245. You do want to drive the cylinder to the rock if it is within reach? Yes, if it is within reasonable reach.
246. What girders have you in the No. 2 plan for the composite bridge. I refer to the cross-girders resting on the piles? The cross-girders at each of the intersections carry the longitudinal girders.
247. And over the piers themselves you put in strong cross-girders? Yes. The truss carries the cross-girders, and the cross girders carry the roadway.
248. And it is cheaper to make all that girder work of iron than to attempt to dispense with iron in that part of the bridge? It would be a little cheaper to use timber there, but there would be considerable difficulty in renewals, and the putting in of new cross girders would involve a serious stoppage of traffic. The main object I have had has been to facilitate renewal, though the expense might be a little greater.
249. So that twenty years hence, when it becomes necessary, you can make the renewal bit by bit without disturbing the general construction of the bridge, and without stopping the traffic? Yes.
250. You can do half at a time? Yes.
251. And you could not do that if the bridge were all wood? No, we should have to take it down completely.
252. Is not a very great part of the traffic now going over the bridge—traffic which comes from the west to reach the railway at Cowra? Yes.
253. On the west side of the river how far have you to go before you get on solid ground out of flood reach? I think at about a mile distant we get beyond the flood level.
254. Is the railway bridge approach over the flooded country on an embankment or on piles? Partly on piles and partly on an embankment.
255. Then even in flood time if there was a platform on that side the traffic could be put on the railway? I have not followed the railway line a sufficient distance to judge.
256. You know the railway bridge? Yes.
257. Is that an iron bridge? Yes, it is an iron bridge with timber approaches.

J. A.  
M'Donald.  
Esq.  
19 Feb., 1890.

- J. A. M'Donald, Esq.  
19 Feb., 1890.
258. Has it one span over the river? No, I think there are three main spans.
259. Is the bed of the river covered in one span, the same as is proposed in this case? I really forget.
260. When that bridge was being built could a traffic bridge have been easily attached to it? It would have altered the design very considerably and increased the cost enormously.
261. Would it have been cheaper than making a separate bridge for the road traffic? Yes, I suppose it would have been a little cheaper, but the bridge would have been right away from the traffic of the town.
262. It would not have been so convenient to the town people? I should think not.
263. Looking at the traffic, do you think that this is an unnecessary expense, or that a cheaper bridge could be made to suit the purpose? I do not think a cheaper bridge could be made to suit the purpose,—not one that would afford a guarantee against flood risks.
264. You say that a £12,000 bridge, with, say, £2,000 added to put it out of flood danger, lasted for twenty years and served all the purposes of the township. Is bridge building now dearer, or why is it that you are going to expend £26,000 on the proposed bridge? The present bridge has a 14 feet roadway. It is not so substantially built, except as regards the trusses themselves, as the timber bridges that are built now. The water-way is not so large, the roadway is only 14 feet, and for the proposed bridge it is 20 feet, and we are giving, besides, two footways of 5 feet each. That gives 30 feet width of roadway as against 14 feet, which is more than double, and very nearly doubles the cost.
265. I ask you whether the traffic requirements are such as to justify twice the expenditure on a bridge now that we spent twenty years ago on a bridge that has practically met the requirements? The present bridge being only 14 feet wide it is almost impossible for one vehicle to pass another.
266. It is really too small for the traffic? Yes. It is very difficult for two buggies to pass one another.
267. *Chairman.*] There are no sideways? No.
268. *Dr. Garran.*] If all that western traffic has to come in at the railway-station at Cowra, a traffic bridge, I suppose, would be necessary? Yes; I think so.
269. Suppose that the railway is extended hereafter to Forbes and Parkes, would not that somewhat diminish the traffic over this bridge? I suppose it would in time, but I am hardly in a position to give an opinion on that question.
270. *Chairman.*] Does not the railway at present running from Cowra lessen the traffic in some way? The traffic returns which I have given were taken in December, a long time after the railway was completed.
271. *Dr. Garran.*] But is not this heavy traffic only for one or two months during the wool season? The average traffic has been given, but at times the traffic is congested.
272. So far as you have been able to form an estimate from personal inspection, you do not think this bridge is an extravagant bridge beyond the necessities of the case? No, I do not.
273. *Mr. Humphery.*] I think you say that the total cost of the bridge will be £26,000? £26,538.
274. What portion of that will have to be renewed within twenty-five years? The whole of the timber work.
275. What is the total cost of the portion that will have to be renewed within twenty-five years;—I think you say in your paper that the estimated cost of the iron-work is £15,000? Yes. The cost of the timber-work will be £8,000, and the planking £3,380. This material would have to be renewed within twenty-five years.
276. So that there would be about £14,500 to be expended again within twenty-five years to replace the wooden portion of the bridge? Yes.
277. That is exclusive of maintenance—exclusive of the cost of painting? Yes.
278. I do not understand some of the figures you have given. In answer to Dr. Garran you said that the capital value meant the capital cost—the actual cost of the bridge with interest, is that right? No; it is an assumed cost. It is the capital that a company would have to invest to build that bridge and carry it on indefinitely.
279. Why should you have to find more if you borrow your money at 3½ per cent. than if you borrow it at 4 per cent.? If you take the annual charges given on the last page of the Appendix, the annual charge at 4 per cent. is greater than at 3½ per cent.; but if you capitalize the annual charge at 3½ per cent., it comes to more capital than if you capitalize the same amount at 4 per cent.
280. Do you think those figures are at all necessary in considering the cost of the bridge? Yes; because I think that a comparison of the different designs should be made on the capital value as given in my statement rather than on the prime cost; because the capital value takes into consideration all maintenance, working expenses, and renewals for all time.
281. According to the calculations you have furnished to the Committee, if we borrowed the money at 2 per cent., it would cost us considerably more to build a bridge than if we borrowed it at 4 per cent.? Yes; but you are only realizing 2 per cent. on the capital you use for the bridge.
282. Our object is to ascertain what the bridge will cost us and not what capital we shall get by investing our money at so much per cent. We do not want to see what the bridge will cost, if we borrow our money at 4 per cent., and what the cost will be if we borrow at 3½ per cent. According to your statement if we borrow the money at 4 per cent. the bridge will cost us £43,000, and if we borrow it at 3½ per cent. it will cost us £46,000? I do not wish particularly to bring forward the difference between 4 per cent. and 3½ per cent. I first of all had it got out at 4 per cent.; then I thought that the Committee might wish to know what it would be at 3½ per cent. I do not want to draw any comparison between 4 per cent. and 3½ per cent., but my object in making this table up was to show the capitalized value of the different types of bridges, including maintenance, repairs, and renewals, so that the actual cost to the country, of permanent and temporary structures, could be compared.
283. *Mr. Dowd.*] How long have you resided in the colony? A little over ten years.
284. What was the first work you were engaged on? The erection of the Parramatta Bridge at Gladesville.
285. What experience had you in the construction of bridges before you came to the colony? I had been with Messrs. Appleby Brothers for about four years. I got out all the working drawings in the workshops for the Parramatta Bridge at Gladesville, and I superintended the work.
286. Then you had considerable experience in bridge-building. How long have you held the appointment of Engineer for Bridges? Since July last.
287. What was your position in the Department previously? Assistant Engineer.
288. Can you inform the Committee when instructions were first received for the preparation of the plans for No. 1 design? No instructions were ever received.

289. How did you come to go to work at it? As soon as I find that money is available for a bridge or any other work, I pass the work into the drawing office if there are men available to do it. I believe this work was referred to the Committee about the 10th October, and on the 16th October I sent a surveyor into the field to make the necessary surveys, and take the sections.

J. A.  
M'Donald,  
Esq.  
10 Feb., 1890.

290. When were the borings taken for this bridge? The borings were taken when it was anticipated that we should go in for renewals rather than for reconstruction.

291. How long ago is that? About two years.

292. After you had the borings taken and local investigations made, what was the next step taken with regard to the construction of this bridge; did you prepare calculations and strain sheets? Yes. But we had them going on pretty well simultaneously. We were four months getting out all the drawings, calculations, and sections, and everything in connection with this work.

293. Then virtually, the bridge has been dealt with by the department during the last two years? It has been before the department, but nothing definite has been done. There were not sufficient funds to do anything.

294. But you took the borings for the piers two years ago? Yes.

295. Have you made any calculation as to the cost of substituting stone piers for iron cylinders? There is no suitable stone in the locality.

296. Have you made inquiries? Yes. The stone is suitable for the concrete we should use in the piers, but it is very difficult stone to dress, and not adapted for masonry.

297. Would the construction of stone piers involve a larger cost? In the majority of cases it would. By using iron cylinders we do away with the necessity for cofferdams or timbering of any sort, except a light stage for carrying the cylinders and platforms; and, when the pier is sunk, we can go down to a greater depth with an iron cylinder to get on the rock than we can with timber.

298. But could you not build stone piers on top of the iron cylinders? Yes, but we keep the size of the cylinders down as low as possible, to give the necessary resistance, and we must have some rigid bracing between the two cylinders. If we built up in masonry we should have to carry the masonry across from one cylinder to the other. The cylinders are erected in pairs—one cylinder to each girder.

299. What is the space between the two cylinders? About 25 feet.

300. Would it not be possible to put an iron girder across, or some iron foundation to receive the stone piers? Iron bracing for masonry is always liable to give. It is not so rigid as bracing the ironwork itself together, and these piers have to resist very heavy floods which rise to a great height.

301. If it were decided to adopt the design for the iron bridge, what would be the total amount of the contract that would be expended outside the colony? The contract might be let in the colony.

302. But would the iron be prepared in the colony? It might be—we have had several bridges built in the colony.

303. Of local iron? Not local iron—imported iron.

304. If a tender were accepted for this iron bridge, can you inform the Committee how much of the expenditure would go out of the country? I cannot tell you.

305. You have drawn up your specification in two separate parts—one for the supply of iron work, and one for the supply of labour—what is the relative proportion of these two? They are generally about equal. If the iron bridge were manufactured in the colony, of course the labour would preponderate.

306. How many iron bridges have you manufactured in the colony? I could not tell you exactly, but I could name some of the principal ones. There was one made about five years ago—a bridge about 300 feet long, with iron lattice girders somewhat similar to that shown on the top plan, and it was manufactured by D. and W. Robertson. There was another, about 280 feet long, manufactured about three years ago by R. F. Ritchie, of Auburn. There is one being manufactured now by Vale, of Auburn, and we have small iron bridges, up to about 30 feet span, for which there is an annual contract. These latter have to be manufactured here on account of the shortness of time allowed for delivery.

307. But no iron bridge of any magnitude has been manufactured in the colony? Well, 300 feet is a fair size for a bridge.

308. What is the length of the proposed Cowra bridge? It is 1,000 feet, but it is an exceptionally long bridge.

309. Do you expect to obtain tenders for this bridge in the colony? I presume that tenders will be invited here first as they always are. If no reasonable tender is received, then tenders are usually invited in England.

310. You have informed the Committee that 50 per cent. of the cost of an iron bridge has to go for the ironwork itself; in other words, that half the amount of the contract for an iron bridge goes for material alone? The material complete, ready to be erected. The whole bridge is erected in the contractor's yard before it is sent up to the site.

311. *Mr. Garrard.*] Then it would be 50 per cent. for transit and erection? I did not say so. I said that the erection of the bridge on site would cost about the same as the supply of the whole bridge ready to be erected.

312. *Mr. Dowell.*] Suppose the bridges were designed with brick or stone piers and timber, would not nearly the whole cost be expended in the colony, or a much larger proportion than is the case as the bridges are designed at the present time? It would involve a considerable increase in cost.

313. Have you made the calculations? No; but I know from previous experience of the cost of masonry and brick. I can give you an idea of the cost of masonry as compared with timber. Lately a design was prepared for a bridge with 27-foot span, to be constructed of masonry walls and iron top. The detailed estimate gave a cost of over £1,200. The funds were not sufficient, and a design was got out for a similar bridge to be built of timber, the estimated cost of which was £250. The span of the timber bridge was 25 feet; and, to give you an idea of the cost of brick culverts, I may state that a bridge with a brick arch, the span being 20 feet, cost £572.

314. Then the brick bridge bears a favorable comparison as regards cost? Yes. This particular brick structure was built at a place where bricks were pretty cheap. It comes out a good deal better than the masonry.

315. Is it not a fact that the expense of maintenance of brick and stone bridges is very much less than in the case of iron or timber bridges? Certainly the maintenance is less.

316. Is not that a very considerable item? Yes, but hardly sufficient to cover the enormous difference in cost.

J. A.  
M'Donald,  
Esq.  
19 Feb., 1890.

317. In drawing out the specification of this bridge, have you selected iron of sizes that are marketable? Yes.
318. Are there no unusual sizes specified? No.
319. None, whatever? None. I presume by marketable you mean obtainable—not iron of merchants sizes, because bridge iron is very seldom kept by merchants. Bridge iron is nearly always rolled to order.
320. Is there not a special additional rate for the sizes of iron you have specified for this bridge? In some cases—as for instance, 9 x 6 T iron, which is a special size—we have to pay a special rate. But we save in material by using that section. If we did not use that section we should have to use double-angle iron and a stringer plate, and we should have to put in a larger area on account of the loss of section due to rivet holes. Therefore, we find it more economical to pay a higher rate and use the special section.
321. Take, for instance, the channel iron bracing in your main girders, was it absolutely necessary that 5½-in. x 2½ x ¼ should be specified;—would not 5 inches have been sufficient? The size of those channel bars varies, and it depends upon what weight of sectional area you require in your bar. You can have it rolled to ¼ longer or ¼ less.
322. Are you not aware that it has been stated that by using these unusual sizes the cost of the bridge is very materially increased? We do not use any unusual sizes in the bridges in our department. The sizes are obtained from special lists—merchants lists chiefly—which have been obtained direct from the Agent-General.
323. But you have already stated that these special sizes for which you have specified in the Cowra bridge entail additional cost? I spoke of one section.
324. I ask you as an engineer, whether by specifying usual marketable sizes, such, for instance, as 5 x 2 x 5½, the cost of a bridge would not be materially reduced? In many cases it would be impossible to get these even sizes. The rolls are made, and very often after a few years those rolls are turned up again, and a section made a shade larger. The result is that the section books are changing, and you get odd dimensions in your section book. If you take an ordinary section book from any of the rolling mills you will find that the same thing runs through them—odd dimensions.
325. What was the cause of the delay in bringing this bridge before the Committee,—had you not a sufficient staff in the office? The work has only taken four months. I do not think that is extraordinary, considering the number of drawings and calculations that had to be made.
326. But it has virtually been in hand for two years? The work was not put in hand until the funds were available.
327. How many draughtsmen have you in your department employed in bridge work only? Twenty-seven.
328. *Mr. Cox.*] You said just now that the life of a timber bridge was twenty-five years? I have assumed it to be that.
329. Does that refer to all qualities of timber? That is assumed as the life of the bridge for the sake of argument in my evidence. But of course in some parts of the country where we cannot get good timber the life of a bridge may be only ten years, while in other parts, where we get exceptionally good timber, a bridge may last for thirty or thirty-five years. But from what I have seen of the bridges built by the Roads Department the average life of the timber bridges is about twenty-five years.
330. Are you aware that first-class timber like red gum or ironbark will last for forty, fifty, or sixty years? Yes. I have seen piles drawn from the ground that have been in for fifty years, and they have been as sound as when they were first put in.
331. Do you think it possible that the timber piles used in the Cowra bridge could have been sound when they were first put in? I think they were composed of very poor timber. They were too light to carry the weight that was put on them.
332. And you think that the persons in charge of the works must have been somewhat lenient to the contractors in allowing such timber to be used? Yes, I think so.
333. *Mr. Tonkin.*] Has the present bridge gone beyond repair? All except the M'Callum trusses.
334. It would be impossible to repair it? It would be possible to repair the piers, but they would always be uncertain. In some places the timber is almost a skin, or from ¼-in. to ½-in. thick, the rest being almost gone with dry rot.
335. Would there be no possibility of replacing those piles with new ones? If a start were made to do it, I am afraid the whole of the piers would have to be renewed.
336. What would it cost to renew the whole of the piers? I could not say on the spur of the moment.
337. The superstructure is sound? Only a part of it. All the approach spans are thoroughly gone. We have been patching them up. We have put trestles in the middle of the 65-foot spans, because they would not carry their own weight, and if a heavy flood came, the whole of the trestles and the approach spans might be carried away, because we have now reduced the width of the spans down to the 30 feet that they were originally in 1870, when they were washed away.
338. At a rough calculation do you think it would cost £2,000 to put the present bridge in good order? It could not be done for anything near that.
339. Did you see a letter which appeared in yesterday's *Daily Telegraph*? Yes, I read it.
340. Do you agree in any way with what is stated in that letter? Certainly not.
341. Do you know the gentleman who wrote the letter? No.
342. You do not know whether or not he is an engineer? I do not know him by name or otherwise.
343. Then without any hesitation you recommend a new bridge instead of repairs to the old one? Yes. I think it would only be throwing good money after bad to do anything more to the old bridge.
344. You would do so even if you considered that the traffic, on account of the railway construction, was not so great as it was when the bridge was constructed? Yes. If we had not to make provision for the increased traffic, I should recommend a new bridge.
345. *Mr. Garrard.*] You stated just now, in answer to Mr. Dowel, that you had plans and estimates made for a bridge the abutments of which would be of stone, and which was estimated to cost £1,200. You said that the estimate was so high that you determined to substitute wood. Was the stone in the locality where the bridge was to be erected handy? Yes, fairly so, but the foundations were so bad.
346. And was the wood available too? Yes, within 10 miles.
347. What would have been the life of the stone abutments? I think it would be a safe thing to put it down at about 150 years.

348. The wood, which was one-fifth of the cost of the stone structure, would have had to be renewed, some of it in twelve and a half years, and some in twenty-five years? Yes.
349. I suppose the planking would be common to both? One was to have an iron top with tarred metal.
350. Therefore we may say in regard to the wooden bridge that the planking would have had to be renewed in twelve and a half years, and the rest of the woodwork in twenty-five years? Yes.
351. Where stone is available do you favour its use in preference to wood or iron? Certainly, if you can put it in cheaper. It is generally a matter of cost; whichever is the cheapest is used.
352. But you are clearly of opinion that where there is likely to be much traffic an iron structure would be better even than composite bridge such as that now proposed? No, I do not think I can say it would be better. The only risk I see at all in the timber structure on such a large scale is that some of the timber might decay without the officer in charge knowing it; there is a certain amount of risk in that way.
353. It would require very careful supervision from time to time? Yes.
354. And, of course, owing to the very frequent repairs of a composite or wooden structure, traffic would be more often interrupted? Yes. The interruption would not be very great with a 20 feet roadway.
355. Is it not a fact that of late years where the traffic would justify it the Roads Department have gone in for iron bridges exclusively—that there has been a tendency of late years to have more iron bridges than wooden ones? I do not exactly know what you mean. We put up about ten or twelve iron bridges a year and about eighty timber bridges.
356. Then there has not been a disposition on the part of the department lately to construct more iron bridges than wooden ones? No, the same average proportion has been maintained for several years.
357. Then are we to understand that when the department has heretofore used iron bridges they will in future use composite bridges; or will each case rest upon itself? Each case will rest upon itself.
358. So that a bridge may be brought before the Committee next Session of Parliament which will be exclusively of iron under certain altered circumstances? Yes.
359. *Mr. O'Sullivan.*] What load does this bridge carry? 84 lb. to the square foot distributed all over the bridge, or an ordinary traction engine going over. That is the greatest load you could have with cross-girders.
360. Do you know the bridge at Nowra across the Shoalhaven? I only know it by seeing the drawings.
361. That is built entirely of iron is it not? I think it has a timber deck.
362. Do you know the deflection of that bridge—on the centre span? No, I do not.
363. *Mr. Copland.*] Do you think there is any danger as regards wooden bridges getting burnt? I believe the existing Cowra bridge has been on fire twice.
364. Have you taken that risk into consideration in making your calculations? I do not remember a bridge having been burnt down, so that I think the risk is very small.
365. Would there not be some danger if a bush fire occurred in the summer time? There is no bush on either side of this bridge. One end is right in the town, and the other is on a large common.
366. *Chairman.*] Would not danger from fire arise from travellers camping under the bridge rather than from bush fires? Yes; that is generally the way the fire occurs.
367. *Mr. Dowel.*] With reference to No. 3 design, what do you estimate the cost of that wooden structure? With iron cylinders, and a footway on both sides, £21,392.
368. Would that answer all the purposes of traffic the same as the other two bridges? Yes. There would be a considerable risk during flood time, owing to the small openings.
369. But it would answer the same purposes as regards traffic that the other two designs would? Yes. It would accommodate the traffic, but it would not give the same openings for flood water.
370. What do you estimate is the life of that No. 3 bridge? Twenty-five years.
371. Could you not estimate the life of that bridge for a longer period if it were constructed of good iron-bark timber, and there was careful supervision? Yes; we might lengthen the life of the bridges all round. The iron bridge, I daresay, would last more than 150 years, so that I think the proportion would remain practically the same.
372. Have you not got a better gauge or guide to form an opinion in the case of wooden structures than of iron? The average life of timber bridges hitherto has been about twenty-five years.
373. I heard you say that ironbark would last very much longer than twenty-five years? Under some circumstances and in some places, but I do not think you could depend upon the whole structure lasting longer.
374. I am referring to this particular bridge;—you would not undertake to say that the life of the bridge would be longer than twenty-five years under any circumstances? No.

J. A.  
M'Donald,  
Esq.  
19 Feb., 1890.

WEDNESDAY, 30 APRIL, 1890.

Present:—

THE HONORABLE JOHN LACKEY (VICE-CHAIRMAN).

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHREY.

The Hon. WILLIAM JOSEPH TRICKETT.

The Hon. GEORGE HENRY COX.

JACOB GARRARD, Esq.

JAMES EBENEZER TONKIN, Esq.

WILLIAM SPRINGTHORPE DOWEL, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

CHARLES ALFRED LEE, Esq.

The Committee further considered the proposed Iron Bridge at Cowra.

John Alexander M'Donald, Esq., M.I.C.E., and M.I.M.E., Engineer for Bridges, sworn, and further examined:—

375. *Vice-Chairman.*] You have a paper which you desire to read to the Committee? Yes; I have written out the few remarks which I wish to make. They are as follows:—

I should like first to make a few remarks on the evidence given by Mr. Hamand, at Cowra:—

To question 193, Mr. Hamand states that "he is a little surprised at a 90 ft. span being put before you at all. They are evidently not big enough, having regard to the floods." So far he entirely concurs with the department. However, in submitting a design he only increases the span about 30ft., giving a waterway of 6,000 square feet, as against 4,350 square feet with the 90 feet span. The department cannot recommend river spans giving less waterway than on design No. 2, or 8,060 square feet.

J. A.  
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Esq.  
30 April, 1890.

J. A. McDonald, Esq.  
30 April, 1890.

To question 196, he states that the advantage of a concrete bridge is that "its life is practically for ever, and it does not cost sixpence for repairs." These statements are both assumptions, and cannot be proved any more than the Department can prove the life of an iron bridge to be only 150 years. I may state that if in design No. 1 the life had been taken at 300 years instead of 150 years, the annual charge would only have been decreased by £7 per annum due to this longer life, and if then the life is still further increased to last for ever, the annual charge would only be decreased by £8 per annum, or a difference in the annual charge of only £1 between 300 years' life and an infinite life; showing that an assumed life of 150 years is practically equivalent to infinity.

To question 217, I may state that the Roads and Bridges Department have and use type designs for the following:— 1 type, 1st class timber culverts; 1 type, 2nd class timber culverts; 3 types, iron-decked culverts, with concrete, brick, or masonry walls; 1 type, timber-top culverts, with concrete, brick, or masonry walls; 3 types, low-level bridges; 2 types, plain beam bridges; 2 types, timber truss bridges, 65 ft. span; 2 types, timber truss bridges, 75 ft. span; 2 types, truss bridges, 90 ft. span; 3 types, lift bridges; 1 type, compound beam bridges.

For iron bridges generally, it would be a waste of time to get out a table as suggested, as every iron bridge designed is kept in the office as a type, and as soon as a chance occurs of reproducing it, it is done.

Mr. Hamand states he does not see the reason for centre span, No. 1 design, being 216 feet, and says he supposes it might as well be 200 feet. How would he propose to divide up his bays? At present the cross-girders are shown 12 feet pitch, but if he gave the same number of cross-girders the pitch would be 11 feet 1½ inches, which arbitrary dimension would certainly confuse mechanics accustomed to work to eighths of an inch.

In general the span is ruled by the economical pitch of cross-girders, of which pitch the span of main girders must be a multiple. In continuous girder bridges the spans of main girders must be so proportioned that the shearing and bending stresses are fairly equal respectively in each span. For small spans, such as design 1, this is practically done by making the outside spans  $\frac{2}{3}$  of the centre span; if all spans are equal there is not much saving in continuity.

In answer to question 224, Mr. Hamand states that he has seen the plans now under consideration for the first time. I may state that your secretary sent for these plans, and personally exhibited them to Mr. Hamand before the latter gave evidence at Cowra.

Question 236 implies that the Department do not recommend concrete or artificial stone for the piers and cylinders. In each of the three designs submitted the iron piers are filled with concrete, the iron cylinder simply forming a thin shell so as to sink the concrete to a solid foundation. The concrete columns carry the weight of the bridge, and not any weight is put on the iron cylinders.

I might now be allowed to proceed to discuss design No. 1, submitted by Mr. Hamand to your Committee, and which was forwarded on to the Roads and Bridges Department by your Committee.

In the design submitted by Mr. Hamand for bridge over the Lachlan River at Cowra the width of deck is 5 feet less, and the sectional area of waterway between abutments (taking the flood-level as a datum) is 4,086 square feet less than provided in Departmental design No. 2. It is, therefore, necessary for the sake of comparison, to assume the deck and waterway to be similar in each design.

ESTIMATED COST OF CONCRETE.

Cost of Materials.		£	s.	d.	
Local granite, machine broken to 2½-in. gauge	.....	0	7	6	per cubic yard.
Gravel screened and broken	.....	0	4	6	do
Clean coarse sand	.....	0	2	6	do
Cement	.....	0	17	6	per cask.
Railway carriage on cement to Cowra	.....	2	0	10	per ton.
Carriage—Cowra Railway Station to bridge site	.....	0	3	0	do.

For carriage—Six casks of cement weigh 1 ton.

For measurement—One cask cement contains 4 cubic feet.

The proportion specified by Mr. Hamand is four parts stone, two parts sand, and one part cement.

If five parts of stone are used to two parts of mortar, the proportion of mortar, two of sand to one of cement, is just sufficient to fill the interstices of the stone when broken to a 2½-in. gauge. If less stone is used the strength of the concrete is not increased, as the strength is proportionate to the adhesive strength of the mortar; but the cost per cubic yard is increased, as where the proportion—5 cubic yards, 2 cubic yards, 1 cubic yard—produces practically 5 cubic yards of concrete, the proportion 4 cubic yards, 2 cubic yards, 1 cubic yard produces 4½ cubic yards of concrete.

I will first give the details of the estimated cost of concrete given by the Department, and then on the same basis give the detailed estimated cost of concrete as specified by Mr. Hamand.

1. AS SPECIFIED BY THE WORKS DEPARTMENT.

	£	s.	d.
Gravel screened and broken, 20 cubic feet = $\frac{4}{6} \times \frac{27}{7}$	0	3	4
Sand, 8 cubic feet = $\frac{2}{6} \times \frac{27}{7}$	0	0	9
Cement, 1 cask = 4 cubic feet	0	17	6
Carriage to site of 1 cask cement = $\frac{43}{10} \times \frac{1}{4}$	0	7	3
<b>Total cost for 20 cubic feet of materials</b>	<b>1</b>	<b>8</b>	<b>10</b>
$\frac{28}{10} \times \frac{27}{7}$ = total cost 1 cubic yard of material	1	18	3
Labour per cubic yard	0	10	0
Allowed in departmental estimate for contingencies, plant, and profit per cubic yard	0	11	9
	<b>3</b>	<b>0</b>	<b>0</b>

2. AS SPECIFIED BY MR. HAMAND.

Local granite, 16 cubic feet = $\frac{7}{6} \times \frac{14}{7}$	0	4	5
Sand, 8 cubic feet = $\frac{2}{6} \times \frac{27}{7}$	0	0	9
Cement, 1 cask = 4 cubic feet	0	17	6
Carriage to site of 1 cask cement = $\frac{43}{10} \times \frac{1}{4}$	0	7	3
<b>Total cost for 17½ cubic feet of materials</b>	<b>1</b>	<b>9</b>	<b>11</b>
$\frac{27}{11} \times \frac{27}{7}$ = total cost materials for 1 cubic yard	2	5	10
Labour, per cubic yard	0	10	0
Contingencies, plant, and profit per cubic yard	0	11	9
<b>Departmental estimate of cost of concrete per cubic yard, as specified by Mr. Hamand</b>	<b>3</b>	<b>7</b>	<b>7</b>

The item above of "plant" includes board frames (but not centring), cranes, skips, punts, staging, measuring boxes, and all tools required for the work.

If the broken granite be taken at 10s. (the present local price for hand-broken) the price of the concrete, as specified by Mr. Hamand, would be increased to £3 9s. 9d. per cubic yard.

The price for concrete given by Mr. Hamand is 44s., whilst in the departmental estimate 60s. has been allowed. Taking the latter price (60s.) as a basis, the proportion and materials specified by Mr. Hamand would fix the rate of concrete proposed to be used by him at 67s. 7d. per cubic yard.

"Excavation in rock" and "other than rock" have been taken at the rates adopted in estimating cost of No. 2 departmental design.

It would appear that no provision has been made in Mr. Hamand's estimate for the floating over, and lining up, of the exposed faces, and in my estimate of his design I have shown the estimated cost of same.

The total sectional area of waterway provided in departmental design between abutments, is 24,108 square feet, against 20,072 square feet, in Mr. Hamand's design. Supposing the deck to be run out level from the centre of end span it would be necessary to add twelve extra arch spans to Mr. Hamand's design to make up the difference in sectional area of waterway between the departmental design and the design submitted by Mr. Hamand.

The

The length of Mr. Hamand's bridge would then be 1,716 lineal feet; the departmental design showing 1,040 lineal feet of bridge. It will thus be seen that to give the same sectional area of waterway, the arch bridge would require to be 676 lineal feet longer than the composite design.

The following table shows the obstruction to flood caused by the massive piers so necessary in bridges of the arch type to be 15 per cent., whilst in the departmental design the obstruction is only 4 per cent. of the total waterway.

J. A.  
McDonald,  
Esq.  
30 April, 1890.

Flood Areas :—

Design.	Total length of bridge between abutments.	Total sectional area of flood between abutments.	Sectional area of flood obstructed by piers.	Percentage of obstruction by piers to flood waters.
Mr. Hamand's .....	924 feet.	23,625 square feet.	3,553 square feet.	15
Department No. 2 .....	1,040 do	23,087 do	979 do	4

The estimated cost of Mr. Hamand's design as submitted by him, with concrete taken at 44s. per cubic yard, is .....	£	37,487
The cost of same design, with the concrete run out, at 67s. 7d., is .....		54,650
By making the deck on arch bridge, the same width as on departmental design, the cost would be increased by .....		8,614
The floating and lining up of exposed faces of walls would also add to the cost of Mr. Hamand's bridge .....		2,100
And to build Mr. Hamand's bridge with the same sectional area of waterway as provided in departmental design, viz., the cost of twelve extra spans, would mean a further expenditure of .....		27,360
Thus, it will be seen, that if the design submitted by Mr. Hamand was modified, so as to provide all the advantages of the departmental design, the total cost would amount to .....		92,724
Then for comparison, admitting Mr. Hamand's assumption that life = infinity, and maintenance and repairs are nil, then capital value of his design is .....		92,724
Departmental design I, capital value .....		76,350
"    II,    "    (that recommended) .....		43,375
"    III,    "    .....		39,400

The Commissioner for Roads did not think it necessary to go into detail with regard to No. 2 design, submitted by Mr. Hamand, as it was practically a dam across the river. The deck level is too high for a low-level bridge, and it is just the height to catch all the timber that would come down in a flood and bank the water up, and to a great extent cover the town of Cowra.

376. *Mr. O'Sullivan.*] Then this bridge would be useless in flood-time? All the bridges, departmental or otherwise, would be useless in times of highest flood.

377. *Dr. Garran.*] And the bridge would be under water? Certainly.

Some reference has been made to British Board of Trade rules, and it would be as well here to state that this department do not adhere to those rules. The British Board of Trade rule for the safe working stress on iron in bridgework is 5 tons in tension and 4 tons in compression per square inch of section. I do not think any engineer would take the responsibility of designing bridges on this assumption, as it makes no allowance for alternating or variable stresses; it assumes that, if one application of a strain of 20 tons will break a bar, that it is safe to load it in an indefinite number of times with one-fourth or with 5 tons. The diagram (*produced*) shows the rule adopted by this Department, the black line being plotted from Weyrauch's formulæ. The full red line represents Board of Trade rule for tension, and the dotted red line represents Board of Trade rule for compression. Weyrauch's formulæ were deduced by Professor Launhardt and J. J. Weyrauch from the investigations which Wohler carried out during eighteen years at the instance of the Prussian Government, and have been practically confirmed by other experimenters during the last twenty years. I think that that fully justifies the Department in not adhering to the Board of Trade in that particular. For timber structures the British Board of Trade rules are equally vague; but no rule made for British timbers could apply to the timbers of this Colony. I may add that the rule of this Department for large timber structures is to allow a factor of safety of 5 in compression members after calculating the breaking weight by Gordon's or Rankin's formulæ for long columns, but adopting the constants as ascertained by Professor Warren in his exhaustive experiments on New South Wales timbers. However, if taken out without treating as long columns, the factor of safety would be about 7 in this case. If all the stresses on a structure have been carefully considered, and the behaviour of the material employed under the stresses imposed is known, a large factor of safety is not required, but can only lead to a waste of material. As showing the unreliability of the British Board of Trade rules, it may be stated that the Tay Bridge was passed by that Board a year before its failure. The Board of Trade also do not adhere to their own rules, for in the Forth Bridge they have allowed  $7\frac{1}{2}$  tons per square inch on the steel when their rule is  $6\frac{1}{2}$  tons.

Mr. Hamand, in his criticism of the departmental design, considers a calculated load of 84 lb. per square foot does not allow sufficient margin for safety for large highway bridges, but gives no reason for his opinion. On one of the 160-foot spans of the composite design the greatest load that could possibly be packed on the roadway (including boilers and machinery) would be 95 tons. This has been ascertained by actual experiment on Temas Bridge. The departmental calculated load is 180 tons, leaving 85 tons for passenger loading on the two footways, or at the rate of 120 lb. per square foot. It would be useless to calculate for a compact crowd on the roadway in addition, as it would be the duty of the police to prevent such a thing, even if it was possible to obtain sufficient people around Cowra. As previously stated, the maximum concentrated moving load calculated for is a traction engine or other load of  $16\frac{1}{2}$  tons.

When giving evidence before this Committee on 19th February, questions were asked me in reference to certain sizes of iron specified by the Roads and Bridges Department, and I now submit a few typical sheets of iron sections. My reason in submitting merchants' lists instead of makers' lists is, that the merchants' lists are more complete, being a compilation of the sections rolled at, perhaps, fifty different mills. The lists submitted are as follows:—Ostermeyer, Dewez, & Co., D. and W. Robertson, Jules Renard & Co., C. C. Dunkerley & Co. It will be seen by reference to these lists that the channel and girder sections mentioned by Mr. Dowel are all given on at least two of them. That odd dimensions are rather the rule than the exception is at once apparent. Take for example Dunkerley's list, and commence at column 3 or channel irons; they run:—

$6\frac{1}{2} \times 2\frac{5}{8} \times \frac{1}{2} \times 16\frac{1}{2}$ lb. per foot run.
$6\frac{1}{2} \times 3\frac{1}{8} \times \frac{3}{8} \times 15\frac{1}{2}$ lb. " "
$6\frac{3}{8} \times 2\frac{3}{4} \times \frac{1}{8} \times 12\frac{1}{2}$ lb. " "
$6\frac{3}{8} \times 2\frac{1}{2} \times \frac{3}{8} \times 19$ lb. " "
$6\frac{3}{8} \times 2\frac{1}{8} \times \frac{5}{8} \times 12\frac{1}{2}$ lb. " "

And again, in the girders similar odd dimensions occur. To illustrate the reason for some of these odd dimensions I have had the section of a girder  $20' \times 7' \times \frac{3}{4}"$  web  $\times$  90 lb. per foot run drawn on diagram (*produced*) and coloured blue. The breaking weight of this girder for a 27 feet span is 37 tons at the centre. With the same rolls the section may be increased  $\frac{1}{8}"$  without any extra cost per ton, as shown by the portion coloured red. This then gives a thickness of web of  $\frac{7}{8}"$ , a width of flange of  $7\frac{1}{2}"$ , and a weight per foot run of 100 lb., and the strength is increased from 37 tons to 39 tons. Without extra cost per ton this section could be rolled to any weight between 90 lb. and 100 lb. per foot run, which would give smaller fractions than  $\frac{1}{8}$  inch. The above illustration applies in the same manner to channel irons as to girders. Another reason for the odd dimensions found on all merchants lists is, that a large percentage of girders and channel irons are rolled on the Continent, where the metrical system of measurement is used. For instance, a girder in English measurement  $19\frac{3}{4}" \times 7\frac{1}{2}"$  would, according to the metrical system, read  $500 \times 180$  millimetres, which are fairly even dimensions. It is useless for the engineer designing bridgework to assume that the sizes of channels and girders increase in size by a certain fixed and even increment, for such is not the case, and he must be content to specify the nearest size obtainable on some reliable merchant's

J. A. M'Donald, Esq.  
30 April, 1890.

merchant's lists, even though it may run to odd fractions, as for instance a girder  $11\frac{3}{16}$ " deep  $\times$   $4\frac{1}{8}$ " wide  $\times$   $\frac{7}{16}$ " thick  $\times$  39·7 lb. per foot run (metrical measurement—300 millimetres  $\times$  125 millimetres  $\times$  11 millimetres  $\times$  59 kilogrammes) may be thought an odd size, but it is obtainable to order. I think the foregoing remarks will entirely clear the Department from any suspicion that unmarketable sizes of iron are specified, and I would draw the attention of the Committee to the fact that this question of sizes of iron is not involved in the design now recommended by the Department for Public Works, as in this design no rolled girders and no channel irons are shown, the only sections required being steel angle bars  $4" \times 3" \times \frac{1}{4}"$  flat plates and round iron for bolts and suspension rods. I hand in detailed estimate of Mr. Hamand's design at the rates adopted by the Department.

## COWRA BRIDGE.

Estimated Cost of Mr. Hamand's Design at rates comparative with those adopted in Departmental Designs.

Quantity.	Item.	Rate.	Amount.
cub. yds.		£ s. d.	£ s. d.
1,744	Excavation other than rock .....	0 2 6 c. yd.	218 0 0
1,128	Do do river piers .....	1 0 0 do	1,128 0 0
28	Do rock do. ....	10 0 0 do	280 0 0
13,492	Masonry concrete .....	3 7 9 do	45,704 3 0
.....	Allow for river foundations .....	bulk sum	2,000 0 0
.....	Do centering, moulds, &c. ....	do	3,500 0 0
7,500	Filling to arches .....	0 2 6 do	937 10 0
623	Metalling .....	0 6 0 do	187 16 0
	Embankment as in No. 2 design .....		695 16 0
		Total... ..	54,651 5 0

Mr. Hamand's design .....	£54,651
Floating and lining 19,362 sq. yds. at 2s. 2d. per sq. yd. ....	2,100
Estimated cost of increasing roadway from 25' to 30' .....	8,464
Floating due to extra width, 1,240 yds. at 2s. 2d. ....	150

Total estimated cost of design with 30' roadway..... £65,364

Estimated cost of additional arches necessary in Mr. Hamand's design to give a waterway equal to that provided in Departmental design No. 2.

One arch—Concrete, 619 c. yds. at £3 7s. 7d. (Departmental estimated rate).....	£2,092
Filling 600 c. yds. at 2s. 6d. (Mr. Hamand's rate) .....	75
Excavation 10½ c. yds. at 2s. 6d. (Mr. Hamand's rate) .....	13

Cost of one arch..... £2,180

Cost of twelve arches..... 26,160

Floating same .....

1,200

Total Cost of twelve arches complete .....

£27,360

Total estimated cost of bridge with width of deck and waterway equal to that provided in Departmental design No. 2. ....

£92,724

378. Mr. Tonkin.] According to the report which you have just read, the Department are entirely against concrete bridges? Against bridges built altogether of concrete for such a site as this, certainly.

379. Have you any idea of using concrete for any other site, or in any bridges at all? We do not often use concrete in the form of arches on account of the expense of centring, and of the difficulty of getting the centring done well, but we are constantly using concrete for abutments, and the cylinder piers of all the iron bridges are filled with concrete.

380. Has there been a bridge built in New South Wales entirely of concrete? I do not know of one.

381. Dr. Garran.] The Bondi sewer is concrete? Yes.

382. Mr. Tonkin.] What would be the span of that? About 20 feet, I think.

383. You say that Mr. Hamand's estimate of the cost of the concrete per yard is something like 16s. below the departmental estimate? Yes.

384. Does Mr. Hamand in his report give the quantities of material used? Yes, and they have been taken as a basis.

385. It is on them that you base your estimate of a higher price? Yes. His concrete is made up of four of stone to two of sand and one of cement. The stone costs at the very least 7s. 6d. a cubic yard for quarrying and breaking. There is very good gravel to be obtained near the site of this bridge which could be got for 4s. 6d. a cubic yard, and which the Department intend to use, so that that makes a saving of 3s. Again, by using so much more sand and cement per cubic yard than the Department have specified the cost of the concrete is increased.

386. Do you know the cost of the sand per cubic yard there? Yes; it is given. It is the same in both cases. Mr. Hamand uses broken stone instead of gravel, and for his cement a proportion of four of stone to two of mortar where we use five of stone to two of mortar, and that increases the cost of his work.

387. How does he make out that his cost is 16s. per cubic yard less than the departmental cost? I cannot answer that.

388. Does he do it? His estimate is 44s.

389. And yours is £3? For our concrete; not for his.

390. According to you, his concrete would cost £3 7s. 7d.? Yes.

391. Can you inform the Committee how he makes it 44s. after he has specified the ingredients of the concret? I cannot.

392. Do you think that there is a possibility of the Department having overcharged for any material—for stone, gravel, sand, or whatever may be used? The estimate for these three designs is liberal all through, in order to insure that the contract when let shall not exceed it, and also because the detailed drawings are not yet completed, and modifications may have to be made. There would, however, be the same proportion between the designs.

J. A.  
McDonald,  
Esq.  
30 April, 1890.

393. That would be with regard to the quantities used ;—I am speaking of the cost of one yard of concrete ;—you say it is £3 or £3 7s. 7d., according to the ingredients used ;—I want to know whether it is possible that the Department may have over-estimated the value of some of these ingredients ;—I ask you this because we have found in other investigations that the departmental estimate for the fencing of railways has been nearly double the actual cost ? There is very little chance of that occurring with regard to the estimate for iron bridges in our Department. As a rule, they are very close indeed to the tenders accepted, both for supply and erection. We alter our prices according to the distance from Sydney. The distance of carriage is always considered, as you will see in the detailed estimate given in the appendix.
394. But where you can get good gravel or stone very easily it surely makes a difference in the cost ? Certainly. I cannot carry all these prices in my head ; but on the Tamworth bridge, which is an almost parallel case with Cowra, we paid £3 15s. a yard for concrete, and used river gravel.
395. In the erection of a concrete bridge, would the material used be superior to that used for filling up the cylinders of an iron bridge ? No. The strength of material is equally important in each case.
396. You say that Mr. Hamand's design No. 2 would be a dam to the water ? Practically a dam.
397. Can you tell the Committee to what height the country on the western bank would be flooded before the water rose to the deck of Mr. Hamand's bridge ? Six feet.
398. If there were 8 feet of water on that large flat would it be worth while to have the bridge above the level of the water ;—could it be used in any way ? No.
399. Then if it were not above flood level nothing would be lost, as the height of the water on the flat land would render it inaccessible ? Quite true—with regard to the matter of traffic only.
400. Could the bridge be used at the time of one of these extraordinary floods, if it were above the flood-level ? No.
- 401-2. Then in what manner would it be a dam, because the water would be all over the level country ? It would reduce the sectional area of water-way, and tend to compel it to run across at some other place and make a new channel. The piers and arches would offer considerable obstruction to the water, and the tendency of that would be to scour out the present channel or to make a new one.
403. You say in your report that Mr. Hamand has taken exception to the 90 feet span in your design, and then you say that his design is only 120 feet ;—is there not some difference between the water-way of the span of 120 feet and that of 90 feet ? There is a good deal of difference.
404. Could not a span of 90 feet be an absolute failure as far as the water-way is concerned when a span of 120 feet would meet all requirements ? That might be so.
405. Then there is nothing in your remark ? What I wanted to point out is that the Department do not propose a 90 feet span—they recommend nothing less than a 160 feet span.
406. You have no hesitation in condemning the construction of the concrete bridge for this particular spot ? I think the cost would condemn it.
407. You think that the cost of a concrete bridge would be more than that of an iron structure or of a composite structure ? Of course, if a low-level bridge was considered necessary, a concrete bridge might be built for less perhaps than the design recommended by the Department ; but it would not give the same facilities.
408. What is your opinion about a low-level bridge ? That it must be below the level at which the timber comes down.
409. You do not advocate one because you think it would not meet the requirements ? Yes.
410. Do you condemn the construction of a high-level concrete bridge ? Yes ; because of the price.
411. You favour an iron bridge—entirely of iron ? No ; a composite bridge.
412. Such as was suggested by yourself ? Yes ; by the Department.
413. You think it would meet all requirements, and be in the end a cheaper bridge than the concrete bridge suggested by Mr. Hamand ? Yes.
414. You do not think that it would last longer ? Of course, in the comparison which I have made, I have given the capital values, and compared them on that. If they were compared on the prime cost the difference in favour of the Departmental design would be greater.
415. I take it that those calculations are carefully worked out, and that, consequently, the difference between 150 years and eternity is not worth considering ? No.
416. You have no hesitation in saying that an iron structure would be preferable to a concrete one ? No.
417. In your design there would be a wooden deck ? Yes.
418. That, I suppose, you will allow, will only last 20 years ? We have allowed 12½ years for it.
419. The other structure would have a concrete flooring ;—would not that last longer than a timber decking ? The question of life has been taken into consideration in regard to the capital value on which the two are compared.
420. The capital value of the high-level bridge is put down at £92,000 ? Yes ; and of the composite one at £43,000. That is allowing a sinking fund for paying off the cost of the deck in twelve and a half years, so that it would bring them both on the same basis for comparison.
421. Do you think that if it were decided to build a concrete bridge, there would be any difficulty in constructing it according to Mr. Hamand's specifications and estimates ? It certainly could be constructed, though I am not aware of any bridges having such a large span being constructed of concrete, and it is possible that there may be difficulties in relation to expansion and contraction. However, I do not think that that need be much feared, if the foundations are solid.
422. Do you think that there would be much difficulty in constructing such bridges where rivers are so liable to heavy floods and freshes as ours are ? I do not think there would be much risk in this case.
423. Do you think that on account of the novelty of the construction, the estimated cost would be greatly under the actual cost ? No.
424. *Mr. Lee.*] Do you know whether the flood level taken by you in No. 2 design, is the same as that taken by Mr. Hamand in No. 1 design ? I have not compared them, but I presume that they are the same, because Mr. Hamand was supplied with a tracing of the river, giving the flood level and the depth of borings to the rock.
425. You have drawn the No. 2 design taking into consideration the highest flood level, and you presume that Mr. Hamand has done the same ? Yes.
426. In the event of other floods occurring at the same level, the approaches to your bridge would be covered to a depth of about 8 feet, although such a flood would be unusual ? Yes.

- J. A. M'Donald, Esq.  
30 April, 1890.
427. Is not the Lachlan River subject to partial floods? Yes.
428. Do not considerably more floods reach the bank of the river than pass over it? Yes.
429. Would a partial inundation of the country completely block all traffic on your bridge (No. 2 design)? Not unless the river were up to the banks. At the highest flood it is 8 feet over the flat.
430. Supposing the water were 2 feet over the flat, could the traffic get to your bridge? Yes; but it would be dangerous.
431. Supposing the water were within 6 feet of your flood level, would it be possible to get on to, and make use of, the bridge called No. 2 in Mr. Hamand's design? No, there would be 4 feet of water over it.
432. In your No. 2 design do you intend to carry traffic under ordinary circumstances only, or under extraordinary circumstances such as an unusually high flood? It is not designed to carry traffic at the highest flood; but it is necessary to keep the bridge up in order to ensure its safety.
433. But it is designed, I presume, to carry on the traffic as long as possible? Yes.
434. Mr. Hamand in his report, page 11, says:—"With regard to comparative estimate, I consider that No. 2 design if increased to the proper standard of strength would cost £30,000, instead of £26,500." Are the Committee to infer that you have used iron of less strength than the Board of Trade rules require, and have so reduced the price? Yes and no. The diagram which I have produced will show that in some cases we have gone above the Board of Trade rules, and in others below them.
435. You do not profess to have used material equal to that prescribed by the Board of Trade standard in designing your bridge? We have used material above the Board of Trade standard.
436. But taking the uniform rule, as laid down by the Board of Trade? No; we have not adhered to their rules.
437. In your design you have used above and below that standard to suit the purposes of the Department? Yes.
438. *Mr. O'Sullivan.*] You recommend No. 2 design;—what is the cost of it? £26,538.
439. And Mr. Hamand's amended design would cost £22,581? Yes.
440. What do you say is the departmental estimate for that design? We have not gone into it at all.
441. Did you not give the departmental estimate for Mr. Hamand's design? For his No. 1 design,—not for his No. 2.
442. I am talking now of Mr. Hamand's No. 1 design? Taking his design as it stands the Department estimate it at £54,650.
443. That is enlarging his design? Taking his design as it is there, without any enlargement.
444. By an enlargement of the dimensions of his design what would be the cost of it? £92,724.
445. Do you think it is requisite that a bridge of those dimensions should be built in order to accommodate the traffic? I think that there are many objections to a bridge of that type, and one of the principal is the risk of the scouring out of the foundations of the piers. The banks there are very liable to scour. When boys go down to dig up worms for fishing, and a fresh comes, holes several feet deep will be scoured out, and I think it would be a risky thing to construct such a bridge there unless the foundations were carried down further than shown on the plan. The piers would form a great resistance to the water, and the tendency would be to create a scour.
446. What do you estimate would be the life of your bridge? One hundred and fifty years for the iron work, twenty-five years for the main timbers, and twelve and a half years for the decking—that is, capitalised out with a sinking fund, it brings the capital value to £43,000. I think that that amount should be taken, in order to compare the bridge with a concrete bridge, and not the prime cost.
447. At £92,000? Yes.
448. Mr. Hamand in his report says, "I have only examined the No. 2 design, and that, so far as the information supplied to the Committee permits, and I observed that it is pervaded by the same error of over-straining timber;"—is that a fact? No. My reply to that is what I stated about the Board of Trade rules. We have actual data to go upon that the Board of Trade know nothing about in regard to the timber here.
449. Later on Mr. Hamand says, "Colonial timbers possess great strength, but they are correspondingly heavy, and in all large spans the weight of the material used is a very large component of the total weight to be sustained. I doubt if timber can be used, even for road bridges, economically when the spans exceed 60 or 70 feet?" Well, I must say in reply to that that we now use it economically with spans of 90 feet.
450. Mr. Hamand also says, "I am sure that the idea of corrupt benefit is impossible, and may be dismissed. The rolled joists referred to are more used by architects than by engineers, and are generally sold guaranteed to carry quiescent loads rather than to fill particular dimensions which are given for information more than for calculation purposes. The bracings, 5½ in. by 2¾ in. by ½ in., are somewhat an unusual size to specify. I am quite satisfied, however, that there is no corrupt motive underlying this matter, but that these unusual dimensions are rather due to the hair-splitting accuracy of some draughtsman more theoretical than practical?" I think that what I have already said as to the sizes of iron is a complete answer to that.
451. You consider that in your reply you have answered all the objections made by Mr. Hamand? Yes.
452. And you speak from the standpoint of experience in this colony? Yes.
453. *Mr. Trickett.*] What test is made of bridges in these colonies before they are used? It is not usual to test the road bridges, because there is a very great difficulty in obtaining sufficient weight to do it. A few years ago, when the Thomas bridge was completed, for my own satisfaction I asked for authority to have it tested, as it was of a very light construction, but we had very great difficulty in getting sufficient loading. We required 100 tons, and it was as much as the district could do to find sufficient carts.
454. Do they not generally test them with live stock? Yes; both moving and stationary. They test them with three or four carts going over at a trot, and they also test them for the full load.
455. Do you not think that it is desirable to test the bridges here? The material is all very carefully tested, and the construction is very carefully watched, so that there is not very much to be gained by testing the bridge itself.
456. I suppose that these tests by soldiers and cattle being taken over the bridge are only applied in towns where there is a large concourse of people? Even near towns it is rarely that the bridges are built to take 120 lbs. to the square foot.
457. You do not think that it is necessary? No.

458. *Dr. Gavran.*] You say that the iron cylinders are merely skins for the concrete, and that the weight of the bridge rests upon the concrete? Yes.

459. So that if the iron skin were to die away the support would not be diminished in the slightest degree? No; but the bracing between the two cylinders, which is above water, would have to be maintained.

460. Is it braced into the solid part of the iron or on to the cap? It is riveted to the outside of the cylinder.

461. Supposing that the lower part of the cylinder were to wear away, what would become of the bracing? The top part can be kept clean and painted, and so long as that is done it forms a bracing between the columns, even if the lower part wears away.

462. What is the life of these iron skins, as you call them;—I suppose none have ever died? No.

463. If the support is on these concrete pillars, you use very much less concrete than Mr. Hamand would do in his old-fashioned concrete supports? Yes. We can go to greater depths.

464. And you have a less solid pillar—his would go right across the stream? Yes. We have only two cylindrical pillars.

465. Then the concrete you would use is less than what he would use? Yes.

466. He has to give a support underground instead of the girder above ground? Yes.

467. Is not that more wasteful? Yes.

468. Will he have to make proper dams for his foundations? He proposes to build the concrete caissons on a cutting edge of iron, and to sink them down in that way.

469. Do you think that that is trustworthy? Well, his specification is not complete enough for me to see exactly how he will do it. He does not say how he intends to model the concrete to form the piers.

470. Would you be able to see without the aid of a diver how these are settling on the ground? It would be simply an enclosed ring lowered down and the excavation would be carried on inside of it, just as we sink the iron cylinders—it would be a concrete caisson.

471. It is a concrete cylinder practically? Yes; it would be hollow inside, though not cylindrical. It would be more suitable for the superstructure which he intends to make. Of course, arches could not be very well struck off iron piers like these.

472. Do you think that an arched bridge is as suitable for a flooded river as one with horizontal girders? No; because of the obstruction which it gives.

473. It would offer very much more resistance to the water? Yes.

474. It would give less space for the water and timber to pass through? Yes.

475. Whatever merits concrete arches may have in certain places, you think that in this country they are quite unsuitable for flooded rivers? Generally—yes. In regard to an estimate for a suspension bridge I may say that when I concluded my evidence at Cowra, the Chairman of the Sectional Committee informed me that an estimate for a suspension bridge would not be required, and I have therefore done nothing further in the matter.

476. *Mr. Tonkin.*] You have been to Cowra and seen the bridge there, and you know, from what you have read, the amount of traffic that goes over it. Do you not think that the bridge that you propose to erect would be larger than is absolutely necessary, taking into consideration the fact that a railway will be constructed to Parkes or Forbes which will take away a very large amount of the traffic? I do not think so, for where the traffic is at all large a 20-foot roadway is not too wide. The only saving that would be made, if it were thought advisable, would be to leave out one of the footways.

477. Would that make much difference in the cost? No, only £3,000 or £4,000.\*

\* NOTE (on revision) :—The actual cost of omitting one footway would be £1,322, not £3,000 or £4,000 as stated.

J. A.  
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30 April, 1890.

## PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## Iron Bridge at Cowra.

## APPENDIX.

## A.

## PRECIS OF PAPERS IN RELATION TO THE PROPOSED BRIDGE OVER THE LACHLAN RIVER AT COWRA.

THE existing bridge at Cowra, which is a timber one, was opened for traffic in the year 1870. The first cost was £9,170 5s. 5d., and a considerable sum of money has since been expended upon it in maintenance and repairs.

In 1886 it was reported that considerable repairs and renewals had become necessary, that supporting tressels or cylinders were required, and that for the increasing pedestrian traffic a footway addition was desirable. For these purposes a sum of £3,000 was placed on the Estimates for 1887.

2/9/87.—Mr. Garland, M.L.A., drew attention to the circumstance that, although the money had been voted no steps had been taken to initiate the work. Mr. Bennett replied that the question was receiving consideration and that the swollen condition of the river precluded active work from being undertaken. It would appear that although the money had been voted for extensive works, only absolutely necessary repairs were carried out.

24/1/88.—The Road Superintendent reported that a portion of the bridge required an extensive overhaul, and that the structure was in so unsafe a condition that he had had to prohibit loads of over 7 tons from coming on to it.

26/3/88.—Shortly after, Mr. Secretary Sutherland visited Cowra, and was interviewed by a deputation regarding the bridge. They stated that it was in a dangerous condition and liable to collapse at any moment, in which case the trade of the town would be seriously crippled. A sum of £3,000 had been voted for iron cylinders; but little, if anything, had been done. The Minister inspected the bridge, and pronounced it to be insecure and too narrow for the traffic. He made a promise that on his return to Sydney some definite action should be taken.

A report accordingly was furnished by Mr. M'Donald to the effect that the main spans were sound and serviceable, but the 65 feet spans were unsafe and might fall over if heavy weights were placed on the bridge. Mr. Bennett gave instructions to execute absolutely necessary repairs, and to place tressels under the deflection spans, which was done, and with good results.

20/8/88.—Succeeding August, Mr. G. Campbell wrote, requesting that such repairs might be executed as would enable teamsters to use the bridge with safety and confidence.

25/9/88.—Mr. M'Donnell submitted an estimate, as under, for the reconstruction of the bridge:—

Amount of estimate	...	...	...	...	...	...	...	...	£12,550
Less 1887 vote	...	...	...	...	...	...	...	...	3,000
Amount for Estimates	...	...	...	...	...	...	...	...	£9,550

But the amount apparently was not placed on the Estimates.

27/11/88.—Mr. Bennett minuted the Under Secretary to alter the amount on the Draft Loan Estimates for the bridge at Cowra from £24,000 to £19,600,\* as it was considered desirable to have timber approaches.

5/3/89.—The Mayor of Cowra forwarded a copy of a report upon the bridge, prepared by the Municipal Works Committee, to the effect that they had inspected the bridge, and found one span and about 20 feet in fair condition, and that the remainder would have to be redecked, it being in many places unsafe for traffic. The tressels which had been placed under the three spans had, they said, been the salvation of the bridge. They appeared, however, to apprehend the possibility of mishap, for they recommended that, in anticipation of any emergency, the old ford should be made passable.

Mr. Bennett minuted that, pending a decision as to the erection of a new bridge, only repairs necessary for safety should be carried out. A memo. is on this paper to the effect that a sum of £19,600 had been placed on the Draft Estimates for a new bridge.

24/6/89.—The Mayor of Cowra wrote that the question of a new bridge had been under the consideration of the Works Department for a long time; that the existing structure had been so far condemned that notices had been posted, prohibiting loads of over 7 tons from passing over it, with the result that a quantity of wool had to be kept back, and that Mr. Sutherland had given a definite promise of a new bridge. The necessary levels had been taken, and he (the Mayor) believed £20,000 had been placed on the Estimates. He would be glad to know if a sufficient sum had been provided, and the Works Department should be urged to prompt action.

24/7/89.—In reply to categorical inquiries made by Mr. Macdonald, the Road Superintendent reported that the traffic over the river at Cowra was such as to justify an expenditure of £30,000 or £40,000 on a permanent iron bridge; that as the municipality was divided by the river, and a great portion of the traffic must pass over the bridge to and from the railway station, the new structure should be of iron, and should be built while the old bridge was available. That the construction of a railway to Forbes would tend to reduce the traffic over the bridge; but the extensive settlement which would inevitably take place would more than replace this; and that the width of deck, exclusive of footways, should not be less than 20 feet. The Superintendent added that two years previously he had reported that the bridge might collapse at any time, under stress of ordinary flood, and he felt bound now to repeat the warning.

A sum of £36,000 has been placed on the Loan Estimates for 1890 for a new bridge, which is thus described:—Main bridge, steel or iron; approaches, iron. Main bridge, continuous girder of three spans, 112 feet, 140 feet, and 112 feet; roadway 20 feet wide, with footway on each side; deck, iron, covered with tarred metal; approaches, similar class of deck; piers, iron, filled with concrete. C.A.B., 9/12/89.

Since the foregoing was written the details of the bridge have been determined, and the above description has been departed from in the following particulars:—The main bridge will consist of three spans of 169 feet, 216 feet, and 169 feet, and there will be four approach spans of 111 feet. Iron piers, filled with concrete, will be used for the main bridge. For the approaches, piers of concrete only. Footways will be 5 feet wide.—C.A.B.

The matter has since been reconsidered, and plans and estimates have been prepared for a composite bridge, to cost £26,537, and this is the scheme which will be submitted for the consideration of the Parliamentary Standing Committee on Public Works.—11/2/90.

\* There is nothing in the papers to lead up to this.

B.

[To Evidence of John Alexander M'Donald, Esq.]

APPENDICES TO PAPER READ BEFORE THE COMMITTEE, AND PUBLISHED WITH MR. M'DONALD'S EVIDENCE.

1.

COWRA ROAD DISTRICT—COWRA BRIDGE REPAIRS.

RETURN of expenses incurred in repairs to Cowra Bridge, from January 1st, 1885, to December 31st, 1889.

	£	s.	d.
1885—January 1st to December 31st .....	262	16	3
1886— Do do .....	216	16	6
1887— Do do .....	128	12	0
1888— Do do .....	283	3	7
1889— Do December 8th .....	168	5	0
1889—December 8th to December 31st, work in progress .....	160	0	0
	£1,219 13 4		

Forwarded in conformity with instructions from the Commissioner and Engineer-in-Chief for Roads and Bridges of 18/12/89.

Roads Office, Cowra, December 20th, 1889.

J. V. BARTLETT,  
Road Superintendent.

2.

TABLE showing traffic over Bridge, from December 19th to 25th (both inclusive), 1889.

Description of traffic.	Dec. 19th.	Dec. 20th.	Dec. 21st.	Dec. 22nd.	Dec. 23rd.	Dec. 24th.	Dec. 25th.	Totals.	Averages, daily.
Foot-passengers .....	161	243	315	258	258	475	382	2,092	300
Horsemen and women .....	126	119	177	43	135	242	215	1,057	150
Spring-carts and buggies .....	43	93	134	48	97	167	127	709	100
Horse drays .....	6	28	28	.....	33	66	10	176	25
Bullock drays .....	2	3	4	.....	1	.....	.....	10	1
Horse waggons .....	2	10	8	.....	16	6	.....	42	6
Bullock waggons .....	1	1	4	.....	13	2	.....	21	3
Sheep .....	50	400	.....	.....	.....	.....	.....	450*	65*
Cattle and horses .....	124	303	351	57	483	364	131	1,818	260
Bales of wool .....	.....	57	.....	.....	325	.....	.....	382†	65
Bags of grain .....	70	283	270	.....	425	273	.....	1,321‡	190
Goods outward, tons .....	.....	4	21	.....	12	4	.....	41§	6

\* Over 200,000 annually. Daily average, nearly 600—10,000 to 20,000 at one time.  
 † Over 21,000 bales annually. Daily average for four months, about 200 bales.  
 ‡ During good season 40,000 bags. Average for four months, about 330 bags daily.  
 § Goods outwards average, about 30 tons per day.

3.

INFORMATION supplied by Railway Department showing Inwards and Outwards Goods Traffic at Cowra Railway Station, from 1st January to 31st December (both inclusive), 1889.

Months.	Inwards.			Outwards.			Total		
	T.	c.	q.	T.	c.	q.	T.	c.	q.
January .....	479	13	1	97	10	1	577	3	2
February .....	546	1	1	50	14	1	596	15	2
March .....	662	14	1	110	10	0	779	4	1
April .....	448	19	3	106	14	0	555	13	3
May .....	619	18	2	112	9	1	732	7	3
June .....	387	15	1	120	13	2	508	8	3
July .....	580	1	2	122	15	1	702	16	3
August .....	554	18	0	86	17	1	641	15	1
September .....	527	12	1	163	14	3	691	7	0
October .....	615	5	2	1,050	10	1	1,665	15	3
November .....	603	9	0	1,244	5	2	1,847	14	2
December .....	576	16	0	1,360	11	2	1,937	7	2
Totals .....	6,603	4	2	4,633	5	3	11,236	10	1

4.

Department of Public Works, Sydney, 22 November, 1889.

AMENDED rates of tolls to be levied on all Ferries from 1st January, 1890.

	s.	d.
For every foot passenger (excepting children going to or returning from school) .....	0	1
For every horse, mare gelding, ass, or mule, drawing or not drawing .....	0	3
For every gig, buggy, waggon, dray, or other vehicle .....	0	6
For every ox or head of neat cattle, drawing or not drawing .....	0	2
For every sheep, lamb, pig, or goat, not exceeding 100 in number .....	0	0½
For every sheep, lamb, pig, or goat, exceeding 100 in number .....	0	0¼
Goods (not conveyed in vehicles) .....	per cwt.	0 3

One charge to include passing and repassing once a day.

Persons riding or travelling in vehicles not to be charged toll as foot passengers.

## 5.

## RATES of Tolls levied at Bridges.

The following tolls were levied at the undermentioned bridges until abolished, 31 December, 1882:—  
*Penrith (abolished 1874), Pitnacree, Belmore, Dunmore, Windsor, and Richmond.*

	s.	d.
Foot passengers, each .....	0	1
Vehicles, each .....	0	6
Horse, &c., drawing or not drawing, each .....	0	3
Ox or head of neat cattle drawing or not drawing, each .....	0	2
Sheep, lamb, pig, or goat, each .....	0	0½

On payment of one toll this bar can be passed any number of times on same day.

*Dubbo and Wellington Bridges.*

	s.	d.
Foot passengers, each .....	0	2
Vehicles, each .....	1	0
Horse, &c., drawing or not drawing, each .....	0	6
Ox, &c., drawing or not drawing, not exceeding 20 in number, each .....	0	4
Ox, &c., drawing or not drawing, exceeding 20 in number, each .....	0	2
Sheep, lambs, pigs, goats, each .....	0	0½

Persons riding or travelling in vehicles not to be charged as foot passengers.  
Tolls to be charged on Sundays.

*Roset's Bridge and Balranald Bridge.*

	s.	d.
Horse, &c., drawing or not drawing, each .....	0	4
Ox, &c., drawing or not drawing, each .....	0	3
Ox, &c., drawing or not drawing, exceeding twenty in number, each .....	0	2
Vehicles, each .....	1	0

*Hay Bridge Bar.*

This is the only bridge under Department where tolls are now levied, by arrangement with the Hay Municipal Council. They have lately applied to have tolls abolished. Matter is under consideration.

	s.	d.
Horse, &c., drawing or not drawing, each .....	0	2
Vehicles with two wheels, each .....	0	3
Vehicles with four wheels, each .....	0	6
Ox, &c., drawing or not drawing, each .....	0	2
Sheep, lambs, pigs, goats, at rate of per thousand .....	10	0

*Albury Bridge.*

Proclamation of amendment of tolls, 27 March, 1872.

	s.	d.
Vehicles .....	1	0
Horses, &c., drawing or not drawing, each .....	0	6
Ox or head of neat cattle, drawing or not drawing .....	0	4
Sheep, pig, goat, each .....	0	1

*Gundagai Bridge.*

Proclamation of amendment of tolls, 1 January, 1875.

	s.	d.
Vehicles .....	1	0
Horses, &c., drawing or not drawing .....	0	6
Oxen, drawing or not drawing, each .....	0	4
Oxen, drawing or not drawing, after first twenty .....	0	2
Sheep, &c., each .....	0	0½

*Cowra Bridge.*

Tolls proclaimed 30 October, 1871, to be collected from 1 December, 1871. Tolls abolished 27 September, 1872.

	s.	d.
Foot passengers, each .....	0	2
Vehicles, each .....	1	0
Horses, &c., drawing or not drawing, each .....	0	6
Oxen, &c., drawing or not drawing, each .....	0	4
Oxen, &c., drawing or not drawing, after first twenty, each .....	0	2
Sheep, &c., each .....	0	0½

Persons riding or travelling in vehicles not to be charged toll as foot passengers. Toll to be charged on Sundays as on other days.

## 6.

TABLE showing Estimated Value of Traffic at Cowra Bridge.

Description.	Daily.	Per annum.	Rate.	Amount.
Foot passengers .....	300	109,500	1d.	£ 456
Horsemen and women .....	150	54,750	3d.	684
Spring carts and buggies .....	100	36,500	9d.	1,368
Sheep .....	.....	200,000	½d.	208
Cattle and horses .....	260	94,900	2d.	791
Total .....	.....	.....	.....	£ 3,507
Deduct wages of two collectors, printing tickets, and sundry expenses .....	.....	.....	.....	507
Balance to credit .....	.....	.....	.....	£ 3,000

The above does not include 10,000 tons of goods conveyed in waggons or drays.

## APPENDIX.

27

7.

DESIGN No. 1.

ESTIMATED cost, with iron deck and two footways.

CONTRACT I.

Quantities.		Item.	Rate.	Amount.
Main Bridge ... £32,000.	262 tons	Cast-iron in cylinders, handrail brackets, and ladder-bracing	£12 per ton	£ 3,144 0 0
	40 "	Cast-iron in bed-plates, saddle-plates, rollers, and caps	£30 "	1,200 0 0
	70 "	Wrought-iron in cylinders and bracing, including rivets	£21 "	1,470 0 0
	957 "	Wrought-iron in main girders (including steel L covers), cross-girders, and wind-bracing	£21 "	20,097 0 0
	281 "	Wrought-iron in rolled girders, buckled-plates, deck-plates, and bulb T irons	£17 "	4,777 0 0
	10 "	Wrought-iron in handrail-standards and black bolts	£25 "	250 0 0
	3 "	Wrought-iron in turned bolts and set screws	£30 "	90 0 0
	2 "	Steel in pins	£32 "	64 0 0
	9½ "	Gas-pipe handrails	£30 "	285 0 0
	1 "	Pig lead	£1 per cwt.	20 0 0
	10 cwt.	Sheet lead	3d. per lb.	280 0 0
		Paint, two coats, bulk sum		300 0 0
	4	Lamp-posts	£8 each	32 0 0
	Footways = £2,478.	37½ "	Wrought-iron in cantilevers	£21 per ton
61½ "		Wrought-iron in buckled plates and bulb T iron	£17 "	1,045 10 0
19 "		Wrought-iron in gas-pipe handrails	£30 "	570 0 0
3 "		Wrought-iron in handrail-standards	£25 "	75 0 0
Total			£	34,487 0 0

Total cost of bridge complete, with footways { Contract I. .... £34,487  
Contract II. .... 35,484

Total cost ..... £69,971

By omitting footways (£4,775) the cost of bridge would be reduced to £65,196

7A.

ESTIMATED cost, with iron deck and two footways.

CONTRACT II.

Quantities.		Item.	Rate per	Amount.
				£ s. d.
Main Bridge ... £26,162 11s.	252 tons	Fixing and sinking cast-iron cylinders, complete	£12 ton	3,024 0 0
	564 cubic yds.	Excavation in cylinders, other than rock	£1 cubic yard	564 0 0
	28 "	" " in rock	£10 "	280 0 0
	837 "	Concreting cylinders	£3 "	2,511 0 0
	500 cubic ft.	Granite or bluestone in bedstones, set	15s. cubic foot	375 0 0
	70 tons	Fixing wrought-iron in cylinders and bracing, complete	£10 ton	700 0 0
	42 "	Fixing cast-iron in bed-plates, saddle-plates, rollers, caps, and scuppers	£10 "	420 0 0
	973 "	Fixing wrought-iron and steel in main girders, cross-girders, wind-bracing, bolts, and set-screws	£10 "	9,730 0 0
	281 "	Fixing rolled girders, buckled plates, and bulb T iron	£10 "	2,810 0 0
	15½ "	Fixing handrail, including wrought-iron and cast-iron brackets	£10 "	155 0 0
	1½ "	Fixing lead	10s. cwt.	15 0 0
	541 cubic yds.	Tarred metal	£1 cubic yard	541 0 0
	950 cubic ft.	Hewn timber, in kerbs and sills	5s. cubic foot	237 10 0
		Tar (two coats)		15 0 0
		Tar (three coats)		10 0 0
		Paint (two coats)		500 0 0
		Paint (three coats)		80 0 0
	630 cubic yds.	Excavation for piers and abutments, including unwatering	2s. 6d. cubic yd.	78 15 0
	790 "	Concrete	£3 "	2,370 0 0
	256 "	Masonry	£3 10s. "	896 0 0
	300 "	Hand-packed rubble	10s. "	154 10 0
	10,437 "	Embankment	1s. 4d. "	695 16 0
	37½ tons	Fixing wrought-iron in cantilevers	£10 ton	375 0 0
	61½ "	" " buckled-plates and bulb T iron	£10 "	615 0 0
22 "	" " handrails and standards	£10 "	220 0 0	
136 cubic yds.	Road metal	£1 cubic yard	136 0 0	
57 "	Masonry in abutments	£3 10s. "	199 10 0	
16 "	Concrete	£3 "	48 0 0	
38 "	Excavation in abutments, including unwatering	2s. 6d. "	4 15 0	
1,864 "	Embankment	1s. 4d. "	124 5 0	
118 "	Rubble	10s. "	59 0 0	
1,635 tons	Railway carriage, Sydney to Cowra, of ironwork	£4 2s. 4d. ton	6,731 5 0	
1,635 "	Carriage, Cowra to site of bridge	3s. ton	245 0 0	
950 cubic ft.	Timber carriage, railway, Sydney to Cowra	9d. cubic foot	36 0 0	
950 "	" " Cowra to site of bridge	3d. "	12 0 0	
121 tons	Ironwork carriage, railway, Sydney to Cowra	£4 2s. 4d. ton	498 0 0	
121 "	" " Cowra to site of bridge	3s. ton	18 0 0	
Total			£	35,484 6 0

CARBON.

Foot-  
ways,  
Main  
Bridge,  
£11,791 10s.Foot-  
ways,  
Main  
Bridge,  
£11,791 10s.Foot-  
ways,  
Main  
Bridge,  
£11,791 10s.

## 8.

## DESIGN NO. 1.

ESTIMATED cost, with timber deck and two footways  
CONTRACT I.

Quantities.	Item.	Rate.	Amount.		
			£ s. d.		
Main Bridge, £21,169.	262 tons .....	Cast-iron in cylinders, handrail-brackets, and ladder-bracing..	£12 per ton .....	3,144 0 0	
	40 " .....	Cast-iron in bed-plates, saddle-plates, rollers, and caps .....	£30 " .....	1,200 0 0	
	70 " .....	Wrought-iron in cylinders and bracing, including rivets .....	£21 " .....	1,470 0 0	
	670 " .....	Wrought-iron in main girders (including steel L covers), cross-girders, wind-bracing (including rivets).	£21 " .....	14,070 0 0	
	14 " .....	Wrought-iron in handrail, standards, and black bolts .....	£25 " .....	350 0 0	
	4 " .....	Wrought-iron in turned bolts and set-screws .....	£30 " .....	120 0 0	
	2 " .....	Steel in turned pins .....	£32 " .....	64 0 0	
	1 " .....	Pig-lead .....	£1 per cwt. ....	20 0 0	
	0½ " .....	Sheet-lead .....	3d. per lb. ....	14 0 0	
	9½ " .....	Gas-pipe handrails .....	£30 per ton .....	285 0 0	
		Paint (two coats) .....		400 0 0	
	4 .....	Lamp-posts .....	£8 each .....	32 0 0	
	Footways, £1,457 10s.	37½ tons .....	Wrought-iron in cantilevers .....	£21 per ton .....	787 10 0
		19 " .....	Wrought-iron in handrails .....	£30 " .....	570 0 0
4 " .....		Wrought-iron in handrail, standards and spikes .....	£25 " .....	100 0 0	
		Total .....	£	22,626 10 0	

Total cost of bridge complete, with footways } Contract I. .... £22,626  
 } Contract II. .... 32,333

Total cost ..... £54,959

By omitting footways (£4,385) the cost would be reduced to ..... £50,574

## 8A.

ESTIMATED cost, with timber deck and two footways.  
CONTRACT II.

Quantities.	Item.	Rate.	Amount.	
			£ s. d.	
Main Bridge, £23,736 1s.	252 tons .....	Fixing and sinking cast-iron cylinders complete .....	£12 ton .....	3,024 0 0
	564 cubic yds.	Excavation in cylinders other than rock .....	£1 cubic yard ..	564 0 0
	28 " .....	Excavations in cylinders in rock .....	£10 " .....	280 0 0
	837 " .....	Concreting do .....	£3 .....	2,511 0 0
	500 cubic ft...	Granite or bluestone in bedstones set .....	15s. cubic ft. ...	375 0 0
	70 tons .....	Fixing wrought-iron in cylinders and bracing complete .....	£10 ton .....	700 0 0
	42 " .....	Fixing cast-iron in bedplates, saddle-rollers, caps, and scuppers.	£10 " .....	420 0 0
	690 " .....	Fixing wrought-iron and steel in main girders (including cast- iron in ladder bracing), cross-girders, wind-bracing, bolts, and set screws.	£10 " .....	6,900 0 0
	15½ " .....	Fixing wrought-iron in handrails and wrought-iron and cast- iron brackets.	£10 " .....	155 0 0
	1½ " .....	Lead .....	10s. cwt. ....	15 0 0
	950 cubic ft...	Hewn timber in kerbs and sills .....	5s. cubic ft. ....	237 10 0
	13,000 " .....	Sawn timber in longitudinal girders and planking .....	5s. " .....	3,250 0 0
		Tar, one coat .....		60 0 0
		Tar, three coats .....		250 0 0
		Paint, two coats .....		700 0 0
		Paint, three coats .....		100 0 0
	630 cubic yds.	Excavation for abutments and piers .....	2s. 6d. cubic yd.	78 15 0
	790 " .....	Concrete do do .....	£3 " .....	2,370 0 0
	256 " .....	Masonry do do .....	£3 10s. " .....	896 0 0
	309 " .....	Handpacked rubble .....	10s. " .....	154 0 0
	10,437 " .....	Embankment .....	1s. 4d. " .....	695 16 0
	37½ tons .....	Fixing wrought-iron in cantilevers .....	£10 ton .....	375 0 0
	23 " .....	Fixing wrought-iron handrails, standards, and spikes .....	£10 " .....	230 0 0
	5,000 cubic ft...	Timber in deck and longitudinal .....	5s. cubic ft. ....	1,250 0 0
57 cubic yds.	Masonry in abutments .....	£3 10s. cubic yd.	199 10 0	
16 " .....	Concrete do .....	£3 " .....	48 0 0	
38 " .....	Excavation, including unwatering .....	2s. 6d. " .....	4 15 0	
1,864 " .....	Embankment .....	1s. 4d. " .....	124 5 0	
118 " .....	Rubble .....	10s. " .....	59 0 0	
	Tar, one coat .....		30 0 0	
	Tar, three coats .....		100 0 0	
1,165 tons .....	Ironwork, carriage railway Sydney to Cowra .....	£4 2s. 4d. ton ...	4,796 0 0	
	do do do to site .....	3s. " .....	175 0 0	
13,950 cubic ft...	Timber do do Sydney to Cowra .....	9d. cubic ft. ....	523 0 0	
	do do do to site .....	3d. " .....	174 0 0	
60½ tons .....	Ironwork do do Sydney to Cowra .....	£4 2s. 4d. ton ...	240 0 0	
	do do do to site .....	3s. " .....	9 0 0	
5,000 cubic ft...	Timber do do Sydney to Cowra .....	9d. cubic ft. ....	187 0 0	
	do do do to site .....	3d. " .....	62 0 0	
	Total .....	£	32,332 11 0	

## 9.

## No. 1 DESIGN

COMPUTATION of Annual Charge on Proposed Designs (with footways), with interest 4 per cent.

With footways, iron deck—	£	s	d
Estimated cost .....	69,971	0	0
Interest and depreciation on .....	2,806	0	0
at 4 per cent., compound interest, and life taken at			
150 years, equivalent to 4.01 per cent. per annum .....	248	0	0
Painting every four years at 20s. per foot per annum .....			
Total annual charge .....	3,054	0	0
Capital value taking interest at 4 per cent., £76,350.			

With footways, timber deck—			
Estimated cost, exclusive of deck .....	49,273	0	0
Estimated cost of deck .....	5,686	0	0
Interest and depreciation on £49,273, at 4 per cent. compound interest, and life taken at			
150 years, equivalent to 4.01 per cent. per annum .....	1,976	0	0
Interest and depreciation on £5,686, at 4 per cent. compound interest, and life taken at			
12½ years, equivalent to 10.33 per cent. per annum .....	587	0	0
Painting .....	248	0	0
Total annual charge .....	2,811	0	0
Capital value, taking interest at 4 per cent., £70,275.			

## 10.

COMPUTATION of Annual Charge on Proposed Designs (without footways), with interest 4 per cent.

Iron deck without footways—	£	s.	d.
Estimated cost .....	65,196	0	0
Interest and depreciation on £65,196, at 4 per cent. compound interest, and life taken at			
150 years, equivalent to 4.01 per cent. per annum .....	2,614	0	0
Painting every four years at 20s. per foot per annum .....	248	0	0
Total annual charge .....	2,862	0	0
Capital value taking interest at 4 per cent., £71,550.			

Timber deck without footways—	£	s.	d.
Estimated cost, exclusive of deck .....	46,389	0	0
Estimated cost of deck .....	4,185	0	0
Interest and depreciation on £46,774, at 4 per cent. compound interest, and life taken at			
150 years, equivalent to 4.01 per cent. per annum .....	1,860	0	0
Interest and depreciation on £3,800, at 4 per cent. compound interest, and life taken at			
12½ years, equivalent to 10.33 per cent. per annum .....	432	0	0
Painting .....	248	0	0
Total annual charge .....	2,540	0	0
Capital value taking interest at 4 per cent., £63,500.			

## 11.

## DESIGN No. 2.

ESTIMATED cost of composite Bridge on Cylinders, with two Footways.

## CONTRACT I.

Quantities.		Item.	Rate.	Amount
Main Bridge, £6,847	114 tons 0 cwt	Cast-iron in cylinders .....	£12 per ton .....	£ 1,368 0 0
	20 " 12 "	" caps, bed-plates, shoes, etc., in trusses .....	£30 " .....	618 0 0
	64 " 0 "	Wrought-iron in cylinders and bracing, including rivets .....	£21 " .....	1,314 0 0
	63 " 8 "	" suspension bolts, black bolts, straps, etc. ....	£25 " .....	1,585 10 0
	81 " 0 "	Steel in lower chords and cross-girders .....	£23 " .....	1,932 0 0
	3 " 18 "	" cross-girders .....	£23 " .....	89 14 0
Total .....				£6,936 14 0



## APPENDIX.

81

## 14.

## DESIGN No. 2.

## COMPUTATION of Annual Charges on Design with Timber Piers. Interest, 4 per cent.

With Footways—	
Estimated cost of ironwork and steel .....	£6,982
Do timber in trusses and piers .....	10,561
Do do planking .....	3,380
	per annum.
Interest and depreciation on £6,982, life 150 years = 4·01 % .....	= £280
Do 10,561, life 25 do = 6·40 % .....	= 676
Do 3,380, life 12½ do = 10·33 % .....	= 349
Painting every four years, at 20s. per foot .....	= 260
	-----
Total annual charge .....	£1,565
Capital value at 4 % = £39,125.	

Without Footways—	
Estimated cost of ironwork and steel .....	£6,836
Do timber in trusses and piers .....	9,103
Do do planking .....	2,340
	per annum.
Interest and depreciation on £6,836, life 150 years = 4·01 % .....	= £274
Do 9,103, life 25 do = 6·40 % .....	= 533
Do 2,340, life 12½ do = 10·33 % .....	= 242
Painting .....	= 260
	-----
Total annual charge .....	£1,359
Capital value at 4 % = £33,975.	

## 15.

## DESIGN No. 2.

## COMPUTATION of Annual Charge on Proposed Design, with Cylinders. Interest, at 3½ per cent.

With Footways—	
Estimated cost of cylinders and ironwork .....	£15,147
Do timber in trusses and piers .....	8,111
Do do planking .....	3,380
	per annum.
Interest and depreciation on £15,147, life taken at 150 years = 3·52 % .....	= £533
Do do 8,111, do 25 do = 6·07 % .....	= 492
Do do 3,380, do 12½ do = 10·03 % .....	= 339
Painting every four years, at 20s. per foot .....	= 260
	-----
Total annual charge .....	£1,624
Capital value at 3½ per cent. = £46,400.	

Without Footways—	
Estimated cost of cylinders and ironwork .....	£15,000
Do timber in trusses and piers .....	6,654
Do do planking .....	2,340
	per annum.
Interest and depreciation on £15,000, life taken at 150 years = 3·52 % .....	= £528
Do do 6,654, do 25 do = 6·07 % .....	= 404
Do do 2,340, do 12½ do = 10·03 % .....	= 233
Painting .....	= 260
	-----
Total annual charge .....	£1,427
Capital value at 3½ per cent. = £40,771.	

## 16.

## DESIGN No. 2.

## COMPUTATION of Annual Charges on Design, with Timber Piers. Interest at 3½ per cent.

With Footways—	
Estimated cost of ironwork and steel .....	£ 6,982
Do timber in trusses and piers .....	10,561
Do do planking .....	3,380
	per annum.
Interest and depreciation on £ 6,982, life taken at 150 years = 3·52 % .....	= £246
Do do 10,561, do 25 do = 6·07 % .....	= 641
Do do 3,380, do 12½ do = 10·03 % .....	= 339
Painting every four years, at 20s. per foot .....	= 260
	-----
Total annual charge .....	£1,486
Capital value at 3½ per cent. = £42,457.	

Without Footways—	
Estimated cost of ironwork .....	£6,836
Do timber in trusses and piers .....	9,103
Do do planking .....	2,340
	per annum.
Interest and depreciation on £6,836, life taken at 150 years = 3·52 % .....	= £241
Do do 9,103, do 25 do = 6·07 % .....	= 553
Do do 2,340, do 12½ do = 10·03 % .....	= 235
Painting .....	= 260
	-----
Total annual charge .....	£1,289
Capital value at 3½ per cent. = £36,829.	

## 17.

DESIGN No. 3.

ESTIMATED cost of Truss Bridge with two footways.

CONTRACT I.

Quantities.	Item.	Rate.	Amount.
Main Bridge, £3,417.	52 tons 14 cwt. Cast-iron in cylinders .....	£12 ton .....	£ s. d. 632 0 0
	17 " 2 " Cast-iron in caps, bed-plates, shoes, &c. ....	£30 " .....	513 0 0
	32 " 0 " Wrought-iron in cylinders and bracing .....	£21 " .....	672 0 0
	64 " 0 " Wrought-iron suspension-bolts, black-bolts, &c. ....	£25 " .....	1,600 0 0
	Total .....	£	3,417 0 0

CONTRACT II.

Quantities.	Item.	Rate.	Amount.
Main Bridge, £12,629.	53 tons .....	Fixing cast-iron in cylinders .....	£12 ton .....
	80 cubic yds. .....	Excavation in cylinders, other than rock .....	£1 cubic yd. ....
	8 " .....	Excavation in cylinders in rock .....	£10 " .....
	133 cubic ft. ....	Granite in bed-stones .....	15s. cubic ft. ....
	32 tons .....	Fixing wrought-iron in cylinders and bracing .....	£10 ton .....
	17 tons 2 cwt. ....	Fixing cast-iron in caps, bed-plates, and shoes, &c. ....	£10 " .....
	64 tons .....	Fixing wrought-iron in suspension-bolts, &c. ....	£10 " .....
	32,217 cubic ft. ....	Supply, and fixing timber .....	5s. cubic ft. ....
	3,677 lin. ft. ....	Supply, and fixing timber round (including piles) ..	5s. lin. ft. ....
	197 cubic yds. ....	Concreting cylinders .....	£3 cubic yd. ....
	.....	Tar, one coat .....	3d. square yd. ....
	.....	Tar, three coats .....	9d. " .....
	.....	Paint, three coats .....	1s. " .....
	3,678 cubic yds. ....	Embankment .....	1s. 4d. cubic yd. ....
	240 " .....	Rubble .....	10s. cubic yd. ....
Footways, 9,000 cubic ft. ....	Supply and fixing timber .....	5s. cubic ft. ....	
106 tons .....	Ironwork, carriage railway, Sydney to Cowra .....	£4 2s. 4d. ton .....	
166 " .....	Ironwork, carriage railway, to site .....	3s. ton .....	
38,755 cubic ft. ....	Timber, carriage railway, Sydney to Cowra .....	9d. cubic ft. ....	
58,755 " .....	Timber, carriage railway, to site .....	3d. " .....	
9,000 " .....	Timber, carriage railway, Sydney to Cowra .....	9d. " .....	
9,000 " .....	Timber, carriage railway, to site .....	3d. " .....	
Total .....	£	17,975 0 0	

Total cost, truss bridge, with cylinders and footways, { Contract I. ... £3,417  
 { Contract II. ... 17,975

Total cost..... £21,392

By omitting footways (£2,701) the cost of bridge would be reduced to £18,691

## 18.

DESIGN No. 3.

ESTIMATED cost of Truss Bridge on Timber Piers.

Total cost of cylinders complete .....	£3,611
Do timber piers complete .....	1,750
Difference .....	£1,861
Total cost of truss bridge with timber piers and footways .....	19,531
By omitting footways (£2,701) the cost would be reduced to .....	16,830

## 19.

DESIGN No. 3.

COMPUTATION of Annual Charges on Proposed Design with Cylinders. Interest, 4 per cent.

With Footways—

Estimated cost of cylinders and ironwork .....	£7,773
Do timber in piers and trusses .....	10,239
Do do planking .....	3,380
Interest and depreciation on £7,773, life taken at 150 years = 4.01 % .....	= £312
Do do 10,239, do 25 do = 6.40 % .....	= 655
Do do 3,380, do 12½ do = 10.33 % .....	= 349
Painting every four years at 20s. per foot .....	= 260
Total annual charge .....	£1,576
Capital value at 4 per cent. = £39,400.	

Without Footways—

Estimated cost of cylinders and ironwork .....	£7,773
Do timber in piers and trusses .....	8,578
Do do planking .....	2,340
Interest and depreciation on £7,773, life 150 years = 4.01 % .....	= £312
Do do 8,578, do 25 do = 6.40 % .....	= 549
Do do 2,340, do 12½ do = 10.33 % .....	= 242
Painting .....	= 260
Total annual charge .....	£1,363
Capital value at 4 per cent. = £34,075.	

## APPENDIX.

33

## 20.

## DESIGN No. 3.

COMPUTATION of Annual Charges on Design with Timber Piers. Interest, 4 per cent.

With Footways—	
Estimated cost of ironwork .....	£4,162
Do timber in trusses and piers .....	11,989
Do do planking .....	3,380
	per annum.
Interest and depreciation on £4,162, life 150 years = 4.01 % .....	= £167
Do do 11,989, do 25 do = 6.40 % .....	= 767
Do do 3,380, do 12½ do = 10.33 % .....	= 349
Painting every four years, at 20s. per foot .....	= 260
Total annual charge .....	£1,543

Capital value at 4 per cent. = £38,575.

Without Footways—	
Estimated cost of ironwork .....	£4,162
Do timber in trusses and piers .....	10,328
Do do planking .....	2,340
	per annum.
Interest and depreciation on £4,162, life 150 years = 4.01 % .....	= £167
Do do 10,328, do 25 do = 6.40 % .....	= 661
Do do 2,340, do 12½ do = 10.33 % .....	= 242
Painting .....	= 260
Total annual charge .....	£1,330

Capital value at 4 per cent. = £33,250.

## 21.

## DESIGN No. 3.

COMPUTATION of Annual Charges on Design with Cylinders. Interest at 3½ per cent.

With Footways—	
Estimated cost of cylinders and ironwork .....	£7,773
Do timber in trusses and piers .....	10,239
Do do planking .....	3,380
	per annum.
Interest and depreciation on £7,773, life taken at 150 years = 3.52 % .....	= £274
Do do 10,239, do 25 do = 6.07 % .....	= 622
Do do 3,380, do 12½ do = 10.03 % .....	= 339
Painting every 4 years, at 20s. per foot .....	= 260
Total annual charge .....	£1,495

Capital value at 3½ per cent. = £42,714.

Without Footways—	
Estimated cost of cylinders and ironwork .....	£7,773
Do timber in trusses and piers .....	8,578
Do do planking .....	2,340
	per annum.
Interest and depreciation on £7,773, life taken at 150 years = 3.52 % .....	= £274
Do do 8,578, do 25 do = 6.07 % .....	= 521
Do do 2,340, do 12½ do = 10.03 % .....	= 235
Painting .....	= 260
Total annual charge .....	£1,290

Capital value at 3½ per cent. = £36,857.

## 22.

## DESIGN No. 3.

COMPUTATION of Annual Charges on Proposed Design with timber piers. Interest, 3½ per cent.

With Footways—	
Estimated cost of ironwork .....	£4,162
Do timber in trusses and piers .....	11,989
Do do planking .....	3,380
	per annum.
Interest and depreciation on £4,162, life taken at 150 years = 3.52 % .....	= £146
Do do 11,989, do 25 do = 6.07 % .....	= 728
Do do 3,380, do 12½ do = 10.03 % .....	= 339
Painting every four years, at 20s. per foot .....	= 260
Total annual charges .....	1,473

Capital value at 3½ % = £42,086.

Without Footways—	
Estimated cost of ironwork .....	£4,162
Do do timber in trusses and piers .....	10,328
Do do do planking .....	2,340
	per annum.
Interest and depreciation on £4,162, life taken at 150 years = 3.52 % .....	= £146
Do do 10,328, do 25 do = 6.07 % .....	= 627
Do do 2,340, do 12½ do = 10.03 % .....	= 235
Painting .....	= 260
Total annual charge .....	1,268

Capital value at 3½ % = £36,229.

## COWRA BRIDGE.

SUMMARY of Prime Costs, Capital Values and Annual Charges calculated at 4 and 3½ per cents.

	Prime Cost.	At 4 %.		At 3½ %.	
	£	£	£	£	£
Iron Bridge, iron deck with footways .....	69,971	3,054	76,350	2,711	77,457
Do timber deck with footways .....	54,959	2,811	70,275	2,552	72,914
Do iron deck without footways .....	65,196	2,862	71,550	2,543	72,657
Do timber deck without footways .....	50,574	2,540	63,500	2,301	65,743
Composite bridge with cylinders and footways .....	26,538	1,735	43,375	1,624	46,400
Do with cylinders and without footways .....	23,894	1,529	38,225	1,427	40,771
Do with timber piers and footways .....	20,822	1,565	39,125	1,486	42,457
Do with timber piers and without footways .....	18,178	1,369	33,975	1,289	36,829
Timber bridge with cylinders and footways .....	21,392	1,576	39,400	1,495	42,714
Do with cylinders and without footways .....	18,691	1,363	34,075	1,290	36,857
Do with timber piers and footways .....	19,531	1,543	38,575	1,473	42,086
Do with timber piers and without footways .....	16,830	1,330	33,250	1,268	36,229

JOHN A. M'DONALD,  
Engineer for Bridges, M.I.C.E., M.I.M.E.

## C.

REPORT BY ARTHUR S. HAMAND, Esq.

Cowra Bridge.

Sydney, 31st March, 1890.

Gentlemen,  
Early in this month I visited Cowra. I carefully examined the existing bridge, its situation, and that of the proposed new bridge, and investigated what materials were obtainable in the district for the erection of a new bridge.

The existing bridge is in a most unsatisfactory state. The only sound part of it is that portion of the superstructure forming the three 130 feet trusses, and the design of this bridge and its present condition are a timely commentary upon the middle paragraph in the "introductory" part of Mr. M'Donald's statement relating to timber work.

These three 130 feet trusses are in every particular exact copies of a type very common in the United States, in use for single track railway bridges. The timber in these trusses must have been carefully selected, and, I am informed, was stacked on the ground two years prior to being used. All the parts have been carefully fitted and put together, and the bolts have been tightened at every opportunity to take up shrinkage; and the point to which I particularly desire to draw attention is that no member of these trusses has ever been overstrained, and consequently the trusses retain the shape in which they were originally built, and are now apparently as good as they were twenty years ago.

The rest of the bridge is a great contrast to these trusses. There is a surplus of timber in one place, and a great deficiency in another. I might go over the whole bridge with the same result, but confine myself to two instances.

The piers carrying the 130 feet spans are of no greater scantling than the piers supporting the 65 feet spans, yet, in addition to having about three times the weight to carry, the piers of the larger spans are twice the height of those carrying the 65 feet openings. Either the piers of the 65 feet spans are of six times the strength required, or the river piers are of only one-sixth the necessary strength. Another example I take from the 65 feet trusses: The working stress on the stretcher beam at top of the queen truss is 36 tons, while the safe stress on the timber used is 15 tons. What wonder that these trusses have gone quite out of shape and have to be propped? The natural consequence of straining timber so severely is that the ends give way, throwing the beams out of line, and inducing new and abnormal stresses, which open splits and shakes in the timber, and cause rapid destruction of it.

I have considered the possibility of renewing and widening the existing bridge; but its position, and the angle at which the piers stand to the current of flood water are not in its favour. I think also, to do it effectually would involve an outlay not far short of £20,000; but on account of the excellent condition of the 130 feet trusses it is only with reluctance I have concluded it is better to build a new bridge.

In reference to the three designs submitted to the Committee, it seems desirable to point out that the spans in each of the three designs being different, no comparison of their cost can be made without taking the variation in the spans into account. The use of different materials can only be compared fairly when the spans are the same. Assuming design No. 2, the one recommended by the Department, as a basis, the difference in the size of spans would, in the same material, alone account for a decrease in cost of design No. 3 of about 15 per cent. on design No. 2, and an increase of about the same for No. 1 over No. 2 design.

I have only examined No. 2. design, and that, so far as the information supplied to the Committee permits, and I observe that it is pervaded by the same error of over-straining timber. For instance, in the polygonal trusses, the middle members of the top boom provide for a stress (according to the strength of ironbark given by Mr. M'Donald) not exceeding 89 tons, whereas they should carry 120 tons. The 89 tons is based on the ultimate strength of ironbark under compression, given by Mr. M'Donald in his statement as 4½ tons = 9,520 lb. per square inch of section, and taking the factor of safety at 8, as allowed for timber by the British Board of Trade. Professor Rankine, a good authority, recommends 10 as the factor of safety in timber structures. If, however, the usual practice is followed, the constant for ironbark would be taken as 7,140 lb. only per square inch as a fairer average, and then with 8 as the factor of safety, the section of timber in the top boom which should carry 120 tons, is only capable of bearing a load of 67 tons.

The subject is of so much importance that I may explain that "8 as a factor of safety" means that in order to provide for, not so much the absolute security as the safe endurance of timber structures, they should never be loaded with more than one-eighth of the average breaking weight of the particular kind of timber being used. In the case of timber, the tests for determining strengths are mostly carried out on small specimens which are carefully selected. Timber varies so much in strength that pieces taken from opposite sides of the same log will often give results differing in amount 50 per cent. To allow for these differences, knots, and other defects, which it is impossible to discover in timber of large scantling, it is usual for engineers to take as a constant for rupture the breaking-weight as determined from small pieces, or picked specimens diminished by one-fourth; so that for ironbark the 9,520 lb. would be reduced to 7,140 lb. as a working average, and all timber is dealt with in the same practical way.

It has further been determined by a series of practical experiments that if a given breaking-weight ruptures a material when applied within a short period, a very much smaller weight will produce rupture if applied repeatedly, or for a longer period, and one of the chief points aimed at in well considered designs is the apportionment of the stresses in such a manner as to prevent what is termed the "fatigue stress" from ever being reached. With the load so limited, or the material so apportioned, the load may be applied to any material an indefinite number of times without injury. For timber used in all permanent and important works, it is the general practice to limit the load to one-eighth of the determined average breaking-weight.

The live-load provided for in the submitted designs is only two-thirds of that allowed for in British works of a similar nature. It is considered that the most trying strain on road bridges is occasioned by the passage of a regiment of soldiers, and 112 lb., sometimes 120 lb., is taken as the working load per square foot. I am disposed to think that a team of bullocks, with their rhythmical tread, and a load of 10 or 11 tons, is a much more severe trial to a bridge, especially a wooden one.

On the whole, then, it would seem that, in addition to providing only for a light working load, that reduced load is permitted to produce much heavier stresses on the section of timber used than is customary with engineers of experience. This is sufficient to account for the difficulty in finding a timber bridge which has not gone out of shape, or which does not give unmistakable evidence of being over-strained. Over-straining timber probably shortens its life by at least one-half.

Colonial,

Colonial timbers possess great strength, but they are correspondingly heavy, and in all large spans the weight of the material used is a very large component of the total weight to be sustained. I doubt if timber can be used, even for road bridges, economically when the spans exceed 60 or 70 feet.

With regard to comparative estimate, I consider that No. 2 design, if increased to the proper standard of strength, would cost £30,000 instead of £26,500, and that for a fair comparison with No. 1 design, £4,500 should be added, making it £34,500; and to compare No. 2 with No. 3, £4,500 should be deducted, making it £25,500, on account of the variation in spans. No. 3 design would, no doubt, also, require more timber to bring it up to standard strength.

In relation to the iron bridge, when before the Sectional Committee at Cowra, I was asked some questions about the dimensions of some of the iron, and it has been plainly intimated that some of the iron is specified of peculiar dimensions, with the object of throwing the contract for it into the hands of particular firms, for the corrupt benefit of someone within the Department. Perhaps it will come with more weight from me, as an outsider, when I say that I am sure that the idea of corrupt benefit is impossible and may be dismissed. The rolled joists referred to are more used by architects than by engineers, and are generally sold guaranteed to carry stated quiescent loads, rather than to fulfil particular dimensions, which are given for information more than for calculation purposes. The bracings,  $5\frac{1}{2}$  in.  $\times$   $2\frac{3}{4}$  in.  $\times$   $\frac{5}{8}$  in., are somewhat an unusual size to specify. Each brace increases in stress as its distance from the centre of the girder increases; but it is not usual to vary the section of iron used for differences involving only a pound or two of iron, as the change is very troublesome to the manufacturer, involving fresh templates, &c. Rather than do this the manufacturer would prefer to continue the stronger section at his own cost until a difference was reached, making it worth while to alter the section; that is to say, the drawing would not be strictly adhered to, as being unpractical. I am quite satisfied, however, that there is no corrupt motive underlying this matter, but that these unusual dimensions are rather due to the hair-splitting accuracy of some draughtsman more theoretical than practical.

I now come to the design, which I submit herewith, together with an estimate and summarised specification for a bridge at Cowra, which, for the most part, will speak for themselves. I have provided a width between the parapets of 25 feet, which may be divided into an 18 feet carriage-way and 7 feet footpath.

The aggregate width of water-way in the existing bridge is 710 feet, and as the fastest current during flood time has been timed at 6 miles an hour, the existing water-way, so far as extent goes, may be considered sufficient. The designs submitted by the Department provide for 960 feet of water-way, and for raising the roadway 9 feet higher than at present.

With a raised bridge, I consider 840 feet ample water-way, and have so drawn it; and, having regard to the spans and their disposition, I think the water-way of my design is fully equal to that provided in No. 2 design. As the specification shows, I propose to build the whole bridge of concrete, part in mass, and part in block concrete. The blocks would be used in those parts where it would be inconvenient to wait for the hardening of the concrete where deposited in mass.

Although I submit this design, it is only to enable the Committee to compare its cost, &c., with iron and timber. I do not recommend it, because I think a concrete bridge at a lower level will answer all the purposes of the traffic of the district, and cost very much less. In a few days I will send in the design for the smaller bridge.

To the Chairman and Members of

the Parliamentary Standing Committee on Public Works.

I have, &c.,

ARTHUR S. HAMAND.

#### Cowra Bridge.

##### Abridged Specification.

THE work to which this specification relates is the erection, completion, and maintenance, during the stipulated period after completion, to the satisfaction of the engineer, of a bridge for carrying the main road over the River Lachlan at Cowra. It includes the provision by the contractor of every sort of material, plant, &c., that may be requisite or incidental to the due execution of the work as well as the imposition of such tests of the strengths of cement and concrete as in the judgment of the engineer may be required.

The foundations are intended to be carried to the several depths shown on the drawing; but the contractor will have to sink the foundations in all cases to such depth as, in the opinion of the engineer, the nature of the ground renders necessary. The river piers are intended to be founded upon the rock.

The river pier foundations are to be built in the following manner:—A curb is to be formed, of the shape of the outside of the pier, with a cutting edge of wrought-iron 12 inches deep by  $\frac{1}{2}$  inch thick, to the inside of which plate is to be riveted iron plate 3 feet broad and  $\frac{1}{2}$  inch thick, with the lower edge so bent that the  $\frac{1}{2}$  inch plate is set at an angle of 45 degrees with the vertical  $\frac{1}{2}$  inch plate, as per sketch of section V. Upon this V-shaped curb is to be built a wall of concrete 2 feet 6 inches thick, forming a hollow pier, and is to be continued to such height as may be necessary. The whole hollow pier is to be then sunk gradually by excavating the interior, when its own weight will cause it to descend until a hard bottom is reached. Pumping will not be insisted on either during excavation or filling the pier solid with concrete after the bottom is reached. If necessary, the descent of the concrete caisson must be guided and regulated in the usual manner, and when an approved bottom is reached the centre of the pier is to be carefully filled with concrete, which, if the foundation is free from water, is to be specially well rammed. The base of the pier should be rather larger than the part above, to diminish friction in sinking.

The whole of the bridge is to be built of concrete of the same kind and proportion of materials. Approved cement one part by measure to four parts of either hard granite or trap broken to approved size, and two parts of clean coarse sand. It is of great importance that the stone and sand should be as free of dirt, dust, and earthy or clayey particles as possible, and every possible precaution to attain this end must be taken by screening, washing, or otherwise.

The materials, after being measured, are to be mixed upon a platform twice, dry, and, after being slightly wetted, again twice mixed before being deposited in place, which is to be done where mass concrete is used, in even layers, not exceeding 6 inches thick, in order to secure facility for tight ramming of it. The concrete, in all cases, is to be mixed with as small a quantity of water as is workable, and special attention will be insisted on to its effectual consolidation by heavy ramming.

That part of the arches which stands at an angle exceeding 40 degrees with the horizontal will be built of concrete blocks, made in moulds six months previously. These blocks will be of convenient dimensions, and of regular sizes throughout; but so that each block is the full depth or thickness of the arch.

The centering of the river span must be made strong enough to carry the arch when supported from the ends only, for which purpose corbellings on the piers may be made. Generally, the design and structure of the centerings, as well as the arrangements for slackening them, must be approved by the engineer. The contractor will be required to provide, at his own expense, all moulds, centerings, timbering, &c., required, and no payment will be made to him in respect of anything but the net quantities of work actually executed, at the rates set out in his schedule of prices,

#### Cowra Bridge.

##### Estimate of Cost.

Description.	Quantity.	Price.	Amount.
Excavation.....	c. yds. 2,900	s. d. 3 4	£. s. d. 483 6 8
Masonry concrete.....	13,492	44 0	29,682 8 0
Allow for river foundations.....	.....	.....	2,000 0 0
Allow for centering moulds, &c. ....	.....	.....	3,600 0 0
Filling to arches.....	7,500	2 6	937 10 0
Metalling.....	626	6 0	187 16 0
Embankment, as in No. 2 design.....	.....	.....	695 16 0
Total.....	.....	.....	37,486 16 8

*Cowra Bridge.*  
Comparative Estimates for Materials.

Description.	Prime Cost.	At 3½ per cent.	
		Annual Charge.	Capitalised Value.
	£	£	£
Masonry concrete.....	37,487	.....	37,487
Timber bridge (cylinders and foot-ways), No. 3 design.....	21,392	1,495	42,714
Composite bridge, do. do., No. 2 design.....	26,538	1,624	46,400
The same, if of standard strength.....	30,000	1,834	52,400
Iron bridge (iron deck and foot-ways).....	69,971	2,711	77,457

Comparison of the ultimate average Crushing loads for Brickwork, Concrete, &c.

Concrete, six months old .....	60 tons per square foot.
Do. twelve months old .....	97     "
Brickwork, good in cement .....	35     "
Rubble masonry, in mortar .....	25     "

*Cowra Bridge.*

Gentlemen,

Sydney, 8 April, 1890.

As proposed in my report dated the 31st ultimo, upon this subject, I now beg leave to submit an amended design for a concrete masonry bridge over the River Lachlan at Cowra, which will be equally available for traffic at all times as the bridges of which the designs have been previously submitted. In times of flood this bridge will remain dry as long as the lower part of the town of Cowra and the main roads approaching it from the west remain above water, and there appears to be no advantage to the locality or the traffic in raising a bridge above this level; although, no doubt, for a timber structure with its buoyancy, and for an iron bridge with its lattice net-work, it would be prudent to build them with their superstructures raised above flood-level, which course would be adopted for the greater security of the structure, and not for any benefit to the traffic.

In the design now submitted it will be observed that the western half of the bridge is at a lower level than the eastern half. This is to allow one half to become submerged before the other half, in case of extremely high floods. It is not intended to furnish the bridge with parapets, but a light railing on either side which, when required, can be laid flat by withdrawing pins from its stays. The roadway throughout the bridge would be finished in concrete, so that there would be no metalling to be washed away.

At the site of the existing bridge the river is narrower, and the banks are much steeper, than at the position selected for the erection of the new one which I have marked upon the plan, and I recommend to be a little further south than where proposed by the Department. There will consequently be much more waterway in the new bridge than is afforded by the existing one, and at the same time less obstruction to the current caused by the piers being set parallel with its flow. The river at the point recommended is both wider and shallower (as the presence of the ford indicates) than at any other point within some distance either up or down the stream, so that there would be in any case less velocity and pressure of water here than elsewhere.

Accompanying the drawing is an estimate of cost of the amended design, amounting to £22,581, while the cheapest design for a bridge with footways put before the Committee by the Department is of the capitalised value of £42,056.

The bridge can be built in sandstone masonry for about the same amount as in concrete; but I prefer the latter for two reasons: Within twelve months from its erection the concrete will be twice as strong as the sandstone, and the use of concrete does not entail the necessity of employing so much skilled labour, the difficulty of obtaining which in the country districts sometimes causes delay and loss to contractors.

In making this amended design I have endeavoured to discard the ideas embodied in the previous plans, and have thought the matter out with a simple regard to the actual necessities of the situation.

To the Chairman and Members of the

Parliamentary Standing Committee on Public Works.

I have, &c.,

ARTHUR S. HAMAND.

*Cowra Bridge.—Amended Design.*

Estimate of Cost.

Description.	Quantity.	Price.	Amount.	
			£	s. d.
Excavation.....	1,650 c. yds.	3 4	275	0 0
Concrete.....	7,800   "   "	45 0	17,550	0 0
Allow for foundations.....	.....	.....	2,000	0 0
Centering, &c. ....	.....	.....	2,500	0 0
Embankment.....	.....	.....	100	0 0
Fencing.....	520 lin. yds.	6 0	156	0 0
	Total.....	.....	22,581	0 0

D.

STATEMENT FROM THE COMMISSIONER AND ENGINEER-IN-CHIEF FOR ROADS AND BRIDGES ON MR. A. S. HAMAND'S REPORT.

Dear Sir,

Roads and Bridges Department, Sydney, 6 May, 1890.

I am sorry I am not well enough to go in and give further evidence on the Cowra Bridge, but I expect Mr. McDonald has said all that is necessary on the subject, and given sufficiently strong reasons against the adoption of either of Mr. Hamand's designs. His high-level bridge, even on his own figures, is very costly; but I am satisfied his estimate is quite wrong. For an ordinary structure, without the risk and difficulties of erection in a river subject to floods, at least 50 per cent. would have to be added to his estimate; but, when the latter is taken into account, it is very difficult to say what the cost would be. Sinking a concrete foundation in the bed of a river is a very costly operation, and subject to such risks that a contractor would require a very large sum to cover "contingencies."

With regard to his low-level structure I cannot see how any sane man could propose such a thing.

Granting, for argument's sake, that a low-level bridge would be the proper one to erect (a supposition which, I think, it is not likely will be endorsed), it is, I think, patent to any one that the design should be of such a character as to offer the least possible obstruction to the current; in fact, to be as spider-web like as possible, to enable, as far as possible, all floating timber and other debris to pass on.

The design submitted is to all intents and purposes a dam, or certainly would, after the first flood, become one, the natural consequences of which would be either the flooding of the town, the carrying away of the bridge, or, more than likely, first one and then the other.

I am still of opinion that the composite design would be the best one to adopt, and trust the Committee will view the matter in the same light.

The Secretary, Public Works Committee.

I am, &c.,  
ROBT. HICKSON,  
Commissioner and Engineer-in-Chief,

E.

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**ROADS AND BRIDGES DEPARTMENT.**

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**LEADING TYPE DESIGNS**

OF

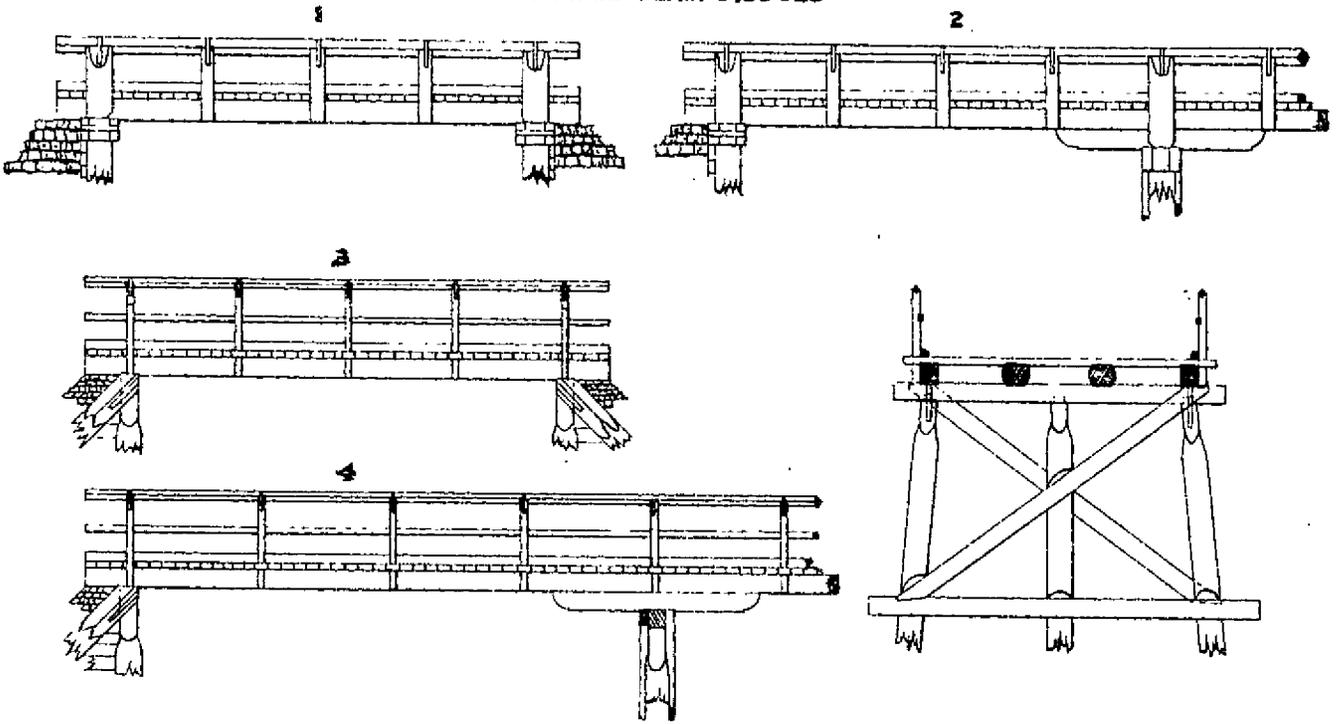
**IRON AND TIMBER BRIDGES**

**THROUGHOUT THE WORLD.**

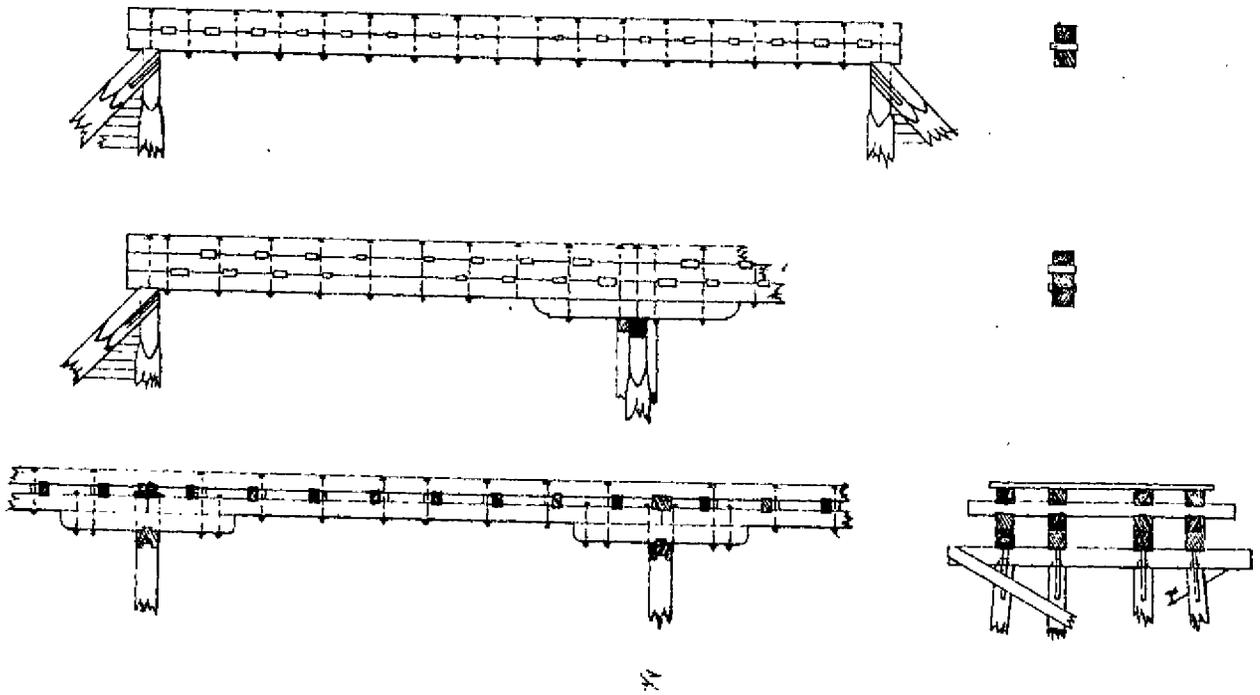
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# TIMBER BRIDGES

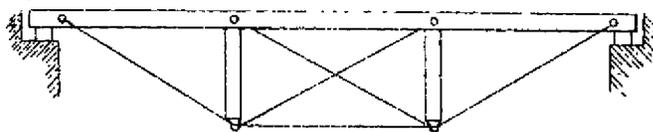
## SIMPLE BEAM BRIDGES



## COMPOUND BEAM BRIDGES



## TRUSSED BEAM



## TIMBER BRIDGES.

### SIMPLE BEAM.

Either (1) with or (2) without corbels, for low level.  
(Do. (3) do. (4) do. for high level.

Spans: 25 to 40 feet.

Example: Used as type design in Roads Department, N.S.W.

### COMPOUND BEAMS.

Either with or without corbels for high or low level.

Spans: 25 to 50 feet.

Example: Pudman Creek Bridge, N.S.W.

### TRUSSED BEAM.

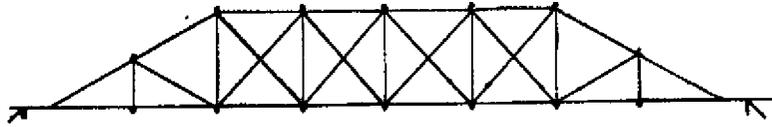
Tension members either timber or iron.

Spans: 25 to 60 feet.

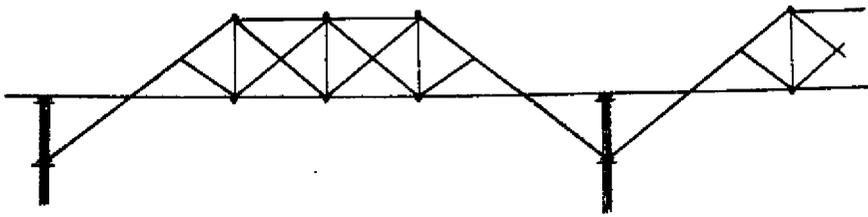
# TIMBER BRIDGES *Continued*

## TRUSS BRIDGES

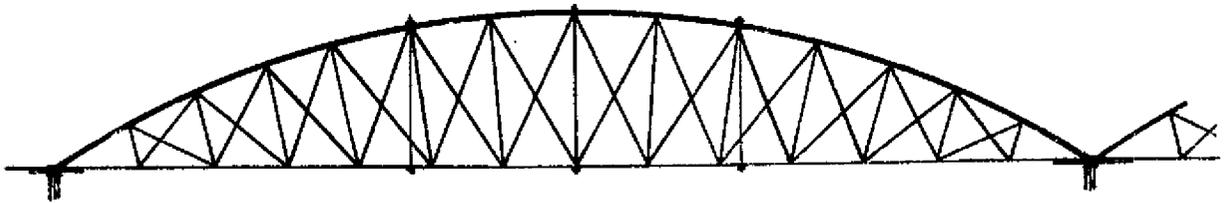
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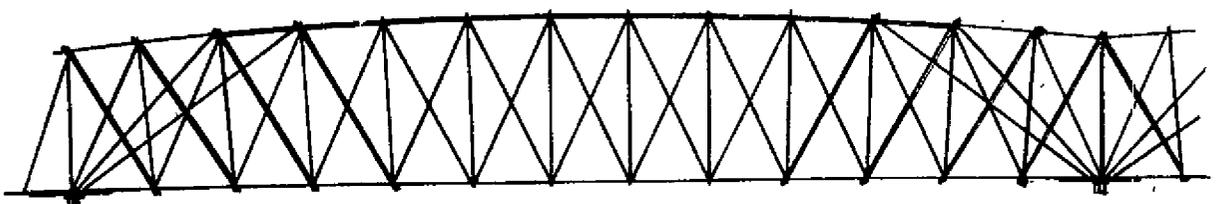
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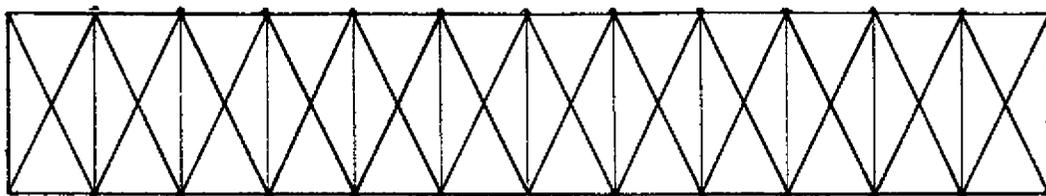
## LAMINATED BOWSTRING



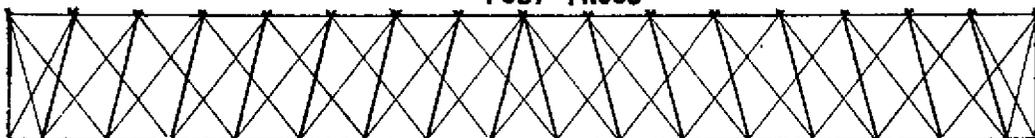
## M'CALLUM TRUSS



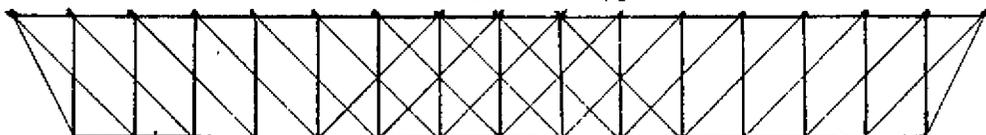
## HOWE TRUSS



## POST TRUSS



## PRATT TRUSS



## TIMBER BRIDGES—(continued.)

## TRUSS BRIDGES.

Vertical tension members iron.

Spans : 50 to 130 feet.

Example : No. 1 used as type design in Roads Department, N.S.W.

## LAMINATED BOWSTRING.

Span : 130 feet.

Example : Union Bridge, over Murray River, N.S.W.

## AMERICAN TRUSSES : M'CALLUM, HOWE, POST, AND PRATT.

Spans : Up to 200 feet

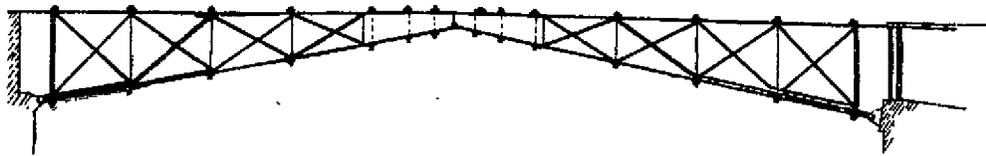
Example : Cowra Bridge, over Lachlan River, N.S.W.

# TIMBER BRIDGES *Continued*

LAMINATED BRACED ARCH

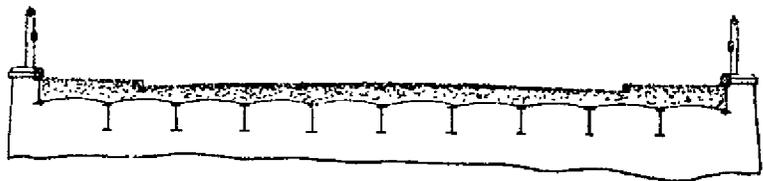


3 HINGED BRACED ARCH

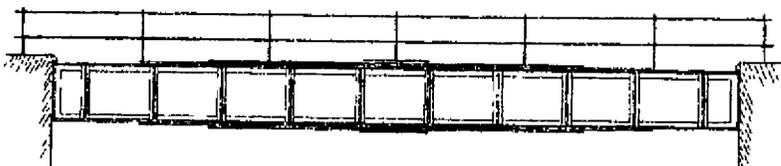


## IRON BRIDGES

ROLLED BEAM BRIDGES



BUILT BEAM BRIDGE



**TIMBER BRIDGES—(continued.)****LAMINATED BRACED ARCH.**

Spans : 50 to 90 feet.

Example : Palmer's Channel Bridge, over Lower Clarence River, N.S.W.

**THREE-HINGED BRACED ARCH.**

Spans up to 200 feet.

Example : Broughton Creek Bridge, N.S.W.

**IRON BRIDGES.****ROLLED BEAM BRIDGES.**

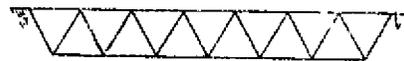
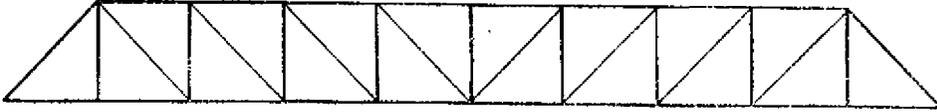
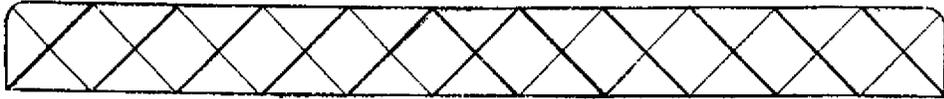
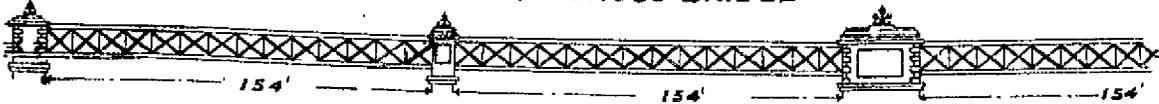
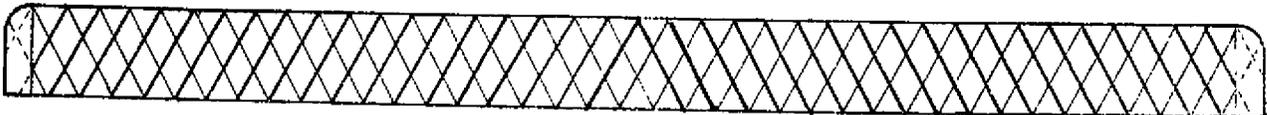
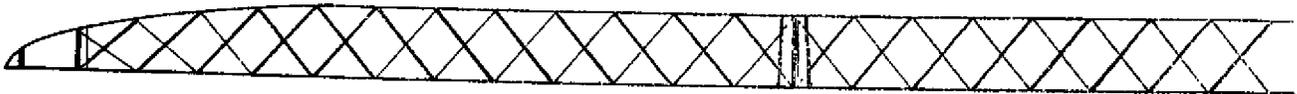
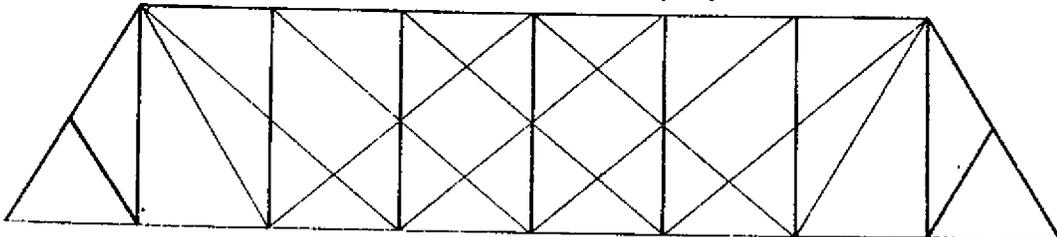
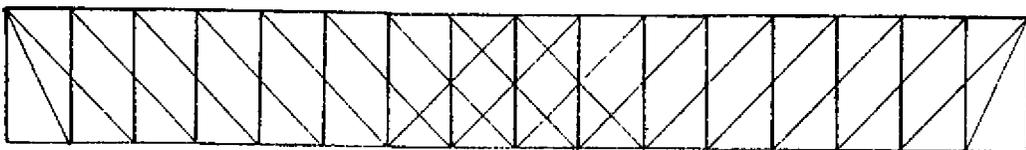
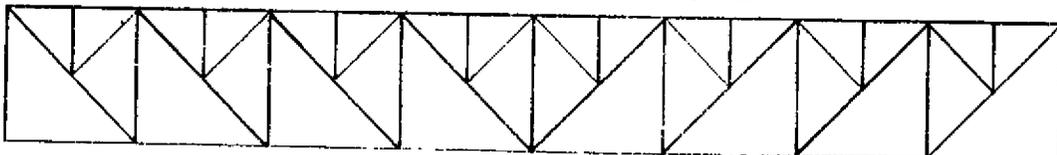
Spans : 7 to 27 feet.

Example : Used as type design in Roads Department, N.S.W.

**BUILT BEAM BRIDGES.**

Spans : 20 to 100 feet.

Example : Martin's Inu Bridge, N.S.W.

**IRON BRIDGES** *Continued***INVERTED WARREN GIRDER****WARREN GIRDER****ORDINARY TRIANGULAR TRUSS****INDEPENDENT LATTICE GIRDER****CHARING CROSS BRIDGE****INDEPENDENT TRELLIS GIRDER****CONTINUOUS LATTICE GIRDER****MURPHY-WHIPPLE TRUSS****LINVILLE TRUSS****BALTIMORE BRIDGE CO'S TRUSS**

IRON BRIDGES—(*continued.*)

## WARREN GIRDERS.

Spans : 40 to 130 feet.

Examples : Railway Bridges between Parramatta and Blacktown, N.S.W.

## ORDINARY TRIANGULAR TRUSS.

Spans : 40 to 130 feet.

Example ; Bathurst Bridge, over Macquarie River, N.S.W.

## INDEPENDENT LATTICE GIRDER.

Spans : 60 to 420 feet.

Example : Wilcannia Bridge, N.S.W.

## INDEPENDENT LATTICE GIRDER, WITH PIN CONNECTIONS.

Spans : 60 to 420 feet.

Example : Charing Cross Bridge, England.

## INDEPENDENT TRELLIS GIRDER.

Span : 60 to 420 feet.

Example : Yass Bridge, N.S.W.

## CONTINUOUS LATTICE GIRDER.

Central spans : 60 to 400 feet.

Example : Used as type design in Roads Department, N.S.W.

## MURPHY-WHIPPLE TRUSS.

Spans : 120 to 500 feet.

Example ; Nowra Bridge, N.S.W.

## LINVILLE TRUSS.

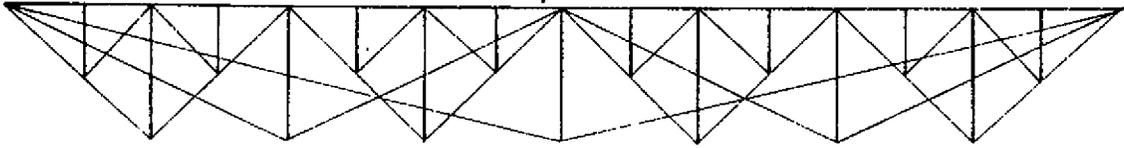
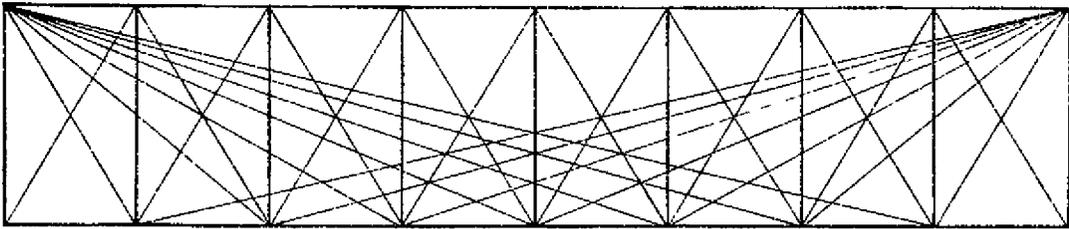
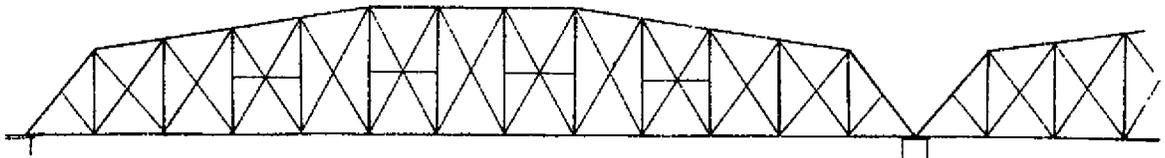
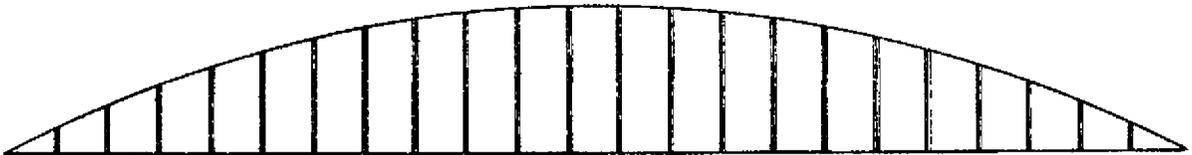
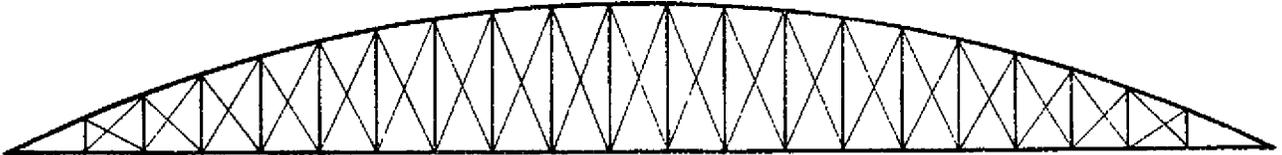
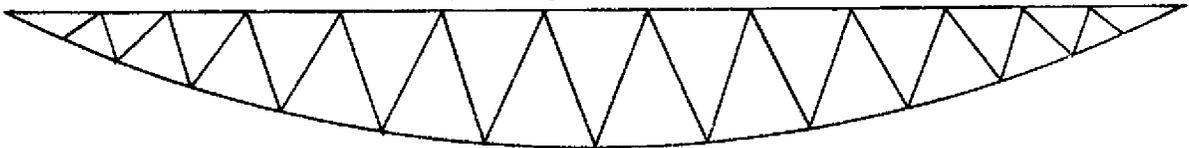
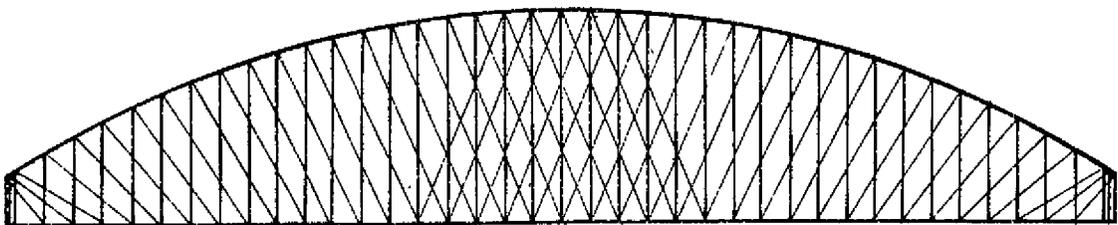
Spans : 120 to 500 feet.

Example : Ohio River Bridge, America.

## BALTIMORE BRIDGE CO.'S TRUSS.

Spans : 125 feet.

Example : Mount Union Bridge, America.

**IRON BRIDGES** *Continued***FINK TRUSS****BOLLMAN TRUSS****UNION BRIDGE CO'S TRUSS****PLATE WEB BOWSTRING GIRDER****LATTICE BOWSTRING GIRDER****INVERTED BOWSTRING LATTICE GIRDER****TRUNCATED BOWSTRING GIRDER**

**IRON BRIDGES—(continued.)****FINK TRUSS.**

Spans : 140 to 300 feet.

Example : Green River Bridge, America.

**BOLLMAN TRUSS.**

Spans : 80 to 200 feet.

Example : Bollman Bridge, America.

**UNION BRIDGE CO.'S TRUSS.**

Spans : Up to 500 feet.

Example : Hawkesbury River Bridge, N.S.W.

**PLATE WEB BOWSTRING GIRDER.**

Spans : 60 to 135 feet.

Example : Goole Canal Bridge, England.

**LATTICE BOWSTRING GIRDER.**

Spans : 60 to 200 feet.

Example : Shannon Bridge, Ireland.

**INVERTED LATTICE BOWSTRING GIRDER.**

Spans : 60 to 200 feet.

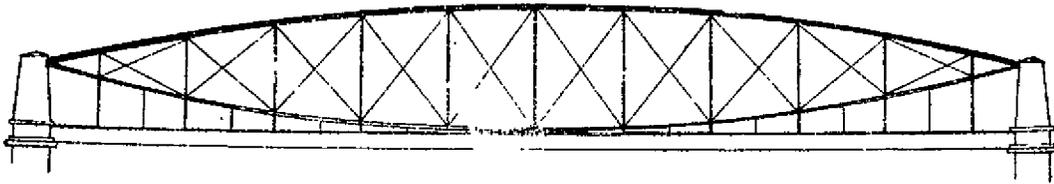
**TRUNCATED BOWSTRING.**

Spans : 60 to 500 feet.

Example : Kuilenberg Bridge, Holland.

# IRON BRIDGES *Continued*

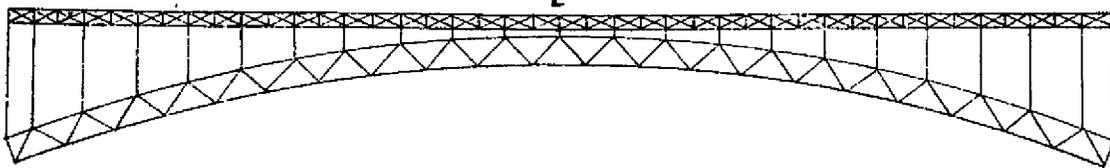
## LENTICULAR GIRDER



## RIGID ARCH PLATE WEB

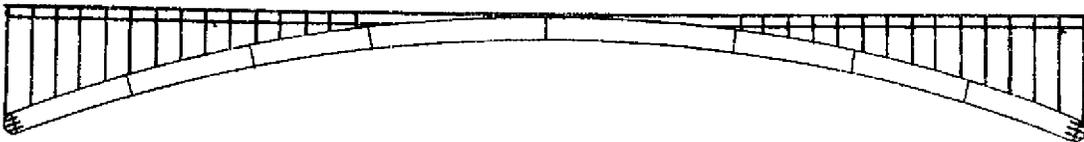


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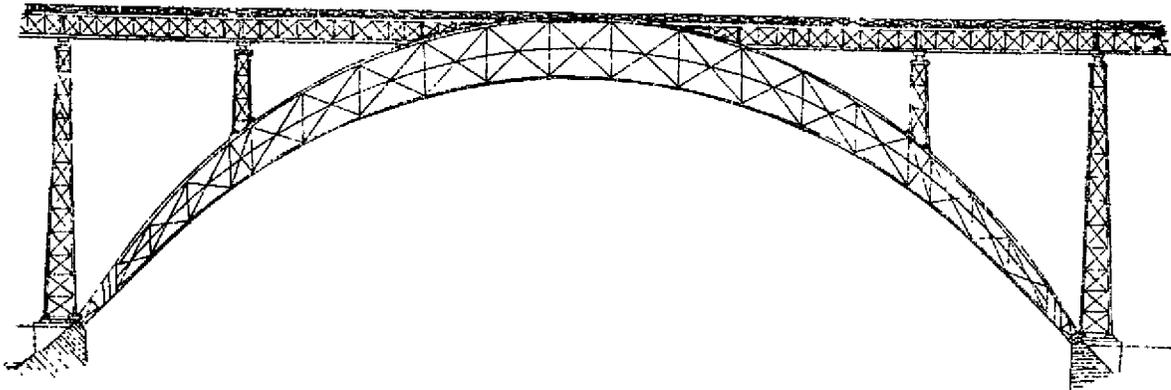


## 2-HINGED ARCH PLATE WEB

1

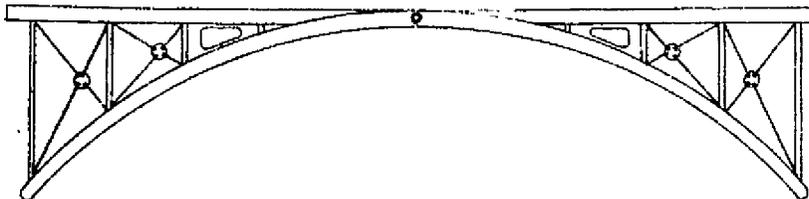


2



## 5 HINGED BRACED ARCH PLATE WEB

1



2



IRON BRIDGES—(*continued.*)

## LENTICULAR GIRDER.

Spans : 345 to 455 feet.

Example : Royal Albert Bridge, Saltash, England.

## RIGID ARCH, PLATE OR LATTICE WEB.

Spans : 170 to 500 feet.

Examples : No. 1, Rochester Bridge, England ; No. 2, St. Louis Bridge, America.

## TWO-HINGED ARCH, PLATE OR LATTICE WEB.

Spans : 200 to 525 feet.

Examples : No. 1, Victoria Bridge, England ; No. 2, Bridge over River Douro, Spain.

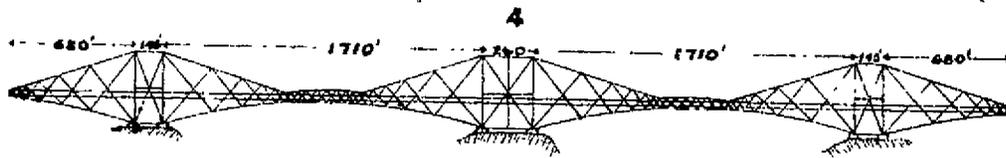
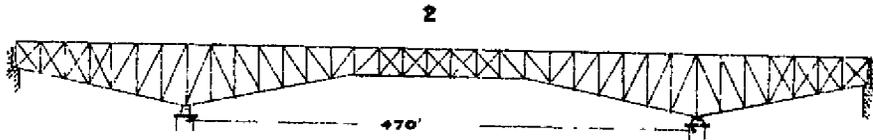
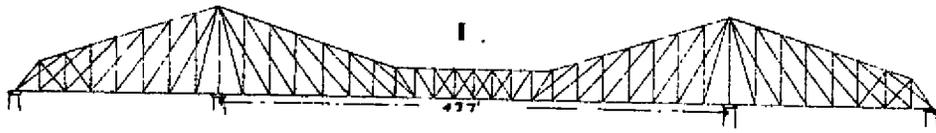
## THREE-HINGED ARCH, PLATE OR LATTICE WEB.

Spans : 45 to 500 feet.

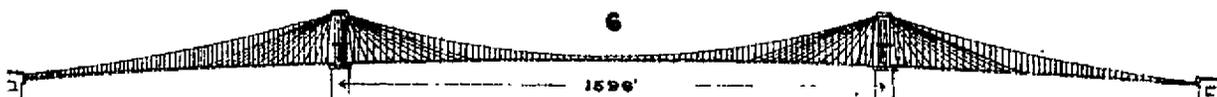
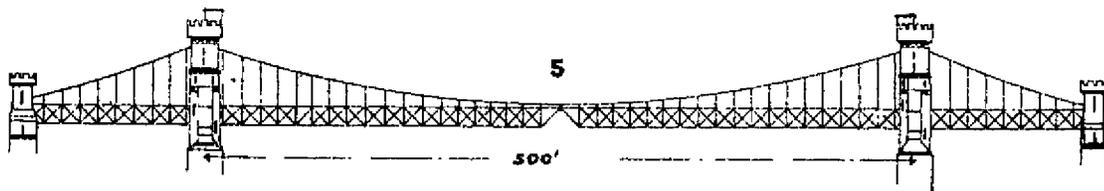
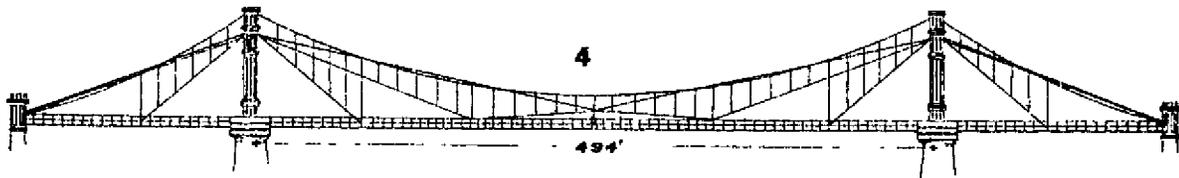
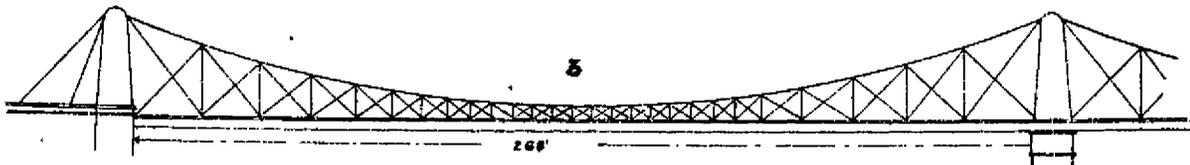
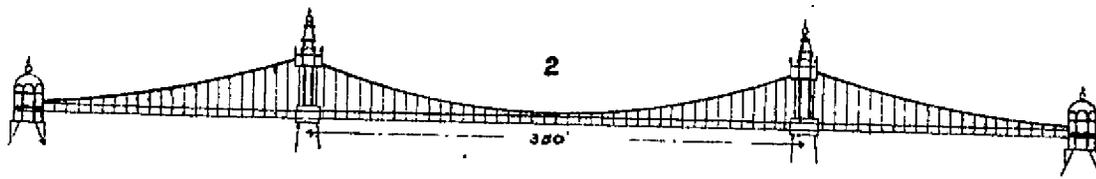
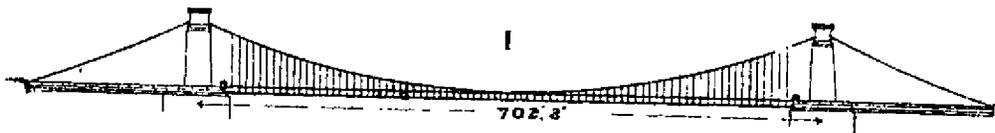
Examples : No. 1, Smollet-street Bridge, Albury, N.S.W. ; No. 2, Fidler's Design.

# IRON BRIDGES *Continued*

## CANTILEVER BRIDGES



## SUSPENSION BRIDGES



IRON BRIDGES—(*continued.*)

## CANTILEVER BRIDGES.

No. 1. St. John's River Bridge, central span, 477 feet, America.

No. 2. Niagara Bridge, do. 470 ,, do.

No. 3. Poughkeepsie Bridge, do. 546 ,, do.

No. 4. Forth Bridge, do. 1,710 ,, Scotland.

## SUSPENSION BRIDGES.

No. 1. Clifton Bridge, central span, 702 feet, England.

No. 2. Chelsea Bridge, do. 350 ,, do.

No. 3. Lambeth Bridge, do. 280 ,, do.

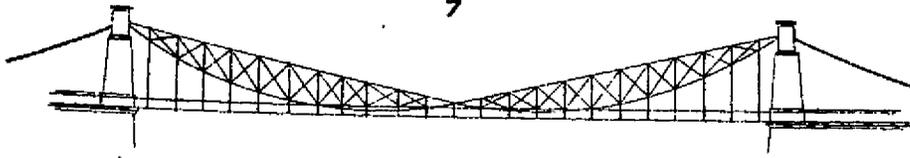
No. 4. Francis Joseph Bridge, central span, 494 feet, Austria.

No. 5. North Sydney Bridge, do. 500 ,, N.S.W.

No. 6. Brooklyn Bridge, do. 1,596 ,, America.

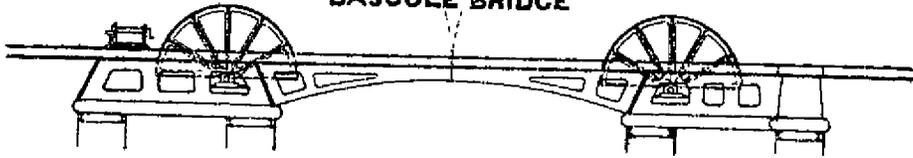
IRON BRIDGES (continued)

7



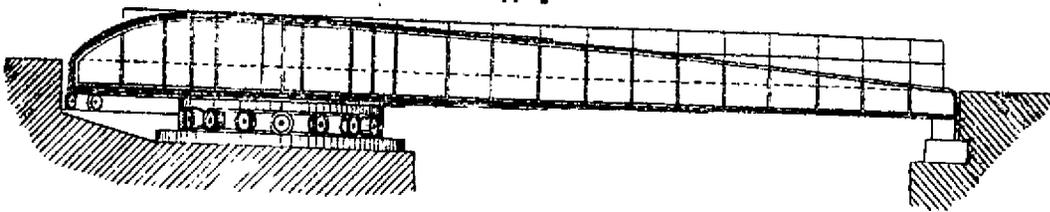
OPENING BRIDGES

BASCULE BRIDGE



LEAF SWING BRIDGE

N° 1

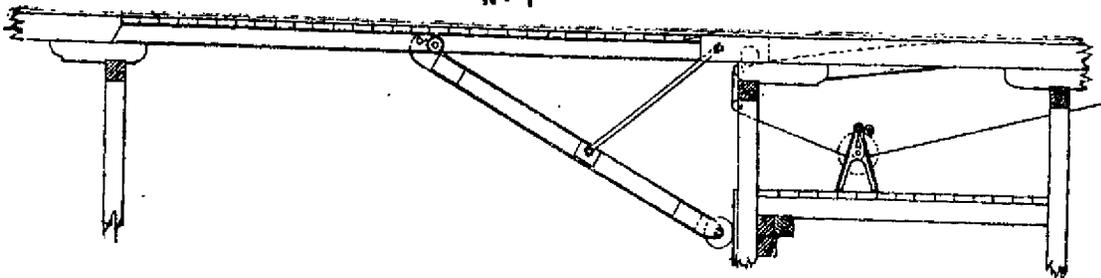


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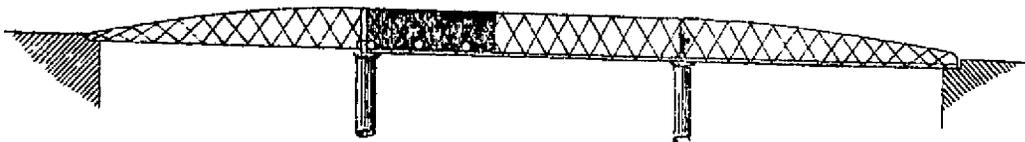


TRAVERSE BRIDGES

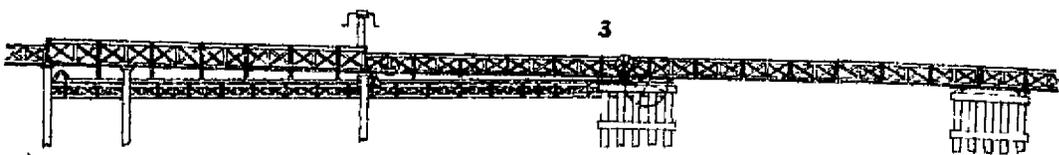
N° 1



N° 2



3



IRON BRIDGES—(*continued.*)SUSPENSION BRIDGES—*continued.*

No. 7. Fidler's Design.

**Opening Bridges.**

## BASCULE BRIDGE.

Spans: 30 to 60 feet.

Example: Selby Bridge, over River Ouse, England.

## LEAF SWING BRIDGES, COUNTER-BALANCED.

Spans: 26 to 350 feet.

Examples: No. 1, Lane Cove River Bridge, N.S.W.

No. 2, Dundirk, France.

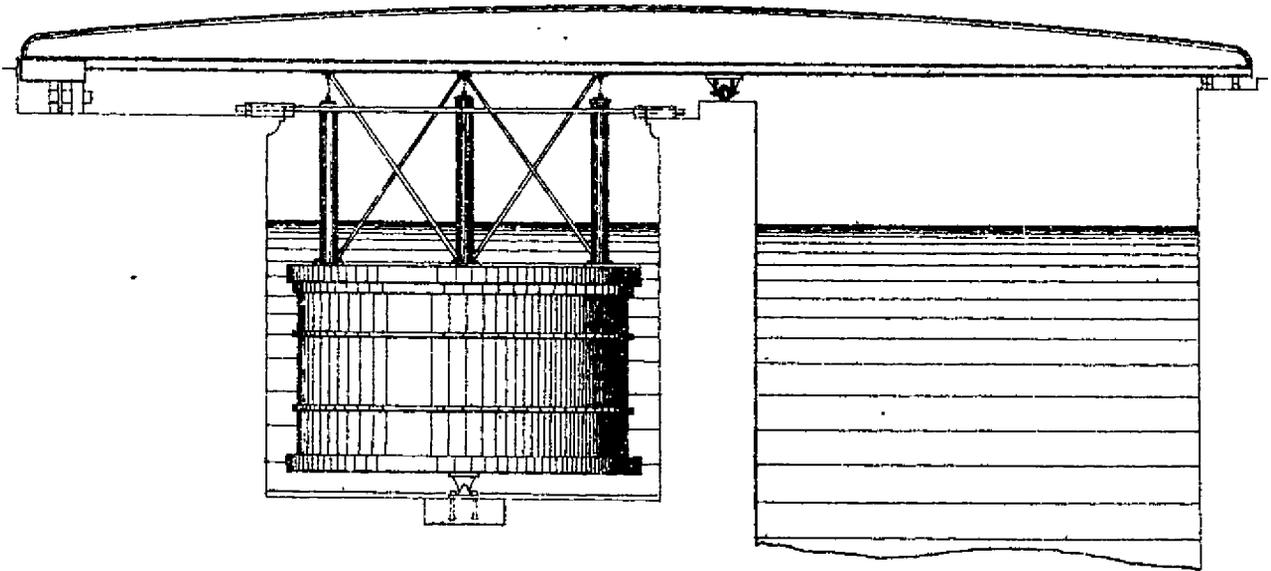
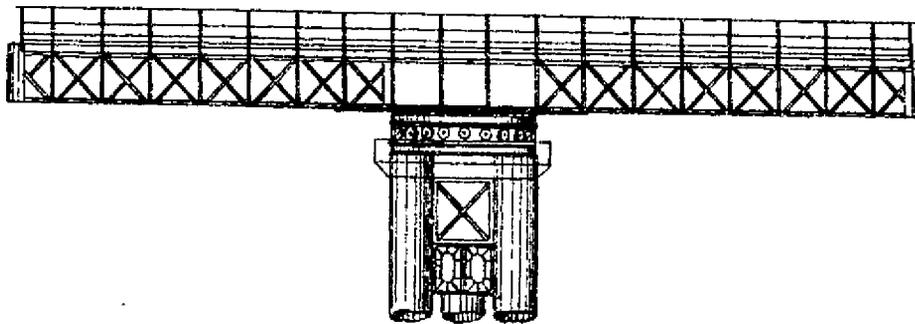
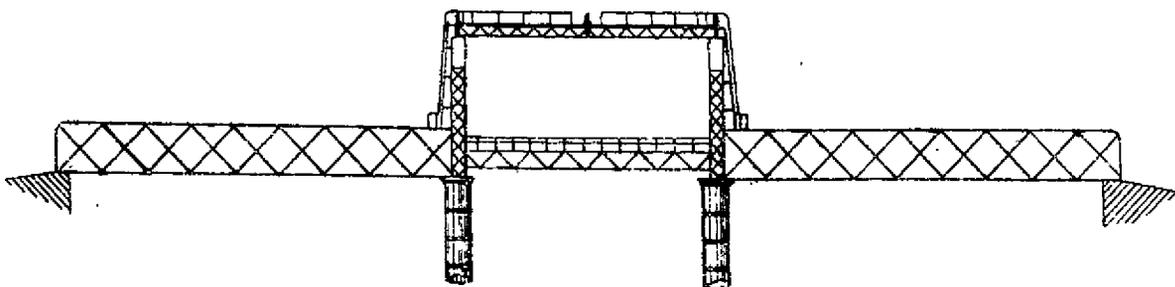
## TRAVERSE BRIDGES.

Spans: 28 to 60 feet.

Examples: No. 1, Cook's River Bridge, N.S.W.

No. 2, Lismore Bridge, N.S.W.

No. 3, Leven Viaduct, England.

**IRON BRIDGES** *(continued)***SWING BRIDGE WITH FLOATING CENTRE****ORDINARY SWING BRIDGE****LIFT BRIDGE**

IRON BRIDGES—(*continued.*)

## SWING BRIDGE, WITH FLOATING CENTRE.

Spans : 28 feet.

Example : Spencer Dock Bridge, Dublin.

## ORDINARY SWING BRIDGE.

Each Span : 40 to 220 feet.

Example : Parramatta River Bridge, Sydney, N.S.W.

## LIFT BRIDGE.

Span : Up to 60 feet.

Example : Wilcannia Bridge, N.S.W.

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JOHN A. McDONALD,  
Engineer for Bridges.

*December 17th, 1889.*

*Roads and Bridges Department,  
New South Wales.*

R. R. P. HICKSON,  
Commissioner and Engineer-in-Chief  
for Roads and Bridges.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

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SECTIONAL COMMITTEE.

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IRON BRIDGE AT COWRA.

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REPORT.

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Your Committee, appointed on the 18th February, 1890, to inspect, take evidence, and report upon the proposed iron bridge over the Lachlan, at Cowra, arrived at that town on the 8th March, and on the same day had interviews with the Engineer for Bridges, and also with Mr. Hamand, C.E. At 2 p.m. they visited the present bridge and the site suggested for the proposed new structure. The bridge is of the McCallum truss type. The superstructure, with the exception of the decking, is in good repair, and appears to have been constructed in a workman-like manner and of proper material. The piers, which to an amateur would appear ridiculously light, having regard to the superstructure, and which could scarcely have been designed by the same engineer, were in a state of decay positively dangerous. The pier on the right bank, or Cowra side of the river, stated by the Engineer for Bridges and the Road Superintendent of the district to be in a worse condition than the opposite pier, was, on account of a fresh in the river, not available for our examination. The pier on the left bank, the base of which had been exposed to view, under instructions from the Superintendent of Roads of the district, showed that one of the piles was entirely decayed. In other cases the scarfs of the piers were so badly constructed that the Committee were surprised that they should have been passed by the Inspector. The remaining timber also, with few exceptions, was in a state of decay, and the Committee have no hesitation in condemning the piers of the bridge as being entirely unsafe for traffic. In one instance the ravages of the white ants were evident. The approach spans, which were in an exceedingly dangerous condition, have been strengthened by the erection of large trusses, which, in the event of a heavy flood, would in all probability be carried away.

Your Committee proceeded to take evidence at the Court-house, Cowra, at 2 p.m. on the 11th March, and examined six witnesses. Mr. J. V. Bartlett, the Road Superintendent, who had already furnished the General Committee with statistics relative to the traffic on the bridge, said the structure in its present state was absolutely dangerous, and that it might at any time, in the event of a flood, be washed away. He enumerated eleven absolutely rotten piles, and spoke favourably of the site of the proposed new bridge at the foot of Kendal-street, within a very short distance of that of the present bridge. He admitted that 90 per cent. of the heavy traffic to the railway would be cut off if the proposed line from Molong to Parkes and Forbes were constructed, although he contended that even then a new bridge would be necessary, in view of local requirements. He condemned not only the workmanship of the piers of the present bridge but also the plan of construction, as being wholly inadequate to carry the existing superstructure. The Engineer for Bridges, Mr. McDonald, corroborated Mr. Bartlett's statements as to the dangerous condition of the present bridge, and urged the construction of a new bridge from the foot of Kendal-street. Mr. Hamand, C.E., was of opinion that the present bridge had not been designed by an engineer, and said that with the exception of the McCallum truss an ordinary carpenter would be ashamed to acknowledge the work. He proposed to build a  
bridge

bridge of masonry, brick, or concrete, or of the three combined. Although the cost of construction might reach that of an iron structure he urged that a bridge so made would be practically everlasting, and would cost nothing for maintenance. The spans of the bridge, he said, determined in a great measure its cost; for example, a span of 200 feet would cost four times as much to construct as a span of 100 feet. The local evidence consisted principally of that of persons interested in the maintenance of the site of the present bridge. They said that their property would be depreciated if a new bridge were erected on a new site.

Your Committee would strongly recommend the construction of a new bridge at the site selected, having regard to the expense attending the repair and necessary alterations of the present erection. This would involve the outlay of a large amount of money, and would be at the best patch-work—not likely to last more than fifteen years. The Committee do not feel in a position to recommend a design until Mr. Hamand, C.E., has fulfilled the commission entrusted to him by the general Committee.

March 19th, 1890.

JAS. E. TONKIN,  
Chairman.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

MINUTES OF EVIDENCE.

IRON BRIDGE AT COWRA.

[TAKEN BEFORE THE SECTIONAL COMMITTEE.]

TUESDAY, 11 MARCH, 1890.

[The Sectional Committee met at the Court-house, Cowra, at 2 p.m.]

Present:—

JAMES EBENEZER TONKIN, Esq. (CHAIRMAN.)

The Hon. GEORGE HENRY COX.

WILLIAM SPRINGTHORPE DOWEL, Esq.

CHARLES ALFRED LEE, Esq.

The Sectional Committee proceeded to consider the proposed Iron Bridge at Cowra.

John Vigar Bartlett, Esq., sworn and examined:—

1. *Chairman.*] What is your position in the service of the Government? I am Superintendent of Roads and Bridges for this district. J. V. Bartlett,  
Esq.

2. What are your qualifications for that position? I am a surveyor and a road engineer. I have practised since 1862. I was articled from 1858 to 1862 to Mr. Prowse, of Geelong, architect, civil engineer, and surveyor. I was afterwards district road engineer of Corio, and also district road engineer of Colac. I was subsequently shire engineer of Colac. From 1866 I was authorized surveyor for the Colac district. At the end of 1882 I resigned. 11 Mar., 1890.

3. How long have you been in the service of the New South Wales Government? Since August, 1884. I was first in charge of a portion of the Metropolitan district. Since December 8th, 1884, I have been in charge of the Cowra district.

4. You are well acquainted with the site of the present bridge over the Lachlan at Cowra? I am.

5. Have you at various times made reports to the Department with reference to the condition of that bridge? About ten or eleven times, I think.

6. What was the purport of those reports? First, I was instructed to give the bridge a thorough overhaul superficially, to see if anything was required, with a view to its maintenance in proper order and the prevention of decay. The first report I sent in was as to the condition of the queen trusses on the other side. It was in a most deplorable condition. After sending in that report, when the water admitted of it, I made a thorough inspection of the place as far as I could get down. I reported then that some of the piles were defective, and sent in a sketch pointing out the exact position in which the defects could be found.

7. Have you a copy of that sketch which you could place before us? Yes. Here is my report of July 25. It does not go into the matter quite fully, because at that time I could not get below the walings. The report I sent in then was as follows:—

Sir,

Roads Office, Cowra, July 25, 1885.  
In conformity with your instructions, I beg to submit sketch of the eastern pier of the Cowra bridge, showing by arrowheads the portions of the two piles that are decayed. The depth of decay is from 6in. to 9in. deep and 2ft. to 4ft. along the piles.

The decking of the bridge will require replacing with new throughout, within two years. Repairs are being effected with old planks cut in two, and the worn parts put outside, but the supply will be exhausted in a few months.

The piers should be replaced within two years, or strengthened, as they have stood about seventeen years, and if you approve of this, provision will have to be made.

I have, &c.,

J. V. BARTLETT,

Roads Superintendent.

The Commissioner and Engineer, Roads and Bridges Department, Sydney.

Subsequently I made an inspection. The caretaker of the bridge got down alongside the piles. He had to get into about 4 feet of water. In the eastern pier on the up stream side four piles are defective under the walings—that is to say worse than above. I found these to be much worse than anything I had previously seen.

8. In what year was that report made? In 1885.

9. At that time how many piles do you suppose were in a defective state? At the time I made my first report two piles only in the eastern pier were, as far as I could see, in that state.

10. Then I take it that since that time you have made several examinations? On the 31st December following I made a more critical examination.

11. What did you discover then? I reported that the planks were being repaired, but that the old planks were of little value having to be frequently renewed. The superstructure of the three large spans was I said in good repair, a few cracks in the upper chord required filling. I gave a sketch showing the position of the several piles which were defective.

- J. V. Bartlett,  
Esq.  
11 Mar., 1890.
12. Can you give us the exact number of piles which were at that time in a defective state. I want to show, if possible, the progressive decay of the bridge—we shall by that means be able to show to some extent the life of the piers? That would depend upon my not missing any defective piles, and at the time to which you refer I could not get below the walings on account of the water.
13. I understand that in 1885 there were only two piles apparently defective—how many more piles were rotten when you sent in your next report? I have not the exact date of it, I have searched everywhere for the document, but cannot find it. I think at the same time I can show you something leading up to it. In my report of December 31st, 1885, I made some notes with regard to the piles commencing on the other side of the abutment Nos. 1, 2, and 3, were sound—that is to say no defects were observed. I refer to the piles of the piers. In the case of No. 5 the piles below the walings was three-quarters decayed. No. 9 was also three-quarters decayed. That is one of the piles on the down stream side—it had been buried in concrete before my arrival here.
14. That concrete was not put there to stop the rotting of the piles, it was put there, I take it, to stop the scour from the bottom? Yes. At No. 11 three piles had vertical stripes from 3 feet to 5 feet long, and these were decayed 2 by 6 inches in depth. At mark A it is hollow. Then at No. 12, 5 piles were decayed, more or less, at the ground line.
15. What date is that? December 31st, 1885. I bring the total up to 11 piles, more or less decayed at the ground line.
16. Are there any more than 11 at the present date? Not visible above the surface.
17. You think that these 11 piles upon which you then reported are the only piles in such a rotten state at the present time? Yes, above ground. I subsequently found that under these piles on the up stream side there were defects far worse than anything else I had seen.
18. What did you discover? I found in various places just a mere shell.
19. You have had a great experience of timber work in culverts and bridges—do you think that this timber could have been sound when it was put into the bridge? I should not like to say that it was all in a sound state; in fact I could not say so.
20. Is it not evident that that must have been the case when you see some timber now perfectly sound, and then again a lot of it in a decayed state? From my experience I should assume that the care exhibited in the selection of timber for the superstructure had not been exhibited in the selection of the timber for the piles.
21. Did you ever see a bridge constructed in that form before with the M'Callum truss? No.
22. Do you consider that the piers are sufficiently substantial to carry the superstructure they now bear? Certainly not.
23. They would not be even if the timber had been ever so good? Certainly not. To quote language which I have used before, I should describe it as a sparrow-legged top-heavy concern—those are the words I used, I think, in my original report.
24. You have no hesitation in condemning the plan of the piers of the bridge? In the first place, I should like to say that the design of the superstructure is adapted to American lumber, soft-wood timber, and not to Australian hardwood.
25. Did you notice the workmanship of the piles and scarfs? I noticed it in some instances.
26. Will you give us your idea of it? I do not know how matters were managed in those days, it would take us back seventeen years. All that I can say is that the management and supervision at the present day is very different.
27. Would the supervision of the present day pass such work as that? Not as far as my experience leads me to believe. From what I have seen of the work of the Department, such work would be condemned at the present day.
28. Did you notice an instance where one of the main piles from 12 to 14 inches square had the whole of its upper part scarfed on to about 5½ inches—bearing on to the lower pile? Yes, but I could scarcely dignify the work by the name of scarf.
29. Did you ever see any such work in your life at any other place? No, I never saw a joining of that description.
30. From your knowledge of timber, could you not say that it would have been better to put it on to a 6-inch pile rather than upon half of a 12-inch pile cut that way. Has not the joint as made a tendency to split the pile? There is a great deal of unnecessary strain on the bolts and the bracings.
31. Do you think it is possible at an economical cost to replace these piles, and so utilize the present superstructure? No.
32. You think the timber is too far gone for anything of that sort? Well, you would require a new lock, stock, and barrel to begin with.
33. The superstructure, however, would last for years? The M'Callum trusses, but not the queen trusses.
34. I am speaking of the main truss; is it possible at a reasonable expense to put in new timber piers? No, I should not recommend it. I may mention that an application was made in consequence of the large increase of traffic to have a footway put on the bridge. I prepared an estimate of the cost of the footway together with sections. These were sent down and approved, but owing to the defectiveness of the piers the matter had to stand over. I am of opinion that to take out these piles and to renew the old bridge would be such a costly undertaking that it ought not to be done. Of course you must have regard to the great increase in the traffic, and the narrowness of the bridge. I do not think that for the sake of having a few years of life for the bridge such great expense should be incurred; it would not, in my judgment, be an economical undertaking.
35. Do you think that the gentleman who designed the superstructure of the bridge also designed the piers? It does not look like it; it looks as though two persons had been at work—that is of course only an expression of opinion on my part.
36. Supposing a railway were made from Cowra to Forbes, do you think that if the bridge were made safe, narrow and all as it is, it would be sufficient for the district. You must remember that the whole of the Forbes traffic would be brought down by railway. Under those circumstances would not the bridge be sufficiently large? I do not think so. We have five scheduled roads on that side; over one half of the district is there. Over one half of the local traffic radiates that way and must come over the bridge.
37. Is not the principal traffic over the bridge, at least three-fourths of it, from the valley of the Lachlan towards Forbes and Condobolin? No.

J. V. Bartlett,  
Esq.  
11 Mar., 1890.

38. Where does the traffic come from then? The whole of the surrounding district. They have to come over this district from down the Lachlan 20 or 30 miles, and half way between here and Young, and then on to Grenfell. The Forbes traffic is a little more than that of Grenfell.
39. But the Young traffic would not come here? I mean the local traffic on the road. There are farms on the road and there would not be a railway station opposite every man's door; he would have to take his grain to the nearest market or siding.
40. Do you wish the Committee to understand that a large portion of the traffic would be drays loaded with grain? Not altogether. I am referring to the local traffic to and fro. It is not all grain and wool. We have a growing district which has doubled itself within the last few years.
41. I have a return of a traffic over the bridge showing a daily average of 300 foot passengers; is that all local? Yes.
42. And would the horse waggons and bullock waggons be local? Some of them would be.
43. It is very strange. We have heard that an enormous traffic would be done on a railway from Condobolin and Forbes down the river Lachlan, and now when we are investigating another work we find that all the traffic coming from that direction is purely local? I do not say that it is all local traffic. The principal traffic is from the Lachlan with the exception of three stations. It comes chiefly from the Lachlan and Grenfell.
44. We were told this morning that £85,000 had been taken at the railway station for traffic in, I think, three years and one month; are we to understand that a great portion of that £85,000 is local traffic—that people have paid that freight for things they require themselves. What is the proportion of local traffic? Would it be 25 per cent.? That would be a matter of opinion. I should say as regards tonnage that 10 per cent. would be local, and that the other would go over the bridge.
45. Do you not think, therefore, that if 90 per cent. of the present traffic on the bridge is cut off it would be sufficiently large to accommodate the traffic? That was not my statement. I was referring to tonnage not to traffic.
46. Is not the tonnage in the traffic? Yes; but there is a good deal of traffic besides.
47. Let us get at the passenger traffic—does much of that traffic go to Forbes, Condobolin, and Parkes? Do you wish to include swagsmen, coaches, and buggies?
48. I am speaking of anything that goes over the bridge. Take foot passengers, equestrians, carts, drays, and coaches—what would be the proportion of traffic across that bridge that would be beyond purely local traffic? I could not hazard an opinion on that matter.
49. Give me an approximate estimate—what would be the proportion of local passenger traffic? The coaches go up one day and come back the next—they may average three or four passengers. There is one coach to Grenfell and two to Forbes. I have not taken a note of the coach traffic, but when I have travelled by coach there have been three or four passengers generally. Sometimes there is a crowd; sometimes I have not seen one passenger in a coach—that, of course, does not often happen.
50. But you must have some knowledge of what is local in the shape of passengers in drays, carriages, and buggies. Taking an average, what would be a fair proportion to allow for the local traffic? It would be only a leap in the dark if I were to give you an estimate. You must excuse me when I state that if I had to be bound by what I say it is not fair to ask me to give an answer to a question when I could not arrive at one even approximately. I have taken no notice of the traffic. What I said just now had reference to the tonnage. I have no doubt that about 90 per cent. of the teams coming over the bridge to the railway station would be between Grenfell and Forbes—that I have taken notice of. I have noticed the heavily-laden vehicles because they have cut up the road.
51. Do you think that 50 per cent. of the ordinary traffic would be beyond local influence? I do not like to hazard an opinion—it would be only hazarding an opinion, I could not be stating a matter of fact.
52. Then you will not answer the question? I would, but I cannot answer it.
53. Suppose that 25 per cent. of the traffic now crossing the bridge were discontinued on the construction of the railway, do you think that the superstructure of the bridge would then be sufficient to meet the requirements of the place? We should have to renew the western portion, which is the greater length.
54. If you were to knock off 25 per cent. of the ordinary traffic and 90 per cent. of the heavy traffic, do you think the bridge when repaired would be sufficient to meet the requirements of the place? I did not say that 90 per cent. of the heavy traffic would be discontinued. I spoke of 90 per cent. of the railway tonnage. I have already said that I think there will be a considerable grain traffic over the bridge.
55. Do you believe that if a large percentage of the present traffic over the bridge were taken away by the construction of a railway, the bridge would, when repaired, be sufficient to meet requirements? If the bridge were put in a thorough state of repair there would still be the inconvenience to be considered in connection with its width. It would be necessary to add one footway, at least, on account of the stock crossing the bridge.
56. How many footways are there now? None.
57. How many years has the bridge been in that state? Since 1870.
58. Then it has not met the requirements up to the present time? It has not met requirements. At the instance of the Progress Committee, meetings have been held year after year demanding alterations, but they have been put off because we cannot load the piers with any additional weight. My recommendation was that iron cylinders should be put in to strengthen the structure, and I believe it was approved.
59. Suppose a new bridge were to be constructed, would you suggest the present site, or the site at the foot of Kendal-street? Viewed as a national work, and apart from any localisms, there can be no two opinions about the matter. The direct route for the through traffic is at the foot of Kendal-street.
60. *Mr. Dowel.*] Is it a fact that there are a large number of residents on the south side of the river? Yes, there are some residents there. There is also a large quantity of suburban land sold there, and some yet to be sold.
61. Do you know if the residents there have to come to this particular part of the town to transact their business? They have, undoubtedly.
62. In your opinion is it not necessary that there should be always a good and substantial bridge across the river, quite independent of questions arising out of railway construction? Certainly, otherwise the place would be divided, and people would be debarred from getting supplies. Business would be paralyzed if the traffic to and fro were cut off.
63. Have any accidents or losses of stock occurred on the present bridge? Accidents have occurred several times. Whenever bullock teams or horse teams are going across, persons travelling in the opposite direction have to wait until they get off the bridge before they can pass over.

- J. V. Bartlett, Esq.  
11 Mar., 1890.
64. You recommend the erection of a bridge of a more modern type, rather than the repair of the old one? Yes.
65. *Mr. Cox.*] How often in the year was the river impassable by reason of floods or freshes? With the exception of one year it has been frequently flooded. Water comes down from the Fish River in a bank of from 4 to 6 feet without any notice sometimes.
66. Evidence was given before the General Committee in Sydney to the effect that from nine to twelve months in the year the river is fordable, is that the case? There must be some slight misunderstanding, I think. A fresh often comes down when there has been a heavy downpour on the Abererombie ranges or on the Fish River. It may stop the traffic for a week, but it then gradually subsides.
67. It is not the case then that for nine months of the year the river is passable? During the last twelve months we have sometimes not been able to get across for more than two or three days in a month.
68. Take five years—what would be the average time per year when the river would be crossable? Traffic has often been impracticable at the ford for two or three weeks at a time. Taking it altogether, I suppose heavy traffic there would be stopped for from four to six months in the year.
69. *Chairman.*] Do you consider that the bridge is at present in a dangerous state? It is in a dangerous state.
70. If a flood came down the river what do you think would be the result? If a flood came down I should not be surprised to see the whole affair swept down the river. I have seen two severe floods since I have been here; I have been on the bridge for over thirty hours, snagging. Nearly all the timber strikes the eastern pier. On one occasion I had thirty men there with me. I have seen the water up to within 4 ft. 3 in. of the lower boom. When Mr. Fishburn was erecting a railway bridge, a flood came down and swept away all his staging and his timber bridge. The engineer, to save our bridge, let go the fishplates in several places.

John Alexander M'Donald, Esq., M.I.C.E. and M.I.M.E., Engineer for Bridges, sworn and examined:—

- J. A. M'Donald, Esq.  
11 Mar., 1890.
71. *Mr. Lee.*] What is your position? Engineer for Bridges in the Roads and Bridges Department.
72. You are conversant with the plan submitted for a bridge across the Lachlan to Cowra? Yes.
73. Do you know No. 2 design? Yes.
74. That design was prepared under your supervision? Yes.
75. During your recent visit to the place you prepared plans. Have you since had occasion to alter or modify those plans? No. I visited the district two or three times before preparing the plans.
76. And you still adhere to your original idea as regards the most suitable bridge to construct at this place? Yes.
77. Since preparing your design have you taken into consideration the life, adaptability, and cost of a stone or a brick pier bridge with a wooden superstructure? That matter was considered before getting out these designs.
78. And you have not considered the matter since? No. I have seen no necessity to open it up again.
79. Have you re-examined the old structure since you arrived in the district? No; I have not had the same opportunity to examine it that I had when I made an examination three years ago in conjunction with Mr. Bartlett, when the river was lower.
80. I believe the Sectional Committee were unable on Saturday to see the worst pier in the bridge, owing to the height of the water? Yes. That is the pier that gets the greatest force of the water in flood.
81. You have already given evidence upon this work before the General Committee? Yes.
82. You are familiar with the estimated cost of the repairs of the bridge? Yes.
83. Have you made any further estimate as to the probable cost of repair? I have made none, except what has been already laid before the Committee.
84. In your estimate-in-chief I notice that you gave an appendix as to the value of the traffic on the Cowra bridge? Yes; £3,000.
85. You were not, in making that estimate, considering that the bridge was going to return anything? No. It was simply made to reduce the detailed table of traffic to something more easy to grasp.
86. The object of the table was to more fully inform the Committee of the actual extent of the traffic? Exactly, so that they could see at a glance what it was.
87. When you gave evidence before the General Committee you said you had men preparing borings on the site of the proposed bridge? Yes.
88. Have those borings been completed? No; detailed borings are being taken right through, so as to ascertain the exact depth at the site of the proposed piers. Previously there were only three bores taken, and on those three bores the depths for the piers were assumed. Before any detailed drawings were got out and before calling for tenders the exact depth would have to be ascertained.
89. Have you now ascertained the exact depth? They are proceeding now.
90. Do you propose to place these cylinders on a rock foundation? Most probably three out of the four will be on rock.
91. Have you had any borings made in the fair way of the stream? Yes; you will see it shown on one of the drawings, it shows a rock bottom.
92. At a depth of 37 feet? It is not 37 feet—it is about 20 feet from the mud.
93. Have you any doubt as to the nature of the bottom? None at all.
94. No bridge could be constructed until you were thoroughly satisfied? No.
95. The Department would not be liable for any expense in the shape of further excavations? None beyond a few feet in sinking the bridge piers. Of course we cannot be certain to a few feet. The rock may not be so solid as the small bore shows it.
96. Now, as to the repairing of the old structure;—do you think it could be repaired in a less expensive manner than has been estimated by the Department? Yes. But it will still be an old bridge. We could repair it with timber piers, but it would be an expensive work, proportionately to putting in a new bridge.
97. Could you not repair the bridge by putting in brick or stone piers? That would be still more expensive.
98. Than iron cylinders? Yes.
99. As a matter of fact it would be an easy matter to repair it, strengthen it, and widen it? Yes; that was the proposal for which an estimate was given of which I spoke in my previous evidence. The proposal

J. A.  
M'Donald,  
Esq.  
11 Mar., 1890.

proposal was to put down iron piers, to put a strong cross girder from one cylinder to the other, to carry the M'Callum trusses on, and then open them out, putting in 20 feet of deck. The piers were supposed to be put in sufficiently strong, so that when the M'Callum trusses required renewal they would carry an iron superstructure and footway.

100. What was the difference between the cost of repairing, and the cost of the proposed new bridge? £12,550 was the estimated cost of the repairs, and £26,538 was the estimated cost of the new bridge. There would be a difference of £14,000.

101. That design provides for a footway on both sides? Yes.

102. And a roadway of 20 feet wide? Yes. If the footways were omitted the cost would be reduced to £23,894.

103. And by omitting the footway and substituting wooden piers for iron piers, the cost would be reduced to £18,178? Yes.

104. Having taken all matters into consideration the Department is of opinion that the bridge now prepared is the most suitable for the purpose? Yes.

105. As to the necessity for this new bridge at all;—have you taken into consideration the fact that it is proposed by the State to extend our railway system to the western country, tapping Forbes? I have not taken that question into consideration. The Department has not gone into that matter. Whatever railway arrangements are made the country must grow, and the necessity for a bridge to connect this side of the river with the other will be permanent.

106. If a railway were taken to Forbes would not a certain proportion of the Lachlan trade be taken to this place? I do not know enough of the country about here to give an opinion.

107. Your Department is strongly impressed, however, with the importance of the district, and is satisfied that the bridge is required? Yes.

108. You have recommended its construction irrespective of existing or prospective railway arrangements? Yes.

109. Do you think the local traffic itself demands an outlay of this kind? It has appeared so from the returns we have had.

110. Has any pressure been brought to bear on your Department? I am not aware of any; it would not come before me.

111. *Mr. Cox.*] If the old timber bridge cost in round figures £9,000, why should this new bridge cost £26,500—the one bridge lasting twenty years and the other only twenty-five years? In the first place, in the new bridge the total width of the roadway and footway combined, will be over double that of the present one—that of itself would almost double the cost. In the second place, the whole chord, right through, and the river piers, will be permanent. The chord of the main spans is supposed to be permanent.

112. If the Department were told that a railway was about to be constructed, and that it would take a great part of the traffic off the bridge, would it not be advisable to reconsider the erection of this expensive bridge, and to see whether one less expensive would not meet the traffic? I do not think that it would lead to any other result. The question has been dealt with in that way previously—that is to say, the Department has considered whether a less expensive bridge would meet requirements. In view of the stock traffic the necessity for a footway has been for a long time apparent.

113. That would cease, however, with the railway to some extent? Then it would become a question of dispensing with the footway only.

114. Your Department has not considered the question of the construction of a railway. You are building a bridge to accommodate all the traffic that now exists? Yes.

115. In the event of the Department being informed that a railway would be made, would it not reconsider the question of the expenditure of this large sum of money? The bridge recommended is to some extent a permanent structure, and therefore the width of the roadway is left large—it will provide for traffic for the next 150 years.

116. The cost per annum to the country will be about £1,735? Yes.

117. Irrespective of maintenance? That includes everything.

118. The bridge is supposed to last only for twenty-five years? The table to which you refer institutes a comparison between permanent, semi-permanent, and temporary structures, instead of comparing them on the prime cost only.

119. It is proposed to build a new bridge on another site? Yes.

120. You are aware of the flood level? Yes.

121. The flood has come up to the floor of the present structure? Above the floor.

122. What provision have you made for that in the new structure? The new structure will be clear of the highest flood known.

123. And to get up to a bridge on the new site you would have a considerable embankment? Yes.

124. Would that interfere with private property in any way? If we keep the embankment close up to some of the properties we should cut them off. If the owners objected to that we could leave a space between the embankment and the present buildings.

125. *Mr. Dowell.*] Do you think the site of the present bridge is the best that can be obtained? No; I do not.

126. You consider that there is a better site where you are making borings at the present time? Certainly.

127. The best that can be selected? Yes.

128. After a careful examination of the banks of the river? Yes.

129. In 1888 you reported on the old bridge? Yes; about then.

130. You reported then that the main spans were sound. Are you of that opinion now? That the M'Callum trusses are sound and serviceable—Yes.

131. When you said that the main spans were sound and serviceable, did you point out that only the main piers carrying those spans were defective? As far as I can remember I reported pretty fully on the question of the piers. If I did not do so in writing I did so verbally to the Commissioner.

132. Having seen the bridge, and having to a certain extent inspected it, are you of opinion that these main spans are sound and serviceable? The M'Callum trusses—yes. There has been two years further wear on the deck.

133. In your opinion, is the old bridge sufficiently wide? No.

134. When do you anticipate that the borings will be completed? In about six weeks.

J. A.  
M'Donald,  
Esq.  
11 Mar., 1890.

135. No. 3 carries out, does it not, the principal dimensions of No. 2 as regards lengths and widths? The full length of the bridge is almost exactly the same in each design.
136. And the width? And the width also.
137. In your opinion, is No. 3 design sufficient to carry all the traffic which exists at the present time? For the road traffic—yes. There is the same width of decking and everything as in the other two designs, but for the flood-waters it is risky.
138. You propose in both your designs to have iron cylinders? Yes. But I have given in the appendix an estimate of the cost if timber piers are adopted.
139. What would be the cheapest price for which No. 3 could be constructed? The cheapest with timber, and without footways, would be £16,000.
140. In your opinion, would that carry all the existing traffic with perfect safety? It would carry the traffic with perfect safety, providing it receives no damage from a heavy flood. At the end of its life there would be almost a complete stoppage of traffic for renewal.
141. Have you not, in your design No. 3, materially improved structures for the piers? Yes; they are very different.
142. Do you not consider them sufficiently sound and substantial to stand any amount of flood-waters? Not in the main river, if a lot of timber were to come down.
143. Then you claim considerable advantage for the iron cylinders? No, the longer spans.
144. What is the width of the principal span of the existing bridge? 130 feet.
145. What is the width of the principal span in No. 3 design? 90 feet.
146. And your composite span? 160 feet.
147. Both piers, then, would be out of the present river course? No; in No. 3 design the iron pier on the right hand side is almost in the fairway of the river.
148. But both piers would be placed well on the river bank? Yes.
149. And that is some considerable advantage? Considerable.
150. Are you aware that there is much timber coming down the river? I cannot speak from personal knowledge, but I understand from Mr. Bartlett that a considerable amount comes down in a flood.
151. I understood you to say to Mr. Lee just now, that you were not in favour of the construction of brick or stone piers in substitution for iron cylinders? No, on the score of cost.
152. Under other circumstances, would you approve of that? We do put them in in some places where we find that it can be done economically.
153. Would it be possible to construct a bridge over this river entirely of brick and masonry, doing away with timber altogether? It would not be impossible.
154. Would there be a great deal of difference in the cost? A great deal; I have made no estimate.
155. Yet you are prepared to say that there would be a large difference in cost? I am.
156. If a brick or stone structure were erected, would not the cost of maintenance be much less than the cost in the case of an iron or timber bridge? It would be much less than in the case of a timber bridge, but not very different from that of an iron bridge. An iron bridge requires very little maintenance, and the increased life sometimes assumed for stone, means a very small item in reducing the value of the sinking fund.
157. Is not your timber decking in the iron and composite bridges a considerable charge on renewals? I was speaking of an iron bridge, then I was referring to the bridge in the list in the appendix at about £70,000—that has an iron deck and a tarred metal roadway.
158. But is not the renewal of timber-decking a heavy item? Yes.
159. You estimate an iron bridge to cost £70,000? Yes.
160. Do you not think that a bridge could be constructed of masonry or brick-work for about that amount, or something less? At this site—no.
161. Knowing what you do about this place and the particular site at which you propose to erect the bridge, do you not think that all interests would be served by the erection of your No. 3 design, more especially as it has been pointed out to you that there is a probability of a railway being constructed from Cowra to Forbes, which would materially relieve traffic on the bridge? The question of traffic is provided for in both bridges. I think that one ought to look forward a little beyond the present day. Take No. 3 design—in twenty-five years, when it has to be renewed, it would be an enormous inconvenience to Cowra to have to stop the traffic completely for twelve months.
162. Do you propose to stop the traffic in the construction of the new bridge? It will be on a different site.
163. Have you not known instances where timber structures if erected properly of good sound timber, and under good supervision have lasted longer than twenty-five years? They do in some cases, but the average is about twenty-five years.
164. Under all the circumstances you do not recommend the construction of No. 3 design? Most strongly—no.
165. You do not recommend the construction of a brick or masonry bridge? No.
166. The only objection you have to that is on the score of cost? That is all.
167. Setting aside your No. 1, 2, and 3 designs, and the masonry and brick bridge, would it not be desirable and possible to erect a suspension bridge which would answer all purposes? It is not a suitable site for a suspension bridge. The foundation on the west side would make the fixing of the cables very expensive.
168. Have you made any estimate of the cost of suspension bridges? I have not. I do not think them suitable for heavy traffic. They are being done away with in other parts of the world for that very reason.
169. Do you know of any suspension bridges over the Thames? I know them all.
170. Does not very heavy traffic pass over some of those bridges? Yes, and they have had to strengthen them up on account of the heavy traffic within the last few years.
171. Is it not a fact that other suspension bridges are being erected in England at the present time, and was not one recently erected at Battersea? The Battersea bridge has been erected for many years.
172. But was not a bridge recently erected there? Not that I know of.
173. Do you still hold the opinion that suspension bridges will not carry heavy traffic? They can be made to do so at great cost.

174. Would they not be more desirable structures to erect over rivers liable to floods than bridges with a large number of piers? In some special sites they are suitable.
175. On a site like this for instance? I do not think so.
176. You prefer in your designs a large number of piers to a very few? As a matter of cost, yes. The longer the spans at this site the greater the cost would be.
177. Could you furnish the Committee with an estimate of the cost of a suspension bridge suitable for the traffic here? It would take some little time to prepare it, but I could do so if you wish.
178. *Chairman.*] You consider the present bridge as it stands as highly dangerous? I do.
179. And that it is liable at any moment to collapse? Yes.
180. Did I understand you to say that in the case of a composite bridge the cost, on account of interest on capital invested and maintenance, would amount to £1,735 a year? Yes.
181. And that the life of the timber portion of the bridge would be twenty-five years? Yes.
182. That would amount in twenty-five years to £43,375? Yes.
183. Added to the original cost, £26,500, it would make the actual cost of the bridge at the end of twenty-five years £69,875? No. The total cost would be £43,375. There is a sinking fund. In comparing the lives of these bridges the sinking fund provides for the cost being paid off by the end of its life—that is what I have shown in the appendix.

J. A.  
McDonald,  
Esq.  
11 Mar., 1890.

Arthur Samuel Hamand, Esq., sworn and examined:—

184. *Mr. Cox.*] You are a civil engineer? Yes.
185. You have heard the evidence just given as to this bridge? I have.
186. Do you endorse the statements made as to the present structure being unsafe? I should decline to be responsible for the safety of the existing bridge.
187. Do you think that the bridge in its original state was a properly-constructed bridge for the purpose? I do not think that it was designed by an engineer at all. I think the main truss, called the McCallum truss, is a *fac simile* copy of a single track railway bridge very much used in the United States, and called there the Pratt truss. For the rest of the bridge I do not think a good carpenter would own it—certainly not an engineer.
188. Do you think the timber used can have been good and sound timber originally? I am told that the chief trusses, the 150 feet spans, are constructed out of timber carefully selected and stored for two years in order that it might be matured. The rest of the bridge is constructed out of sap timber cut down hurriedly.
189. Some of the piles you observe on the other side could hardly have been sound timber when erected, or they would not have been in such a rotten state in twenty-five years? I think not.
190. The fact that some of the piles are still sound would seem to show that other piles must have been of inferior timber? In choosing timber it is difficult to determine what will last and what will not without knowing something of the growth of the timber itself. Anyone coming into the district without knowing anything of the growth of the timber there would very likely make a mistake.
191. In building a bridge for the future requirements of Cowra, considering that sooner or later a railway will be constructed, so relieving the present heavy traffic on the bridge, to what extent do you think the country would be justified in spending so much money—in other words what is the cheapest bridge that could be built in order to meet the present requirements? I think the district is entitled to a bridge that will carry two lines of traffic—one in either direction. I think it ought to have, also, one footway, at least, that is if it is constructed on girders as a timber bridge.
192. What would be the material employed in such a bridge? I should endeavour to build a bridge of masonry, brick, or concrete, or perhaps the three combined.
193. And a bridge such as you describe would meet the requirements of traffic, and could be erected for how much? That is a very large question. I would point out first that the three designs at your back are designs which contain very different spans. The relative cost of bridges is determined more by their respective length of spans than by any other consideration. It is almost impossible to compare these three bridges because the spans are so different. There is one with a 90 feet span, another with a 160 feet span, and then there is an iron bridge with a span 216 feet and no small spans. The cost of a span varies nearly as its square, that is a 200 feet span, so far as the main girders are concerned, will cost nearly four times as much as a 100 feet span. I am a little surprised at a 90 feet span bridge being put before you at all. They are evidently not big enough, having regard to the floods.
194. Especially having regard to the fact that one flood came over the decking of the bridge? I understood that one flood came up 4 feet over the bottom of the bridge. I doubt whether we will have so tremendous a flood again.
195. Could you, off-hand, say what a bridge of the three materials you have just mentioned would be likely to cost, knowing the spans required? I could not say without preparing plans, and making an estimate in the usual way. Upon general principles, everything else being the same, you ought to be able to build a bridge of masonry, brick, or concrete, or the three together, for at least as little as an iron bridge, and probably less.
196. What advantage would it be to build a bridge of brick, masonry, or concrete if it cost the same as an iron bridge; would its life be longer? Its life is practically for ever, and it does not cost 6d. for repairs.
197. In the case of either of the bridges now under consideration the annual cost of depreciation amounts to a large sum? Yes.
198. Of course the bridge will cost the country nothing to maintain, but if a wooden bridge after twenty-five years costs £43,000 we should be quite justified in building a stone bridge at a cost somewhat over that amount, provided the sum were reasonable? Yes. In building a stone bridge you do not put quite so much weight in your foundations as you do with iron cylinders. The consequence is that it might not be absolutely necessary to go down to the solid ground. By spreading the base over a large area, and distributing the weight upon each square foot of the base, it is not always necessary to go down to the rock. I have no doubt you all know that not a single bridge in London is built on rock—they are built on clay.
199. I suppose there is no rock? No.

A. S. Hamand,  
Esq.  
11 Mar., 1890.

- A. S. Hamand,  
Esq.  
11 Mar., 1890.
200. I do not know whether you will be asked to prepare any estimate of the bridge, but we should be guided a good deal by what you say, having regard particularly to the information you have now obtained as to the probability of a large traffic being removed from this bridge, and our requiring a bridge to meet common local requirements? I think Cowra is destined to grow, and to grow very rapidly, to become an important centre, and if you do get a line of railway from Forbes I think it will only tend to increase the rapidity of the town's growth.
201. Is not that the reverse of what has happened in many country towns when the railway has gone beyond them? Yes, it is so in some cases.
202. But you think that in a district with material wealth in its immediate surroundings that is not likely to be the case? No.
203. *Mr. Dowel.*] Have you made any examination of the stone in this locality? I have not finished my investigation upon those points, and I would rather not be asked any questions upon them because I could not give complete information.
204. Have you made any observations as regards the quality of bricks? I have looked at some of them.
205. Can they be made at Cowra suitable for the construction of a bridge? I think so.
206. Have you any experience of the construction of iron bridges? It extends over thirty years.
207. In forming a specification is it absolutely necessary to take channel iron bracings at  $5\frac{1}{2}$  inches by  $2\frac{3}{4}$  inches by 5-16ths? I have no doubt it is when specified.
208. Would not a piece of iron 5 inches by 2 inches answer all the purposes required—would it not be a more marketable size than that specified;—is not the size specified one which would have to be specially rolled for this particular purpose? I think  $5\frac{1}{2}$  inches is a little extraordinary in size. I do not think it will be kept in stock by most manufacturers. I think the size would be 6 inches. Certain manufacturers might always keep it in stock, but I do not think it would be generally kept in stock. They might have it in their lists, but it would not be kept in stock, I think.
209. Then I will take wrought-iron rolled girders 27 inches by  $7\frac{1}{2}$  inches—is the  $\frac{1}{2}$  put in for any special reason? I can only imagine that it is put in to secure the next inch below it being a full inch.
210. Is it the custom, so far as your experience goes, to specify these peculiar sizes of iron in the construction of iron bridges? We generally put in the size that happens to be in the trade list. I have had manufacturers come to me and say, "I have none of that particular iron in stock, will you alter the dimensions?" I have altered the dimensions accordingly.
211. I am referring more particularly to the  $1\frac{1}{4}$ th and 5-16ths? When it comes to thickness it is a different matter, of course.
212. But taking the iron-work to which I have referred is the  $\frac{1}{4}$ th and 5-16ths necessary? That depends upon the particular section.
213. Would not a specification of certain sizes other than these peculiar ones have a tendency to cheapen the cost of the bridge? I think I ought to explain that there are certain manufacturers who occasionally do supply an extra 1-16th or an extra  $\frac{1}{4}$ th. They tell you that they are prepared to do so. Sometimes the rolls are a little bit worn and they turn them down to get the requisite dimensions. For ordinary purposes it is best to keep to more simple figures.
214. In preparing designs is it a very difficult thing to make calculations and proper strain sheets for certain spans? I should think an ordinary draughtsman ought to do it very quickly.
215. Take the No. 1 design for instance? Well, I should not like him to be much more than a week about it.
216. Then if the chief of the Department said it took two months, you would consider that a considerable time? That would refer to every detail, not to the main girders alone.
217. Would it not be an economy if the Department were to adopt a certain type of bridge and to have tables prepared—is it not practicable? I think in many cases it would be practicable. For instance, I do not know that a 216 feet span is necessary, I suppose it might as well be 200.
218. Suppose you started with a 500 feet span and came down to a 30 feet span, could not a table be prepared showing at a glance the calculations and strains for the various spans? If the weight you were going to carry per superficial foot were identical in all cases, and the width of the bridge would be identical it might be useful.
219. Do you recommend the adoption of any type? If I were designing bridges, and had one with 100 feet span to design I would endeavour to make any designs that followed, whether a 90 feet or 110 feet agree—that is I would endeavour to alter the spans to 100 feet—that would save me the trouble of getting out the design for a 90 feet or a 110 feet span.
220. Do you know that it is the practice to call for tenders for iron bridges in England? I do.
221. Are you aware that in nearly all cases tenders are accepted in England for the iron-work? I suppose it would be so in all cases.
222. Would the cost be cheapened if some modification were made in the specifications in regard to the sizes of iron I have been asking you about—would the matter be simplified? If you were to show me a whole girder bristling with these odd dimensions, I have no doubt an alteration could then be made which would reduce the cost.
223. Supposing I were to show you a whole bridge, would not that be more to the purpose? I think if you could I should tell you that it ought to be altered.
224. I take it that you have examined the plans now under consideration by the Committee? I have seen them on the walls to-day for the first time.
225. You are not prepared to give the Committee an opinion as to their suitability? Not having had any opportunity to examine the designs I am unable to give you an opinion.
226. What is the nature of the information you desire now to give to the Committee? I was requested by the General Committee to prepare the design of a bridge of brick, stone, or masonry—that I am about to do. Knowing that the Sectional Committee were sitting here, I thought that they might like to put some questions to me.
227. You have no special information you wish to give us? None at present.
228. Now as to the construction of suspension bridges—are you aware that they are considerably used in other parts of the world? Yes. They are much used on the Continent and still more in America.
229. Do they carry heavy traffic? They carry railway trains. It is simply a question of stiffening the girders.

230. If it were not a matter of such excessive cost might it not be desirable to span the Lachlan with this description of bridge, in view of the timber coming down in flood-time? If I could build a suspension-bridge for the sum of money some of the designs are to cost I should prefer the suspension-bridge, because it affords more freeway for the water.

A. S.  
Hamand, Esq.  
11 Mar., 1890.

231. Do you see any particular difficulty in the way of the construction of a suspension bridge, having regard to the banks of the river? No difficulty whatever.

232. Have you made any comparative estimate of the cost of a suspension-bridge and a brick bridge? I have not done that yet. I had already considered the question of a suspension-bridge before you mentioned it. I know of so many places where they are usefully employed that I thought it just possible one might come in here.

233. As an engineer, do you not think that the construction of light suspension-bridges across our rivers generally would be a material gain? Wherever the banks are deep, or wherever the depth of rock for a foundation for the cylinders is great, wherever the length of pier is tremendous, a suspension-bridge would come in cheaply.

234. You have seen the banks of this river—do you think there should be any great difficulty in putting down foundations of timber pile-driving for the purpose of carrying stone piers or iron cylinders? Pile-driving and timber work are more suitable for places where the foundations are swampy, or where perhaps the clay is soft, or where there is a quicksand or something of the kind—then you may rely on the friction of the piles partly to sustain your base. There is no difficulty in making a foundation in a place like this.

235. Can you give the Committee any instance where stone piers are erected on iron cylinders? I suppose the Hawkesbury bridge is erected on those foundations. There are numerous instances. The Royal Albert bridge, at Saltash, was put down on similar foundations.

236. So that if local stone is to be obtained here it will not be undesirable or impossible to construct stone piers on foundations of iron cylinders? No; it will not be impossible at all.

237. There would be no engineering difficulties? No. It is a question of relative cost.

238. I take your evidence to show that it is necessary that a new bridge should be constructed at Cowra? I think so.

239. And that the construction of that bridge should be carried out in brick, stone, or cement, or concrete? I should say this, that I am influenced to some extent in my judgment from the fact that the existing bridge stands at a considerable angle with the flow of the water, and that the pier on the Cowra side of the river is almost immediately in the centre of the current. It is a kind of trap to catch anything that might come floating down the river. On that ground it is dangerous. That, and the width of the bridge, made me come to the conclusion that you ought not to try and patch up that bridge, and that the new one ought not to be erected on that site.

240. Do you think that the site selected by the Government is a desirable one for the new bridge? I think it is better than the old one; but I should still bring the bridge further south—almost in a direct line to the angle of the two streets—let us say, the angle opposite Murray's store. I should like to bring the centre line of the bridge exactly at right angles with the flow of the stream, down the piece of straight there is in the river. The river, at that point, is fringed by rows of trees, and those trees would have the effect of training anything that came down the river, into a straight line projected from them.

241. What is the custom adopted in other countries for testing the iron and steel used in bridges—is the cost of a test paid by the contractors, by the parties employing them, or how is it paid? Generally by the contractor. He is bound to provide just as many tests as the engineer thinks necessary.

242. You think it is desirable that the custom should prevail of allowing the testing of the iron and steel to be made by parties in the employ of the contractor? Not by parties in the employ of the contractor—certainly not. The usual course is this: Assuming that you wish a particular piece of iron tested, you say to the contractor, "test this specimen for me—put on such and such a strain." The contractor provides the assistance, the labour, the iron and all the surroundings for you to see it done. That does not make you in the employment of the contractor.

243. That would be quite as far as you would go? It is; and I think it is as far as anybody would go.

244. *Mr. Lee.*] Is not the object of your mission here at the present time, to collect information to enable you to prepare plans, and submit specifications with an estimate of the cost of a bridge of either brick, masonry, or concrete? Yes.

245. And up to the present time you have not completely supplied yourself with that information? No.

246. When you have finished and prepared your estimates and plans, they will be submitted to the General Committee? That is so.

247. Will you require any soundings or borings to be made in the river? I think not. I think I know sufficient from what I have seen.

248. *Chairman.*] Have you ever seen any of these brick or masonry structures—that is, arched bridges—in a country where floods are so strong as they are in this country? I think the river Po, in Italy, rises as much as this river—in fact rather more. It drains 500 miles frontage of the Alps; it has a fall of only 2 inches a mile for the last 100 miles of its length. Nearly all the bridges there are of brick or stone.

249. Arched bridges? Yes.

250. What would be the result if a flood came up above the arch of one of these bridges—would it affect the structure? I do not think so, if it were properly built. It might obstruct the water a little; but there would not be the slightest fear of its being carried away.

251. There is a great deal more resistance in a brick and stone bridge than in an iron or wooden bridge? Not only that, but there is a greater dead weight to move.

Mr. Robert Daly, innkeeper, sworn and examined:—

252. *Chairman.*] What are you? I am an innkeeper at this end of the present bridge.

253. How long have you been there? Over thirty years.

Mr. R. Daly.  
11 Mar., 1890.

254. I suppose the evidence you wish to give would be in favour of the bridge remaining where it now is? I have an objection to any change, of course, in the site of the bridge, on account partly of its effect upon my trade.

255. Do you think that the site of the present bridge facing, as it does, a narrow street, and being out of the line of the main traffic, is as good as the proposed site at the end of Kendal-street? Of course it is not, at the present juncture, but there are some buildings which could be pulled down. I remember that

- Mr. R. Daly. in 1862 and 1863, when I was one of the chief agitators for a bridge over the Lachlan, the floods were far more usual than they are now. A gentleman came up from Sydney and made an estimate for a bridge somewhere near where it is proposed to erect one now. He made an estimate of £26,000. Some diggings were breaking out at the time, and we had to shift everything by boat. We had three boats carrying goods across the river. The next man who came up made the estimate £16,000 or £20,000, taking the bridge two chains lower down the river. The next man who came up was Mr. Meldrum. He pointed out that where the bridge is now it was two chains narrower to span over the river than at the other points. He brought the estimate down to £10,000 or £12,000, and the first contract was £9,000.
- 11 Mar., 1890. 256. We want to know why you object to the bridge being shifted? I object to it because it will be the ruin of me; it will drive all trade away from my place. Then I want to show that by putting the bridge where it is now on this side of the river there will be an advantage so far as the putting in of piles is concerned. I remember that when the piles were put in before they dug a trench, and when the flood came down two months afterwards it washed all the material out. The bridge, however, remained firm, and the trench was filled up with concrete. The alteration of the site of the bridge would injure several others besides myself.
257. You consider that if this bridge is shifted to the end of Kendal-street it will materially affect your business? Of course.
258. Are there any other business people in that street who will be affected by the alteration? Yes, several.
259. And you wish to enter your protest against the site being shifted? Yes, and if they wish to pull down any building of mine, I shall be quite willing to accept any value which may be placed upon it by arbitration.

Mr. Henry Dennis, innkeeper, sworn and examined:—

- Mr. H. Dennis. 260. *Mr. Cox.*] You are an hotelkeeper at Cowra? Yes.
- 11 Mar., 1890. 261. You have heard the evidence just given as to the new bridge to be erected over the river? Yes.
262. You have heard that it is proposed to start from Kendal-street, instead of from where the old bridge stands in Bridge-street? Yes.
263. Do you approve of the site of the new bridge? No, I do not.
264. What objection have you to it? Well, in the first place, as Mr. Daly has already stated, it will generally reduce the value of my property; in the second place, the expense of the bridge would be increased because the spans would be longer and the approaches greater. I see that an official states that there are two curves in Bridge-street, but neither of them are greater than the one curve in Kendal-street.
265. In the event of the old site being chosen for the erection of a new bridge you would have no bridge for twelve months? I have been fourteen years a resident of Cowra, and it is not often that the floodwaters of the Lachlan have stopped all traffic. They might stop it for team traffic, but not for ordinary traffic.
266. How often in the course of the year is a bridge necessary over the river? For heavy traffic it is always necessary.
267. How did you get on before a bridge was built? I cannot say, I was not a resident here then.
268. In the event of a railway being taken to Forbes from here would not all the heavy traffic be stopped? In the event of that line being made it would, of course, take all the heavy wool traffic off any bridge in existence.
269. Then do you think there is any occasion for a bridge at all? I understand that in view of the state of the present bridge it is necessary that a new bridge should be made, or that the old one should be repaired, so as to render the traffic safe. Some bridge is necessary in any case.
270. You think your property would depreciate in value if the site of the bridge were removed? I do not think it would be any great benefit to the travelling public to have the bridge shifted from its present site. Of course, if it were shifted, the value of my property would be depreciated.
271. You would prefer to have the other bridge repaired then? Yes, according to the evidence of the engineers, if cylinders were put under it, and it were widened, there would be a saving to the State of some £15,000, and the bridge would meet all requirements for many a day. I believe it has been stated that there would be a saving of from £18,000 to £20,000 if the old structure were repaired, and having regard to the necessity for retrenchment in our public works expenditure, I think that is a great consideration.
272. Have you anything further to state? Well, it is a well-known fact that if the bridge were taken from Kendal-street across the approach would be up to the roof of Murray's frontage.
273. Would not that embankment tend to save the property from being flooded in time of flood? Yes. But when the embankment is made, the property will be as it were inside a wall. If we get a railway from here to Forbes I unhesitatingly state that all the local traffic could be carried over the repaired bridge. The heaviest local teams that will come over it will not be from more than 3 or 4 tons. The 9 or 10 ton wool teams will cease, because the wool will come by rail.
274. *Mr. Dowel.*] Do you anticipate any increase of traffic from the southern side? Yes.
275. And do you think the present structure will accommodate the increased traffic? Not in its present state.
276. Is the present bridge wide enough? No.
277. Have you known accidents or loss of stock to occur on that bridge? Yes, from the narrowness of it. You have to be careful to allow two buggies to pass one another, and it is not safe to drive alongside a team when it is coming over, indeed it is positively dangerous. The loss of the stock on the bridge has been very little, but it is unquestionably too narrow.

Mr. Dennis Cornelius Joseph Donnelly, storekeeper, sworn and examined:—

- Mr. D. C. J. 278. *Mr. Dowel.*] You are a resident of Cowra, engaged in business as a storekeeper? Yes.
- Donnelly. 279. You have resided here for some time? Yes; I remember the river before the bridge was built over it.
- 11 Mar., 1890. 280. You know the position of the present bridge, and the proposed site of the new one? Yes.

281. In your opinion which is the more desirable position for a bridge? The new site would be of more service to the public generally. There are some vested interests in Bridge-street. I should not care to interfere with those interests, but common-sense would suggest that a straighter course than the present would be better. I shall be quite willing to take the bridge round by Bridge-street if it could be done profitably to the country.

Mr. D. C. J.  
Donnelly.

11 Mar., 1890.

282. In the interests of the general community, which proposal do you favour—that to construct a bridge on the new site or that to repair the bridge on the existing site? The new site would be shorter for the travelling public, although for my part, I do not object to going round the other way.

283. In your opinion is the present structure a suitable one for the requirements of the district? It is not; I have no hesitation in saying it is not. It is in no way fit for the present traffic.

284. Do you anticipate any increase of settlement and traffic on the south side of the river as time goes on? Yes. I think that in building a bridge we should remember that we are building for the future. When I came here twelve years ago there was not one-sixth of the population that is here to-day. If we continue to increase at the same rate this place will be six times as big as it is now in twelve years time. I have heard it stated to-day that in the event of a railway being taken from here to Forbes a great amount of the heavy traffic would be taken off this bridge. Now I say that that is not the case, and it never will be the case. Of course it will take some, but the bridge is a means of communication cementing Cowra with Burrowa on the extreme left. Then there is Marengo, Koorawatha, and the whole of the country between here and Grenfell. Not only that, but there is a large tract in the Bland country. At the present time there is traffic going in that direction. Then there is all the trade between here and Goolagong 30 miles down the river—that the railway will not touch at all. All that traffic must come in here across the bridge unless we have a railway from every point of the compass, and that is not at all probable. The railway must to some extent relieve the traffic on the bridge, but the relief so given will in a short time be more than compensated for by the produce of the increased acreage under crop. A great deal of land on the other side is under cultivation. There is the whole of Morongolo under cultivation; then there is Back Creek, and the slopes of Broula Range, and Neila Creek and its tributaries. There is no other way for all these people to come here with their produce except by the bridge. I am quite sure in my own mind that the traffic cut off by the railway will be superseded by the new traffic caused by the very railway itself.

285. *Mr. Lee.*] From the tenor of your evidence, I gather that, you are perfectly satisfied that the traffic is of such a nature that a serviceable bridge is demanded? Yes.

286. Do you consider the present structure sufficient for the purpose? I do not.

287. What is your opinion as regards the repair of the present structure, and the erection of a new one? I think the erection of a new one would be the better course. I think the repair of the present structure and the keeping of it in repair afterwards would be as expensive as a new bridge. Then the narrowness of the existing bridge is dangerous to life and limb. Two months ago a daughter of mine almost lost her life on the bridge. I have had to rush in front of horses to save my own children on the bridge. Even when people drive carefully, with skittish horses it is dangerous to be on the bridge. When you meet cattle on the bridge there is invariably danger and confusion.

288. You think that the new bridge should be on the new site? Precisely.

289. As a townsman of long residence do you know of any valid reasons against the new site selected? I know of nothing but the vested interests in Bridge-street.

290. But apart from those? I am not aware of anything.

291. You have heard previous witnesses refer to the approach on this side, I suppose you are aware that it will commence flush with Kendal-street, and graduate up to the floor of the bridge? Yes; I think the wall of which I have heard the witnesses speak would be more a protection than otherwise.

292. If the present bridge is as much used as you say it is for heavy teams and for sheep and cattle, must it not be extremely inconvenient at times to bring the traffic through that narrow street round into Lachlan-street? I have experienced some little inconvenience myself in coming round that corner.

293. I was speaking more particularly of lots of sheep and cattle and long teams having to come along that narrow street? I should imagine it would be rather inconvenient.

294. Would it not be a greater convenience to all parties concerned to have a better get-away in Kendal-street. Would not that be better than the traffic crossing the bridge, coming upon the ordinary traffic suddenly? Common sense suggests one answer, and it is—yes. At the same time if it were possible to so arrange matters that the bridge could be erected without doing injury to the property to which I have referred, I should like to see it done.

295. But how is it possible to have the new structure in Bridge-street, and at the same time to give a proper approach to it? I can see the difficulty very well. I have often been on the present structure in flood time helping to get logs away from the bridge with grappling irons, but if the river were in flood again, as I have seen it in the past, I should think twice before I went upon the bridge to do what I did there before. I think there would be some difficulty in getting volunteers to go upon that bridge to clear logs after the investigations which have been made within the past few days.

[Ten plans].



1890.

NEW SOUTH WALES.

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PARLIAMENTARY STANDING COMMITTEE ON  
PUBLIC WORKS.

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REPORT

TOGETHER WITH

MINUTES OF EVIDENCE, APPENDICES, AND PLAN,

RELATING TO THE

PROPOSED BRIDGE OVER TARBAN CREEK,  
PARRAMATTA RIVER.

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Presented to Parliament in accordance with the provisions of the Public Works Act,  
51 Vic. No. 37, section 8.

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SYDNEY CHARLES POTTER, GOVERNMENT PRINTER.

1890.

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Page 1

Page 2

Page 3

Page 4

## MEMBERS OF THE COMMITTEE.

## LEGISLATIVE COUNCIL.

The Honorable JOHN LAGKEY, Vice-Chairman.  
 The Honorable ANDREW GARRAN.  
 The Honorable FREDERICK THOMAS HUMPHERY.  
 The Honorable WILLIAM JOSEPH TRICKETT.  
 The Honorable GEORGE HENRY COX.

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 JACOB GARRARD, Esquire.  
 HENRY COPELAND, Esquire.  
 JAMES EBENEZER TONKIN, Esquire.  
 WILLIAM SPRINGTHORPE DOWEL, Esquire.  
 EDWARD WILLIAM O'SULLIVAN, Esquire.  
 JOHN HURLEY, Esquire.  
 CHARLES ALFRED LEE, Esquire.

## GENERAL INDEX.

Report by the Committee.  
 Minutes of Evidence taken by the Committee.  
 Appendix.  
 Plan.

## LIST OF WITNESSES.

	PAGE.
Joseph Barling, Esq., Under Secretary for Public Works .....	1-2
Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges .....	2-4
John Alexander M'Donald, Esq., M.I.C.E. and M.I.M.E., Engineer for Bridges .....	4
Colonel Frederick Wells, Engineer for Roads .....	4-5
John William Deering, Esq., Metropolitan and Coast District Surveyor .....	5-6
Charles Edward Jeanneret, Esq., Mayor of Hunter's Hill .....	6-13
Frank Farnoll, Esq., M.P. ....	13-14
Angelo Tornaghi, Esq. ....	14-15
George Pile, Esq., Auctioneer.....	16-17
Mr. Robert Henry De Low, Officer-in-charge of the Miscellaneous and Alienation Branches in the Lands Department.....	17-19
Mr. Francis Kirkpatrick, Chief Inspector of Public Accounts and Consulting Accountant .....	19-21

## APPENDIX.

<i>Précis</i> of Papers relating to the proposed Bridge over Tarban Crock, Parramatta River .....	A
Extract from Minute Paper by the Commissioner and Engineer-in-Chief for Roads and Bridges to the Under Secretary for Public Works .....	B
Letter from the Under Secretary for Public Works proposing the withdrawal of the Bridge from Inquiry .....	C
To Evidence of Mr. R. H. De Low.—Statement showing the number of lots and area sold, and the amount realized on account of Sales of Crown Lands, in the years specified, upon the Field of Mars at Hunter's Hill..	D
To Evidence of F. Kirkpatrick, Esq.—Statement showing the amounts realized by Sale of Land under "Field of Mars Resumption Act of 1874," 38 Vic., No. III. ....	E
To Evidence of F. Kirkpatrick, Esq.—Statement showing the amount voted, expended, and the balance unexpended, on account of the bridges over the Parramatta River and Iron Cove Creek, exclusive of the railway bridge ...	E 1
Copy of the Act to authorise the Resumption and Sale of the Field of Mars Common. [Assented to 25th June, 1874.] .....	F

## PLAN.

Plan of Bridge Sites at Parramatta River, Lane Cove River, and Tarban Creek.



PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

BRIDGE OVER TARBAN CREEK, PARRAMATTA RIVER.

REPORT.

THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS, appointed during the first Session of the present Parliament, under the Public Works Act of 1888, 51 Vic. No. 37, and the Public Works Act Amendment Act of 1889, 52 Vic., No. 26, to whom was referred the duty of considering and reporting upon the "expediency of erecting a bridge over Tarban Creek, Parramatta River," have, after due inquiry, resolved that it is not expedient the bridge should be erected; and, in accordance with the provision of sub-section IV, of clause 13, of the Public Works Act, report their resolution to the Legislative Assembly:—

1. No plan of this proposed bridge has been submitted to the Committee, and no definite description of the bridge has been put before them. A few words of description will, however, be found in a *précis* of the proceedings relating to the proposal for the bridge; and from these it will be seen that the intention has been that the bridge should "either be an arch, in steel, of 370 feet span, with steel approaches, or iron lattice bridge, 600 feet long, on iron piers," and that "until borings are taken, the most economical of the two designs cannot be ascertained." It is also stated by the Engineer for Bridges, in his evidence, that it was proposed to use iron piers and a composite structure at one site, and a timber bridge higher up the creek. The object in erecting the bridge is explained in an extract from a minute written by the present Minister for Works last year, to be to complete the line of communication by the shortest route between the Parramatta Iron Bridge and the Bridge over Lane Cove, giving access to the North Shore, and saving a distance of one mile and a half.

Description of the proposed bridge.

2. The cost of the bridge, as put before the Committee, would be £26,000; but the accuracy of this estimate is very doubtful. The estimate, the Engineer for Bridges states, is not guaranteed in any way; "it is simply an idea of the probable cost."

Cost of the proposed bridge.

3. Immediately the inquiry respecting this bridge was opened, the Committee were met by a desire, expressed by the Under-Secretary for Public Works, on behalf of the Minister for Public Works, that the proposal should be withdrawn, on the ground that a bridge could be constructed for a sum under £20,000; and that, therefore, it was not necessary, under the Public Works Act, for the proposal to construct the bridge to be inquired into by the Committee. It was considered, however, that, as the matter had been referred to the Committee by the Legislative Assembly for inquiry and report, the inquiry must proceed, and the request that the proposal for the bridge be withdrawn could not therefore be acceded to.

Proposal to withdraw the bridge.

4. The Committee then examined Mr. Robert Hickson, Commissioner and Engineer-in-Chief for Roads and Bridges, and he gave evidence to the effect that the bridge ought not to be constructed, as, in his opinion, it was not required. "Soon after I took charge of the Department," he says, "my attention was called to a sum of money being placed on the Estimates for this bridge, and I therefore visited

Evidence of officers of Roads and Bridges Department against the bridge.

visited the site. After a very careful examination of the place, I came to the conclusion that the Government would not be warranted in spending any money there at all, and I reported to the Minister accordingly." Evidence from the Engineer for Bridges and from the Engineer for Roads is also to the effect that the bridge is not required. This opinion on the part of the responsible officers of the Department of Roads and Bridges, it will be observed, is a contradiction, first to the information which led the Minister for Works to cause the Legislative Assembly to refer the bridge to the Committee for inquiry; and secondly, to the idea on the part of the Minister, as expressed in his desire to withdraw the proposal, that a bridge should be erected at a cost less than £20,000. The peculiar position in which, by the evidence of the officers of the Department of Roads and Bridges, the Minister was placed, was subsequently explained in a letter to the Committee from the Under Secretary for Public Works, in which it was pointed out that the evidence upon which the Minister determined to submit the proposal to Parliament was that of the late Commissioner for Roads, who was then the official adviser of the Government on such matters. "As, however," the letter proceeded, "the Minister finds that the present Commissioner holds opinions differing from those of his predecessor, he is desirous of reviewing the matter, not only from the standpoint of cost, but also from the more radical one of necessity," and on this further ground it was requested that the proposal be negatived.

Visit of the  
Committee to  
the site of the  
bridge.

5. The Committee, in view of the nature of the information before them, decided to visit the site of the proposed bridge and make themselves personally acquainted with the locality; and on Wednesday, 5 March, the visit was made. Accompanied by the Commissioner and Engineer-in-Chief for Roads and Bridges, they proceeded by vehicle to Tarban Creek, and inspected the site for the bridge and the surrounding locality, inquiring, at the same time, respecting the facilities for travelling afforded by the roads in the district.

Evidence in  
favour of the  
bridge.

6. The only witnesses who have come before the Committee to give evidence in favour of the proposed bridge are three:—Mr. C. E. Jeanneret, Mayor, and Mr. A. Tornaghi, resident, of Hunter's Hill; and Mr. Frank Farnell, M.P., one of the Members for the District. Mr. Jeanneret considers the bridge would be of very great benefit to the municipality of Hunter's Hill, and to the municipalities on the North Shore, a saving of distance in getting to Hunter's Hill being effected to the extent of a mile and a quarter, and that it would also benefit adjacent Government lands; but the evidence which he gives in support of his advocacy of the bridge is very weak. He admits that the bridge is not required as a means for enabling the residents of Hunter's Hill to get to Sydney by road; that it would not be used by them in preference to the steamers if it were constructed; and that they have not agitated for it in any way; but he considers it would be of service to persons "who like to drive about and see the country," or who may convey goods of one kind or another by vehicle to Hunter's Hill, and he thinks it should be erected if only because Hunter's Hill has not hitherto had the advantage of Government expenditure. Another reason put forward by him in favour of the construction of the bridge is, that the district has a distinct claim upon the Government in connection with the proceeds of the sale of the Field of Mars Common, that common having been given up to the Government, he contends, on condition that the proceeds were to be kept as a separate account and appropriated for local works. Mr. Farnell advocates the construction of the bridge in the interests of the general public, and states that an informal promise that the bridge should be erected was made by his late father when Minister for Lands; but he does not consider the work to be of a pressing nature. Mr. Tornaghi also speaks of a promise in connection with the sale of land at the Field of Mars Common, and states that he was a large purchaser because of his understanding that there was to be a bridge and a tramway constructed.

The Field of  
Mars Common  
in its relation  
to the bridge.

7. From the nature of the evidence given by the three local witnesses, as well as of that from the officers of the Department of Roads and Bridges, it became clearly apparent that the only reason of any weight put forward in support of the proposal for the construction of the bridge was that represented in the assertion that the bridge had been promised in connection with the sale of land at the Field of Mars Common; and it thus became necessary for the Committee to ascertain definitely whether such a promise had been made. This they did by an

examination

examination of the "Field of Mars Common Resumption Act of 1874," and by obtaining evidence from certain persons specially acquainted with matters relating to the Field of Mars Common. An examination of the Act showed that it contains a provision for defraying, out of the proceeds of the sale of the land, the cost of a bridge suitable for general traffic across the Parramatta River, which bridge has since the passing of the Act been erected; but it contains no reference to any other bridge. That being so, evidence was obtained from the auctioneer who sold the land at the Field of Mars Common, from the officer of the Lands Department who, in his official capacity, attended the sales, and from the Consulting Accountant at the Treasury, who is specially acquainted with the manner of dealing with the proceeds from the sale of the land at the Field of Mars Common; and the statements made by those witnesses are conclusively to the effect that no promise respecting a bridge over Tarban Creek was ever made. A promise was made at one of the sales that a tramway should be constructed, and this was afterwards repeated in Parliament; but with the exception of the bridge mentioned in the Field of Mars Common Resumption Act, which has been erected, there is nothing, so far as the Committee can ascertain, to indicate any intention on the part of any Government to provide bridge communication in connection with the Field of Mars. It is also shown by the evidence of the Treasury officer that no separate account of the money derived from the sale of land at the Field of Mars Common has been kept at the Treasury, and that it has been carried to the General Revenue Account, under the heading of Auction Sales of Crown Lands.

8. The Committee, therefore, have no difficulty in coming to the conclusion that the bridge ought not to be erected. They arrived at a decision in the matter on Tuesday, 18 March, 1890, on which date the following resolution, moved by Mr. Hurley, and seconded by Mr. Humphery, was passed:—

Decision of the  
Committee.

"That, in the opinion of the Committee, it is not expedient the proposed Bridge over Tarban Creek, Parramatta River, as referred to the Committee by the Legislative Assembly, be carried out."

J. P. ABBOTT,  
Chairman.

Office of the Parliamentary Standing Committee on Public Works,  
Sydney, 15 April, 1890.

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# PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

## MINUTES OF EVIDENCE.

### BRIDGE OVER TARBAN CREEK, PARRAMATTA RIVER.

WEDNESDAY, 12 FEBRUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).	
The Hon. JOHN LACKEY.	HENRY COPELAND, Esq.
The Hon. ANDREW GARRAN.	JAMES EBENEZER TONKIN, Esq.
The Hon. FREDERICK THOMAS HUMPHERY.	WILLIAM SPRINGTHORPE DOWEL, Esq.
The Hon. WILLIAM JOSEPH TRICKETT.	EDWARD WILLIAM O'SULLIVAN, Esq.
JACOB GARRARD, Esq.	CHARLES ALFRED LEE, Esq.

The Committee proceeded to consider the proposed Bridge over Tarban Creek, Parramatta River.

Joseph Barling, Esq., Under Secretary for Public Works, sworn, and examined:—

1. *Chairman.*] You are the Under Secretary in the Department of Public Works? Yes.
2. Can you give the Committee any information about this proposal to construct a bridge over the Tarban Creek, Parramatta River? I have to ask, with the permission of the Committee, that I may be allowed to make a short statement with regard to the whole of the bridges before the Committee.
3. You may make a statement, but we will have to have an inquiry about each one of them? Quite so. But if you will permit me to make a statement it will open up a new line of inquiry with regard to each of the bridges. There are four bridges now before this Committee, viz., a bridge over Tarban Creek, Parramatta River, a bridge over the Hunter River at Jerry's Plains, a bridge to connect Bullock Island with the mainland at Newcastle, and a bridge over the Lachlan River at Cowra; and I am to ask that the Committee will have the goodness to negative the first three proposals—that is to say, for the bridge over the Tarban Creek, Parramatta River, the bridge over the Hunter River at Jerry's Plains, and the bridge to connect Bullock Island with the mainland at Newcastle. I wish to explain shortly why it is I ask this, and I also have to bring under the Committee's notice the fact that with regard to the last bridge named—the bridge over the Lachlan River at Cowra—the Committee will be asked to consider a modified plan—a plan different from what was intended when the proposal to construct a bridge was submitted to the Committee by Parliament. The reason why I am asking that the first three proposals for bridges over the Tarban Creek, Parramatta River, the Hunter River at Jerry's Plains, and from Bullock Island to the mainland at Newcastle—should be negatived, is that each one of these bridges can be built at a cost of less than £20,000, and therefore it is not necessary to refer them to the Public Works Committee under the Act. Shortly after Mr. Bruce Smith took office, estimates for three bridges were brought under his notice. The first was a bridge at Narrandera, estimated to cost £17,280, the second was a bridge over the Darling River at Wentworth, estimated to cost £26,248, and the third was for a bridge at Cowra, estimated then to cost £69,971, or a total sum of £113,499. When these estimates came before Mr. Bruce Smith he was struck with their magnitude in comparison with what he thought were the justifiable requirements of each case, and he was the more inclined to question them because he was aware that even in the old country, centres of population were continually changing so that what at one time was a populous place became, owing to change of circumstances, almost untenanted. This was specially shown to be the case in the history of England, where many old boroughs, which were once populous towns, became, after the lapse of years, reduced to very small numbers. Applying this principle to this new country, where of course the chances of change are very much greater than in old countries, and looking well ahead, Mr. Bruce Smith felt perfectly certain that no one could foretell what would be the requirements of places in this new country fifty years hence; the roads would probably have to be changed, and all requirements incidental to population would be completely altered, and he thought therefore that it would be most desirable to build bridges as cheaply as possible so as to meet the immediate requirements of each case; and therefore when these estimates came before him he directed that the whole question should be remitted to the Roads Department with the view of ascertaining whether wooden structures would or would not answer all necessary requirements, more especially as he was aware that we have the finest timber in the world. I think I may refer to the Hon. the President of this Committee in verification of what I say, because one of these bridges—the Wentworth Bridge—affected his constituency, and he expressed his very strong approbation of the steps the Minister was taking in reviewing the whole question of our bridge construction. The Roads Department, of course, at once took up the lead of the Minister, and as a first result of this revision, the Narrandera Bridge, which was estimated to cost £17,280, was let for £3,555 13s. 1d.; that is, a timber bridge was substituted for the iron one at

J. Barling,  
Esq.  
12 Feb., 1890.

J. Barling,  
Esq.  
12 Feb., 1890.

first proposed, and it was pointed out, and is very clearly proved I think, that this much smaller expenditure has answered all the requirements of the case. Then, with regard to the Wentworth Bridge, it was found that, by substituting timber, the estimated cost could be reduced from £26,248 to £12,000. The actual cost I cannot tell at present because tenders have not yet been invited, but the relative cost will remain the same. Supposing the timber bridge be found to cost more than the £12,000, from having to go deeper for the foundation, the cost of an iron bridge would be increased in the same proportion. The fact remains that a very large saving is effected by substituting timber for iron. I may also remark that in many cases it can be shown that the accumulated interest on the difference between the cost of timber bridges and iron bridges would be sufficient to renew the timber structures for periods varying from ten to fifteen years. So everything shows most conclusively that the action the Minister has taken has resulted in a very large saving to the public purse. I have therefore, for the reasons stated, to ask that the first three proposals mentioned may be negatived, because we can construct each one of these bridges for less than £20,000—the Tarban Creek Bridge, the bridge over the Hunter River at Jerry's Plains, and the bridge to connect Bullock Island with the mainland at Newcastle.

4. Can you give us a *précis* stating the reasons for the proposal to construct a bridge over Tarban Creek? I was under the impression that the Cowra Bridge was the one under consideration to-day, consequently I have not brought any papers with regard to the other bridges. For the reasons I have stated, we have no plans to submit to the Committee with regard to those three proposed bridges.

THURSDAY, 20 FEBRUARY, 1890.

Present:—

The HONORABLE JOHN LACKEY (VICE-CHAIRMAN).

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

JAMES EBENEZER TONKIN, Esq.

WILLIAM SPRINGTHORPE DOWEL, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

CHARLES ALFRED LEE, Esq.

The Committee further considered the proposed Bridge over Tarban Creek, Parramatta River.

Robert Hickson, Esq., Commissioner and Engineer-in-Chief for Roads and Bridges, sworn, and examined:—

R. Hickson,  
Esq.  
20 Feb., 1890.

5. *Mr. Garrard.*] You know the proposal before the Committee to construct a bridge across Tarban Creek, so as to give more direct access to the metropolis from the North Shore? Yes.

6. Has the project been reported upon by yourself or by other officers of the department? It was reported upon by me.

7. What is the estimated cost of the bridge? It would cost £26,000. The project was reported upon in the first instance by my predecessor, Mr. Bennett.

8. Since then has the department reconsidered the advisability of erecting a bridge here, or has it thought that one of a less permanent character would do? Soon after I took charge of the department my attention was called to a sum of money being placed on the Estimates for this bridge, and I therefore visited the site. After a very careful examination of the place, I came to the conclusion that the Government would not be warranted in spending any money there at all, and I reported to the Minister accordingly.

9. Do I understand you to say that there is no necessity for a bridge of any kind at this place? I think there is no necessity, considering the cost.

10. And if a bridge were necessary, a less expensive one could be put up? A bridge could not be put up at the proposed site—that is, the continuation of Joubert-street—for less than £26,000, but one could be put up at the site coloured green at a cost of about £10,000.

11. That will not be so direct a route from the Parramatta Bridge to the Lane Cove Bridge? No; there will be very nearly half a mile difference between the two routes.

12. What is the distance between the Parramatta River Bridge and Joubert-street, where the Gladesville Road meets Joubert-street? The distance between those two points, if the proposed bridge were made, would be as nearly as possible half a mile—46 chains; by a bridge at the termination of Demilhaus-street it would be as nearly as possible a mile—77 chains; and by the present road it is a mile and three-quarters.

13. So that if the bridge which it is proposed to construct were constructed, it would save a mile and a quarter of travelling between Sydney and Willoughby? Yes.

14. Is there very much traffic on that road? There is a good deal of traffic across the Parramatta Bridge, but I think that I am within the mark when I say that three-fourths of it goes to Ryde; it does not come back towards Hunter's Hill.

15. Are you aware whether the people on the Field of Mars gave up their rights to a commonage on the condition that the money realized from the sale of it should be spent on bridges in the district? I do not know anything about it.

16. Do you know why this proposal has been put before the Committee? I do not.

17. And the department now wish to withdraw it, or to get the Committee to negative the work, on the ground that there is no necessity for a bridge there in the public interest? Yes.

18. *Mr. O'Sullivan.*] Of what kind of construction would the bridge be? It would be very much the same as that which we propose to put up at Cowra.

19. Composite? Yes; that would be the cheapest structure.

20. If any bridge is to be erected here you purpose erecting one higher up the creek at a lesser cost? Yes. If it is decided at any future time to erect a bridge, a cheaper structure would undoubtedly be better.

21. What kind of bridge would you erect then? A timber bridge would do. The water is shallow and the bridge need not be any great height.

22. *Dr. Garran.*] Do you know what municipalities as they now exist had a right in the Field of Mars Common? I do not.

R. Hickson,  
Esq.  
20 Feb., 1900.

23. I suppose Hunter's Hill had? I do not know anything about the Field of Mars Common.
24. You do not know what the supposed value of the unsold part of that common is? I do not.
25. You do not know how much has been spent on existing bridges there? No.
26. There is a scheme for extending a tramway to this district;—do you know how much that would absorb of the remaining balance? I do not. I do not even know the route of the tramway.
27. Is it proposed to make either of these bridges out of the money derived from that land? I understand that that would be paid for with loan money.
28. You are not treating the work as having a claim on that land, but as one that will be paid for out of the General Loan Fund of the Colony? Yes.
29. *Mr. Copeland.*] Can you say whether there is any documentary evidence in the department as to the Government being committed to expend the money derived from the Field of Mars Common on bridges or anything else in the district? Not that I know of. There is nothing in our correspondence with regard to this bridge—I know that.
30. There is no correspondence whatever, as far as you know, which would lead one to believe that any such bargain had been made with the Field of Mars people? None that I know of.
31. You are treating this question simply on its merits? Yes.
32. And you do not think the public convenience requires this expenditure? I do not. The bridge undoubtedly would be a convenience, but it would be too dearly bought. They have got a very good road now which is only 1½ mile longer than the road will be across this bridge, so that I don't think the department would be justified in spending £26,000 on the bridge.
33. Do you think that if Tarban Creek were situated in any of the country districts the people would be likely to make a claim for a bridge? I do not know about their making a claim, but I do not think it would be granted.
34. Can you say what money the Government have spent in maintaining this road—to what class does it belong? I could not tell you from memory; I could get you the information.
35. Would any expenditure be saved in maintenance if the bridge were constructed? No; there would be an additional expenditure for maintenance, because we would have to maintain the bridge and the approach to it on either side in addition to the present road.
36. Do you know anything about the population of North Willoughby? No; I cannot tell you what the population is.
37. I suppose you have no statistics as to the number of conveyances or people which cross the Lane Cove Bridge? No.
38. In fact you have not provided yourself with any information of the kind because the department wish to withdraw the proposal? Yes.
39. *Vice-Chairman.*] We have a minute emanating from your department withdrawing the proposed work altogether, together with two other bridges? Yes.
40. Your opinion is that the work is not of such a character as to warrant the expenditure proposed, and that if it were desirable to construct a bridge that could be done for a considerably less amount? Yes.
41. The department does not go into the policy of constructing bridges—you are simply acting under the Minister, to carry out such directions as may be given? Yes.
42. You do not consider whether the population is great or small—I suppose the Minister has to do with that? Yes.
43. Your objections in connection with this bridge apply to the two other bridges before the Committee? Yes; those at Jerry's Plains and Bullock Island. The Bullock Island bridge is not exactly on all fours with this, but I will explain that presently.
44. *Mr. Dowell.*] If your answer to the Vice-Chairman was correct, that the Minister inquires into the population of a district, and the necessity for erecting a bridge, what are your reasons for recommending that this bridge shall not be constructed? My general observation of the traffic in the district. The exact number of inhabitants in the district, and the number of people that would use the bridge, would be obtained by the Minister.
45. Have you any knowledge of the population that would be served by the construction of this bridge at Five Dock and North Willoughby? Only a general knowledge.
46. You have nothing to guide you? A general knowledge obtained by going over the district several times.
47. Are you not aware that some representations have been made to the Government for the construction of this bridge? No; I am not aware of it.
48. Did the Minister give instructions to you to withdraw the bridge? No.
49. You suggested to the Minister that it should be withdrawn because you did not think that there was sufficient traffic to warrant the expenditure? Yes.
50. Yet you say you have no knowledge of the population residing at North Willoughby or Five Dock? As I said before, I have not an exact knowledge; I have a general knowledge, and from it I came to the conclusion that there was not sufficient population to justify the expenditure of £26,000 for this bridge.
51. Does the country appear to be fairly settled? About Hunter's Hill it is; but the inhabitants there generally use the steamers. North Willoughby is sparsely populated as yet.
52. Are you aware that there is a tramway in course of construction at Five Dock that would be very much served by the erection of this bridge? No.
53. Have any borings been taken at the site of the bridge? No. When it was decided to withdraw the proposal we thought that it was not necessary to go to the expense of drawings or borings, so neither have been prepared.
54. If I understand you, the bridge has been withdrawn because from your own personal observations you do not think there is sufficient traffic for it? The Minister has withdrawn it. He had my report and other evidence.
55. Your report to him? Yes.
56. On the strength of your report he has thought fit to withdraw the proposal? He has thought fit to withdraw it, I presume, because of that report.
57. *Mr. Trickett.*] Has Colonel Wells any personal knowledge of this bridge or of the requirements of the locality? I dare say he may have. Of course he knows the district very well.
58. Had he not some project for shortening the road route? Yes; we propose to shorten the road route by Salter-street, cutting off an angle? It is a very small thing.
- 59.

- R. Hickson, Esq.  
20 Feb., 1890.
59. Was he not to get a right-of-way through some church property? Through the Asylum grounds; we could do that if it was found necessary.
60. *Mr. Hurley.*] You wish the proposal to be withdrawn because the district is well served by good roads and by steamers? Yes. The portion of the district that this bridge would specially serve—that is, the lower end of Hunter's Hill—is well served by steamers.

- J. A. M'Donald, Esq.  
20 Feb., 1890.
- John Alexander M'Donald, Esq., M.I.C.E., and M.I.M.E., Engineer for Bridges, sworn, and examined:—
61. *Mr. Lee.*] You know the site of the proposed bridge over Tarban Creek, Parramatta River? Yes.
62. Have you any personal knowledge of it? I have been there myself two or three times.
63. Have you prepared any drawings with reference to it? A survey and sections have been made, but the work has proceeded no further.
64. Have you been in any way instrumental in the withdrawal of this proposal? I received instructions from the Engineer-in-Chief not to proceed further, after he himself had visited the site.
65. The suggestion did not come from you that this matter should not be proceeded with? The Engineer-in-Chief went out with me, when the survey was completed, to see the site, and he formed his own opinion on the matter.
66. Were you led to the conclusion that the proposal should be withdrawn in consequence of the bad position of the site? I have not expressed that opinion. The matter was decided by the Engineer-in-Chief.
67. Without reference to yourself? Of course he consulted with me.
68. Were borings taken? No.
69. No detailed work was done in connection with the bridge in consequence of the desire to withdraw the proposal? Yes.
70. As a matter of fact you take your instructions from the Engineer-in-Chief, and whether it is decided to go on with or to withdraw a work is a matter that does not rest with you? Yes.
71. You simply carry out your instructions? Yes.
72. *Mr. O'Sullivan.*] If the proposal was withdrawn, do you think it is likely that a wooden bridge would be constructed? That is a matter for the Engineer-in-Chief. I have received no instructions about it.
73. *Dr. Garran.*] You have not done anything in the way of preparing plans of either site? No.
74. Upon what is the calculation of expenditure based? The estimate that is given is not a guaranteed estimate in any way. It is simply an idea of the probable cost—it could not be guaranteed to the required 10 per cent.
75. What sort of bridge was it proposed to construct—one on iron piers? It was proposed to use iron piers and a composite structure at the one site, and higher up the creek to put a timber bridge.
76. With no iron in it? No iron.
77. The estimate before the Committee is only a rough estimate? Yes.

Colonel Frederick Wells, Engineer for Roads, sworn, and examined:—

- Col. F. Wells.  
20 Feb., 1890.
78. *Mr. Humphery.*] Can you state whether you gave any advice or made any suggestions as to the withdrawal of the proposal now before the Committee? None; I have given no authoritative advice to anyone.
79. Have you examined the proposed site of this bridge? Yes, some few years ago.
80. Do you consider a bridge there necessary? I do not think it necessary—at any rate at present; I think it would be premature.
81. Why have you arrived at that conclusion? I scarcely think that the requirements of the neighbourhood of Hunter's Hill necessitate so expensive a bridge when an alternative road could be made at a much less cost that would do away with the necessity for it, and make very little difference in the distance.
82. Will you describe the alternative road that you consider would meet the requirements of the district? The road was surveyed, and the survey could be produced. It would head Tarban Creek at low water, or, if necessary, take in some reclaimed ground—which it is quite within the province of the Government to do—and then, by an arrangement which I made with the Marist Brothers, a road could be made that would ascend and meet at the same point; that would not make five minutes difference in the distance, and the bridge over the little creek at the head of Tarban would be an insignificant affair.
83. Can you state the distance from the proposed road which you describe to the iron swing-bridge? I cannot, because I am not at present in possession of the surveys. I was quite unaware that I was to be called upon, or else I could very possibly have traced the surveys in the office.
84. Can you state approximately the cost of the road you suggest? No, I cannot. The matter was thrown over for the bridge before it came to a head. Only the survey was made.
85. Can you say about how much longer the road would be? It is almost impossible to state from this map without a survey; I do not think it would be half a mile longer.
86. Would it need any bridge at all? A small bridge over Tarban Creek.
87. At what cost? If built well in iron, possibly £1,000 at the outside for the bridge without approaches.
88. Can you point out on the map where the bridge you proposed would be constructed? If I remember rightly, the route follows a road on the western boundary of the French Mission for a short distance; it then diverges to the right, and begins to make its gradient through allotments in the street up to the line proposed for the bridge.
89. By looking at the tracing now before you can you say whether the difference in distance will be more or less than half a mile? It will be 28 chains shorter as it scales.
90. That road could be constructed at a comparatively small cost, and a bridge costing only £1,000 would be needed? I do not think the cost of the bridge would exceed £1,000.
91. Would that bridge be suitable for all traffic? For all traffic. The cost of the reclamation of the flat at the head of Tarban Creek would of course have to be added on, but it would be insignificant in comparison with the cost of the proposed bridge. A small reclamation would have to be made at the head of the creek to recover a flat that is bare at low tide, which the Government could do with advantage.
92. *Mr. Trickett.*] Do I understand you to say that you made some arrangement with the Marist Brothers for right-of-way through their property? Yes; I had a verbal arrangement with the Rev. Father of the college, and he told me that he would have no objection to the route which I proposed, as it would not interfere with their grounds.

93. And on the score of expense and convenience, do you think that that road would answer all requirements for some time to come? I think it would. Col. F. Wells.
94. *Mr. O'Sullivan.*] Do you know if there is much traffic on the Lane Cove Bridge? Not very much traffic—there is a fair amount. 20 Feb., 1890.
95. There is not a very great settlement in North Willoughby to which this bridge gives access? There is not much traffic. There is settlement on the Lane Cove Road to which the bridge gives access.
96. Is that a favourite drive for people on a Sunday afternoon or a holiday? It is; but it is not crowded. I frequently drive along there myself.
97. *Mr. Dowel.*] You have visited the site coloured red? Yes.
98. You know the locality well? I know the whole of the bay from that side to the head.
99. And to Willoughby? Yes.
100. Can you inform the Committee as to the character of the country? Well, it is the usual North Shore country—barren, but capable of being made into good garden ground.
101. Is it suitable for buildings? Yes.
102. Is it pretty fairly settled upon at the present time? Not thickly.
103. Would the construction of a bridge have any effect in causing settlement there? I doubt it.
104. Can you inform the Committee at whose instance the first proposal to construct this bridge was made? I think it was by the Members and Mayor and Council of Hunter's Hill; they brought it forward and advocated it very strongly.
105. Did they receive a promise that a bridge should be constructed? I do not know. I know nothing further than that I examined the line which I mentioned for a road to avoid the large detour by the asylum.
106. *Mr. Hurley.*] Having in view the probability of a Local Government Bill being passed, do you not think that the construction of such bridges should be paid for by local taxation? I think they are too heavy in cost for local taxation, though I have no doubt that municipalities would be more careful about asking for bridges if they knew that if built they would have to pay interest on them.
107. The construction of such a bridge would not benefit a large number of the general public, would it? No, not beyond the road as a drive.

TUESDAY, 25 FEBRUARY, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN.)

The Hon. JOHN LACKEY.

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARBARD, Esq.

HENRY COPELAND, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee further considered the proposed Bridge over Tarban Creek, Parramatta River.

John Williams Deering, Esq., Metropolitan and Coast District Surveyor, sworn, and examined:—

108. *Mr. Trickett.*] What position do you occupy in the Government service? I am Metropolitan and Coast District Surveyor. J.W. Deering,  
Esq.  
25 Feb., 1890.
109. How long have you been in the Department of Lands? I have been in the Government service for thirty years. I first joined the Railway Department.
110. Have you had much to do with the sale of Crown lands? Yes; with the surveys and the preparing of public lands for sale.
111. Do you know a property on the Parramatta River called the Field of Mars? Yes; well.
112. You are aware, I suppose, of the circumstances connected with the sale of that property? Yes.
113. The Field of Mars Common Resumption Act was passed in 1874, was it not? Yes.
114. That Act provides "that the proceeds of the sale of the lands may be devoted towards defraying the cost of a bridge suitable for general traffic intended to be constructed by the Governor, with the advice of the Executive Council, across the Parramatta River." Do you know whether any other promise was made to construct any public works out of the moneys arising from the sale of the Field of Mars? There was a verbal statement made by Mr. Farnell at the time of the first sale that a tramway should be made, but it was a conversational statement.
115. To whom was it made? It was made at the time of the sale to the people present.
116. Mr. Farnell was Minister for Lands, and was present at the sale? Yes, and he made that statement. I never thought myself personally that it was binding.
117. The statement was that a tramway should be constructed to the Field of Mars? Yes. The people said, "Are you going to make a tramway, Mr. Farnell? Are we going to have a tramway?" and he answered in a somewhat conversational style, "Oh, you will have a tramway. Yes, you shall have a tramway." But it was not a Ministerial promise.
118. Do you know of a proposal that has emanated from the Works Department to erect a bridge over Tarban Creek, on the Parramatta River? Yes, I know there is such a proposal.
119. Was any promise ever made by the Lands Department or by any authoritative body that you are aware of that this bridge should be constructed out of the proceeds of the sale of the Field of Mars? Never.
120. You are quite sure of that? Yes. I might point out that the Act only mentions the building of one bridge, and the department has already built three bridges.
121. The Field of Mars Resumption Act refers to one bridge across the Parramatta River; that bridge has been erected, and two others besides? Yes, and we have made roads as well. We are, I admit, clearing the land for sale, but we have made roads. Up to 1887 there was an expenditure of £72,000 for roads, &c.
122. Do you know what the sale of the land realised? The area of land sold up to the present time is 1,712 acres, and the amount realised £96,203.
123. Do you think that amount has been expended on these improvements? The Government expended £72,000 on roads only as against £96,000 received.
124. Including the bridge? Not including the bridges. The building of both the bridges and the roads, with the maintenance of the former, has cost about £200,000. It has always appeared to me that on Mr. Farnell's verbal statement made on the ground the people of the Field of Mars are trying to build up a case.

- J. W. Deering, Esq.  
25 Feb., 1890.
125. *Mr. Garrard.*] They have a very good foundation when they have the statement of the Minister, have they not? Not given in a verbal way like that. I do not think such a statement made at the time of sale would bind the Cabinet; but this is only my individual opinion.
126. *Mr. Copeland.*] The auctioneer has more authority on such an occasion than the Minister? Yes.
127. What area in the Field of Mars Common remains unsold? 3,600 acres.
128. *Mr. Garrard.*] What do you estimate is the value of that area? About £20 an acre average.
129. Would the land remaining unsold realise sufficient to build a tramway? At £20 an acre it would only realise £72,000.
130. What do you think the tramway would cost? I could not say. I have not seen the section, and do not know the depth of the cuttings.
131. Do you think it would cost more than £72,000? Yes, if it is to cross the Parramatta River bridge, and Tarban Creek bridge is to be erected.

THURSDAY, 6 MARCH, 1890.

Present:—

The Honorable JOHN LACKEY (VICE-CHAIRMAN).

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee further considered the proposed Bridge over Tarban Creek, Parramatta River.

Charles Edward Jeanneret, Esq., Mayor of Hunter's Hill, sworn, and examined:—

- C. E. Jeanneret, Esq.  
6 Mar., 1890.
132. *Mr. Garrard.*] I believe you are Mayor of Hunter's Hill, and were at one time a Member of the Legislative Assembly? Yes.
133. Do you know the site of the proposed bridge across Tarban Creek? I do.
134. Is there very much traffic between the metropolis and Hunter's Hill to the places beyond the Lane Cove bridge? There is very considerable traffic there. Independently of other traffic, the establishment of colleges in that locality has added very largely to the traffic.
135. You allude to the Marist Brothers College at Hunter's Hill and the Riverview College on the northern side of Lane Cove River? Yes.
136. But do not the majority of the people visiting both Hunter's Hill and the college on the other side of Lane Cove travel by the steamers that touch at these places? Necessarily the majority go by the steamers, but a large number of people go by the road.
137. You are a very old resident of that locality? Yes; I have lived there for thirty-three years.
138. Can you give us any idea of the average number of vehicles that cross the Parramatta bridge with the view of going to Hunter's Hill, and the other places? I could not. I never made an estimate of the number of vehicles. The people at the bridge could give you accurate information on that point, as I believe it is their business to keep a record.
139. Do you know the estimated cost of the proposed bridge? I understand that it is estimated to cost £30,000.
140. Do you think the people are put to such straits that they require the expenditure of this large amount of money to overcome the obstacles in getting to Hunter's Hill? I think the bridge would be of very great benefit to the municipality of Hunter's Hill, and also the municipalities on the North Shore, and it would benefit the Government lands adjacent.
141. What would it save in point of time or distance in getting to Hunter's Hill? The distance from the northern side of the Parramatta Railway bridge to the southern side of the Lane Cove bridge by the present road is 150 chains. The distance by the proposed bridge would be 63 chains, so that the distance saved would be about one mile and a quarter.
142. Do you think that for the saving of that short distance the country would be justified in erecting a bridge across Tarban Creek as proposed? I think so, and one reason is that the district has a very large claim upon the Government on account of the proceeds of the Field of Mars Common. This common was given up to the Government on condition that the proceeds were to be kept in a separate account, and appropriated for local works.
143. The Committee have heard this assertion very frequently;—do you know the Act under which the Field of Mars Common was resumed? I am perfectly cognisant of that Act.
144. Is there anything in it relating to an agreement between the people and the Minister for Works? No. But there is a provision in the Act to the effect that the proceeds of the common should be placed to a separate account, and I am aware that the Government have given a promise, or stated in Parliament their intention, that all this money should be expended in the district.
145. Was this merely a general statement on the part of some member of the Government, or was it a Government statement? It was a Government statement. I think it is a principle recognised by the Government that the proceeds of the common should be devoted to local improvements after the building of bridges.
146. Suppose that promise was given, how would that affect the construction of this bridge? This bridge would be of very little benefit, if any, to the Field of Mars proper? It would be an immense benefit to the Field of Mars as well as to all persons residing in the parish of Hunter's Hill.
147. But the Field of Mars Common lies to the north-west of the proposed bridge? Hardly to the north-west. It lies to the west of north, but it stretches away a great deal to the north. The most valuable portion of the common, and that most likely to be largely populated, is in very close proximity to the site of the proposed bridge.
148. Can you tell us who were supposed to have rights to this common—merely the people about Gladesville and Ryde, or the people of Gladesville, Ryde, and Hunter's Hill? The people of Ryde, Hunter's Hill, and Gladesville have all equal rights to the common. The common was granted for the benefit of all persons having land in the parish of Hunter's Hill and the Field of Mars. Hunter's Hill is particularly mentioned.

C. E. Jeanneret, Esq.  
6 Mar., 1890.

- 149. But the parish of Hunter's Hill extends beyond the mere municipality of Hunter's Hill? Of course it does.
- 150. And would include what is now known as Gladesville? Yes. It includes also what is known as Ryde. But the remotest portions of Hunter's Hill, even as far as Woolwich, have claims to the proceeds of the common equal to the claims of those living adjacent to the Field of Mars. In fact, we have the greatest say, for we were in the majority at the time of the surrender of the Field of Mars, and I think it was mainly at the instance of those living at our end that the common was given up. The Ryde people, and those living close to the common, were rather opposed to its surrender. But it was so far away from us that we preferred having it sold, and the proceeds applied to the benefit of the district.
- 151. As a matter of fact, if this bridge were erected it would be only the people living to the eastward of Joubert-street and the people on the other side of Lane Cove bridge who would be benefited? And a considerable number living on the western side of Joubert-street.
- 152. How many? A considerable population about there—Eltham, and all those places. But, of course, it would be principally for the benefit of those going beyond Lane Cove, and those on the eastern side of Joubert-street.
- 153. Do not the majority of the inhabitants of Hunter's Hill and Lane Cove generally use the ferries which travel to and from Sydney? They do.
- 154. And it is only a small number of the people, those who are carriage folks, who occasionally use the road? Yes, a comparatively small number.
- 155. Putting the Field of Mars promise, whatever it may be worth, on one side, and considering that the money be drawn out of the general tax-payer's pocket, do you think the Government would be justified in erecting the bridge as proposed? Apart from the claims we have, I would not venture to say that the Government would be justified in going to that large expenditure at the present time. Eventually it will have to be done, but at present we are in this position: we have had nothing whatever from the Government for Hunter's Hill. We have had no Government aid whatever for anything except the ordinary municipal allowance. We have had to do everything for ourselves while the other places higher up have received very great benefits. For instance, the construction of the Parramatta River bridge is comparatively of small benefit to Hunter's Hill while it is of very great benefit to Ryde and Gladesville.
- 156. If that is a small benefit this proposed bridge will be a small benefit? But this bridge will make it a large benefit. At present as we have to go more than double the distance round to reach the Parramatta River bridge it is practically of no use whatever to us. Any omnibus traffic or any other traffic that crosses that bridge is of no use to Hunter's Hill.
- 157. Do you see on the map a blue line showing an alternative scheme for a bridge in a different locality? Yes.
- 158. Do you think a bridge across there would suit the requirements of the people? I do not think it would be of any use at all.
- 159. Did you not commence a bridge there at one time? I commenced a little bridge, or an embankment across there. I do not think it would be of any use. It is more in connection with the ferry service.
- 160. And the bridge higher up still, shown on the map by a pencil line, would be of still less use? Yes. The bridge indicated by the blue line would be of use merely for foot passenger traffic.
- 161. But for a bridge to be of any great service to the people of Hunter's Hill and beyond Lane Cove bridge the site chosen by the Department and shown on the map by red lines would be the one? Undoubtedly. It would be a great benefit.
- 162. But you are of opinion that if there were no promise, nor anything in that way connected with the Field of Mars, the Government would hardly be justified in expending public money by constructing the bridge at the present time? I should not like to say they would be justified just at present. When you consider the large district of the North Shore and the very large traffic now going on right away to North Willoughby, and the large expenditure of Government money upon those roads, I think there is some warrant for doing it.
- 163. Is it not a fact that the greater part of the vehicular traffic for Riverview College and the land immediately around it goes at present via North Shore and Crow's Hill? By no means. There is a very large amount of traffic from Balmain. In fact, a surprising number of vehicles are to be met with along that way, and the number seems to be increasing every day. I drive there sometimes myself, and I meet them.
- 164. Do you know the tile works just before you come to the Lane Cove Road on the right hand side going up? Yes.
- 165. What road do they use to send their produce to Sydney? I cannot say. I know that a great many bricks come from the North Shore Brickworks across the bridge.
- 166. In order to serve their customers in the western suburbs? Yes. I also know that a great quantity of bricks come from Sydney. Although bricks are manufactured at the North Shore they seem to be sent from Sydney along that road to the North Shore.
- 167. *Mr. Copeland.*] Did I understand you to say that there is a provision in the Act that the proceeds of the Field of Mars Common should be dealt with differently to any other public revenue? Yes. You will find that according to the Field of Mars Resumption Act, the money is to be placed to a separate account, and the interpretation put upon that by the Government since has been that the money was to be devoted to local public purposes.
- 168. By what Government? By the Government in which Mr. Garrett was Minister for Lands when he gave a promise of the Executive in writing that certain things should be done for the district.
- 169. You have been a Member of Parliament representing a country constituency have you not? I have.
- 170. Can you mention any single instance where the proceeds of the sale of a common have been dealt with in any different way from the proceeds of any other land sale—that is to say, did the money go into a separate account, and was it used for the construction of special works? I presume the law has been carried out. Of course I have not seen the account.
- 171. Are you under the impression that there is an account? Yes, and it is controlled by the Lands Department.
- 172. And that account is available for the construction of public works? Not generally, but public works in pursuance of that Act.

C. E.  
Jeanneret,  
Esq.  
6 March, 1890.

173. Do you think that the money for any of the bridges, or expenditure of any other kind has been taken out of this particular fund? I am under that impression.

174. You think the money has not come out of the consolidated revenue? Some of it must have done, because at the present time the account is overdrawn.

175. But can you give a single instance where the cost of any public work has been taken from this special fund, and where the money has not gone through the usual form of being voted or appropriated from either loan account or consolidated revenue? I moved for a return in Parliament of the money expended on the Field of Mars Common, and of the money derivable from the common, and I got the return, but whether the money expended was by special vote or otherwise I do not know. I presume it was in accordance with the Act.

176. You know that the Act says:—"And the proceeds of every such sale (after deducting therefrom any costs or charges incurred herein) shall be paid to the Colonial Treasurer, and by him be carried to the credit of a separate fund or account as part of the public revenue." You observe the words "as part of the public revenue." You have been a member of Parliament for a country constituency; can you mention a single instance where the proceeds of the sale of a town common has been dealt with differently to the proceeds of any other land sale? No, I cannot. I may be wrong, but I have always been under the impression from the provision of the Act, and the interpretation placed upon it by the Government that a separate account of the proceeds of the Field of Mars Common was being kept as against the expenditure upon the bridges.

177. Can you point out any speciality in this case as showing why the people who had the use of the commonage for many years should be dealt with differently to the people having the use of other commons in the colony? Certainly I can. The Field of Mars Common was given up to the Government on the express condition that certain local works were to be constructed out of the proceeds of it, and you will find that this is expressed in the Act.

178. When you say the common was given up, was it given up in any way differently to all the other commons that have been given up? Yes, it was. There was a special Act of Parliament on the petition of the people and the promise of the Government.

179. Why was that special Act of Parliament necessary? Because there was no other way of dealing with the matter.

180. Because the common was vested in trustees? I presume so.

181. And the land therefore had to be resumed at that time. You are aware that if the land had to be dealt with at the present time it would not have to be resumed by special Act of Parliament? Perhaps not. But the provisions of the Act expressly state what the money is for. The Act states how the money is to be applied.

182. But the recital in the Act refers only to a bridge? That is all. But there was a distinct announcement by the Government, as to which I can speak confidently because I was in the House at the time, that the whole of the proceeds of the common would be devoted to local works. This statement was made in the House by the Minister.

183. But is it not a fact that as a sop to the people for the loss of the common, the Government proposed to build the bridge, and that accounts for the other words in the Act in reference to a separate account being kept of the proceeds; because at that time it was not known whether or not the proceeds would realise enough to pay for the cost of the bridge? As a matter of fact, it was anticipated that the bridge would cost more than the common would realise.

184. And that explains the keeping of a separate account? Yes. It afterwards turned out in consequence of the largely increased value of land that the common would realise a great deal more than the cost of the bridge across the river.

185. The Government having completed their part of the contract in building that bridge, and one or two other bridges, besides taking a railway through a portion of the common, do you not think they have more than complied with all their stipulated agreements? The railway is of no advantage except to the portion of the common which is very remote indeed from Sydney, viz.: Carlingford.

186. It is an advantage to that portion of the common that was sold? No; not to the portion that was sold at the first two or three sales, none whatever.

187. The railway is of advantage to those portions that have been sold recently—since it was constructed? Unquestionably; but until the railway was constructed those portions were of no value at all.

188. What I want to get at is this: Can you furnish any reason why the proceeds from the sale of this common should be dealt with differently from the proceeds of the sale of any other common in the country? I think I have already given a reason. The common was voluntarily surrendered by the people to the Government on the express understanding that a bridge should be built across the Parramatta River. That bridge has been built. The sale of the common has realised or will realise very much more than the cost of the bridge. The Government have distinctly promised that any surplus arising shall be applied for the benefit of the district.

189. Which Government has distinctly promised? The Government in which Mr. Garrett was Minister for Lands.

190. Is there any written evidence of that statement? Yes; you will find it in *Hansard*. I will undertake to produce it. And not only that, but the Government have distinctly by a Minute of the Executive promised to do certain other works out of the proceeds of the common.

191. The same Government? Yes; the Government in which Mr. Garrett was Minister for Lands. I may say that the common has always been dealt with in the Lands Department as a special part of their business, and also the works upon it.

192. The sale of it belongs to the Lands Department; but has that department ever exercised any supervision over the expenditure of the proceeds? Yes it has.

193. In what direction? In the laying out of the common and the making of roads. They have exercised a great deal of control over it.

194. That was only the same control that they exercised over every other common? What I mean is that the Lands Department has exercised special supervision over the expenditure upon the roads. They have not only surveyed the roads, but they have been the means of getting them metalled and of having bridges constructed, and everything else in connection with the common has been done under the direction of the Lands Department.

195. You mean those new roads which were built recently by unemployed labour? Yes. I think the unemployed labour was used chiefly for clearing purposes; I do not think it was used so much for road-making.

196. I ask you, as a man who knows something of the country districts, whether the Lands Department exercised any more supervision over that common than they did over any other common in the country that they cut up and subdivided? I was always under the impression that they did.

197. Have they done anything more than they did at Willoughby? I am under the impression that they have. I only speak from conversations I have had about the common with Mr. Oliver, formerly of the Lands Department.

198. You are well acquainted with what is going on in the vicinity of Sydney; have they done anything more than what was done at Harbord, where there was a subdivision of Government land? Yes; they have done more than they have done anywhere else. If you go to the Field of Mars Common you will find a good macadamized road and good bridges. The places are aligned, and there are valuable reserves and all that kind of thing, where at present there is no population at all, and no traffic. That, I think, shows that they have dealt with it differently to the way in which they dealt with other commons. You will find some splendid bridges and some splendid macadamized roads and beautiful reserves in preparation for a large population; but there is at present no population there at all. I do not think there has been six houses built on the common yet.

199. But did not the Government do the same thing with the Holt-Sutherland Estate, which was private property? I do not know anything about the Holt-Sutherland Estate. I have not seen it for twenty years.

200. You know something about the Hornsby Estate? No; I have not been on that estate either for some years.

201. You have not told us how this right originated for the Field of Mars Commoners to be dealt with differently from the commoners in every other part of the colony? It arose in this way. There were 6,000 acres of land of very little value. The commoners asked the Government to resume that land, and build them a bridge across the river. The Government said, "You must first of all get a valuation made, and see if the proceeds of the land will pay for a bridge." We got Messrs. Richardson and Wrench to assess the common, and they valued it at £30,000, the estimated cost of a bridge at that time being £40,000. The Government then introduced and passed a bill, and on the condition that the bridge was to be built the common was surrendered. The Government then thought it would be wise to build the bridge first and sell the common afterwards. They built the bridge, and the first sale of the commonage land realised over £90,000. According to the estimate of the Lands Department, there still remains unsold £200,000 worth of land on the common. This may be slightly an over-estimate at the present time, because land is not as valuable as it was; but I have no doubt whatever that if the proposals of the Government are carried out the land will realise £200,000. In consequence of the Government not having carried out what they intended, I do not think that the £90,000 worth of land which has been sold would realise on a resale £25,000. In fact the land is practically useless in its present condition.

202. I suppose a very large number of people make use of the bridge across the Parramatta River? Yes. There is a surprising amount of traffic across the bridge from Balmain.

203. Would not that bridge have been constructed all the same if there had not been one single square inch of the Field of Mars Common? Certainly not.

204. You think the Government would not have built a bridge there, the same as they have done in other places, to meet the requirements of the people? I am quite sure they would not. They would not have entertained the idea for one moment.

205. Why would they not have treated those people the same as they treated the people of any other part of the colony? I do not know why, but they would not. The only thing that induced them to build the bridge was the surrender of the common. If the common had not been surrendered, I am quite confident that up to this day no bridge would have been built across the Parramatta River except the one required for railway purposes, which was built in the wrong place.

206. But you know that other bridges have been built where there has been a population? I do not know that such an expensive bridge has been built as that across the Parramatta River.

207. You know that there was a bridge built to accommodate the people of Cowra, for instance,—I mean an ordinary traffic bridge? But I would not compare that with the bridge across the Parramatta River. The Cowra Bridge is only a wooden structure, which cost, I suppose, about £15,000 or £20,000.

208. But you will admit that that bridge was built without any inducement, such as the giving up of a common? Yes, but the people could not cross the river without the bridge.

209. Could they have crossed the Parramatta River without a bridge? There was no population at that time to cross the river. There was no population in the district. The place has all grown up since the bridge was built.

210. But I suppose you are aware that the people of Cowra did cross the river without a bridge? I have no knowledge of the place before the bridge was built; but I should think it would be extremely difficult to cross it when the river was in flood.

211. Is it not a fact that the Government do as a matter of course build bridges in all parts of the colony where there is a necessity for them; or is it only in places where the people have a common to give up that they build bridges? There was no necessity for building the Parramatta bridge, and no justification for it at the time, unless the people could give the Government something in return for it, because the population there was very sparse. They had a punt by means of which they crossed the river, but having this large asset, which was vested in trustees, and which was considered to be to a large extent the property of the inhabitants, upon our giving up that property the Government were willing to construct a bridge.

212. You are aware that there are other commons that were in exactly the same position, and that have been taken away from the people and resumed under the present law? That is of recent date.

213. Within the last four or five years? Yes; but this common was surrendered nearly thirty years ago.

214. The reason it had to be done by special Act of Parliament was because the present laws were not then in existence? No doubt they were not thought of then.

215. Do you know that there is a large common between the Field of Mars and Richmond? Yes; the Ham Common as it is called.

C. E.  
Jeanneret,  
Esq.  
6 Mar., 1890.

C. E.  
Jeanneret,  
Esq.  
6 Mar., 1890.

216. Was anything done with the proceeds of that common? I do not think it has been sold.
217. You are aware that if a common similar to the Field of Mars had to be resumed now, all that would be necessary to be done would be for the Minister for Lands to lay on the table for so many days the proclamation resuming it from the Trustees for public purposes? I am aware of that. But of course, all lands are dealt with differently now to what they were thirty years ago. As you are aware the reservations of 100 feet were promised to be granted for nothing thirty years ago, and now they charge for them more than double their value.
218. There is nothing in the Field of Mars Common Resumption Act except provision for a bridge? That is all.
219. And the Government have complied with that condition and have provided that bridge? They have, and they have gone a little further.
220. And the only claim the people can make now for further expenditure is, because they set up a title to all the proceeds of the sale of the commonage lands? They did set up a claim, and the Government whether properly or improperly I do not say—acknowledged the justice of it, and I think you will find on reference to *Hansard* that not only Mr. Garrett, but also Sir Henry Parkes promised that all the proceeds of the common should be devoted to the improvement of the district. In fact, I believe, that Mr. Frank Farnell has a written promise from the Government to that effect.
221. But as far as your parliamentary experience goes you do not know of any other case in the colony that has been dealt with in the same way that you wish the proceeds of this land to be dealt with? I cannot say that I do.
222. I suppose you do know of other commons that have been sold where they had more land than was required, and where the proceeds of the sale have been placed to the Consolidated Revenue account? I have no recollection at present of any particular common, but I imagine such to be the case.
223. You know such to be the case, and that commons are being resumed every day and sold, and the proceeds paid into the Consolidated Revenue? Yes. I believe this is an exceptional case.
224. *Mr. Trickett.*] Are you Mayor of Hunter's Hill at the present time? I am.
225. What is the population of Hunter's Hill? I am not in a position to say accurately, but the Council Clerk informed me yesterday that he expected to be able to announce presently that the population was 4,000. I hardly think at present it is as large as that. I should say the population was not much more than 3,000.
226. What is the value of the ratable property? Our rates at one shilling in the £, realized £1,600 a year.
227. Has there been any public agitation in Hunter's Hill for this bridge? There is a very general desire for it, but the Hunter's Hill people do not agitate actively in favour of anything; they only agitate to oppose anything that is being done.
228. Have any public meetings been held? They do not hold public meetings over those matters in Hunter's Hill.
229. There has never been a public meeting in support of this bridge? No.
230. You know that there are three modes of crossing the creek that have been proposed—one is the expensive proposal at a cost of over £30,000; another is to cross the creek a little further up at Dimilia-street; and another to cross the creek further up again at the grounds of the Marist Brothers? Yes. The one by Dimilia-street would be of slight advantage. It would give you a horse track and a footway to the Parramatta River, but I think it would be hardly possible to make a good road up the hill, because the ascent is very steep and the distance short. I do not think you could make a good road by it unless you constructed a very high bridge, almost as high as the one proposed at Joubert-street.
231. When the members of the Committee were in the locality yesterday we saw the commencement of a road made across Dimilia-street;—when was that started? I started that twenty-five years ago.
232. What name was eventually given to it? I have since heard it called "Jeanneret's Folly."
233. And it has never been carried out up to the present time? The Government stopped us.
234. For what reason? Because they said we were cutting off the people above from access to the harbour. The people having the water frontages above, I believe made an objection and the Government stopped the work on that ground.
235. I noticed yesterday that stones were still being shot at the end of this embankment? I do not know whether they are extending it. I think Dr. Manning, in the interests of the asylum, is making a bit of a wharf there. I know that he wished to have the whole of that bay reclaimed, and has applied to have the water frontages to Gladesville Hospital filled in and reclaimed. With regard to the other proposed bridge higher up, midway between Dimilia-street and the present bridge, I do not think that would be of any use whatever. The distance saved would not be great, and the ascent and descent would be very much greater than that of the present road. Then, again, it would be expensive because a lot of private land would have to be resumed.
236. Do you advocate a bridge over Tarbau Creek in the interests of Hunter's Hill or in the interests of the Field of Mars? Well, in the interests of both.
237. But is not the Field of Mars much to the westward of Hunter's Hill? A portion of it is, but all the valuable portion of the Field of Mars lies closely adjacent to Hunter's Hill. As soon as you get away, say 50 chains, from the boundary of Hunter's Hill the Field of Mars Common becomes of comparatively little value. The price realised for land at the boundary of Hunter's Hill was £6 a foot, but when you get back some distance the price goes down to about £40 or £50 an acre.
238. If you were going to the nearest point of the Field of Mars how much would you save by going across the proposed bridge instead of by the present road? To the nearest part of the Field of Mars you would save a little more than half a mile.
239. Not more than half a mile? Between half and three-quarters of a mile.
240. So that really the chief advantage would be to the inhabitants of Hunter's Hill? Unquestionably; the inhabitants of Hunter's Hill would save about a mile and a quarter.
241. Have not the Government expended a large sum of money in connecting Hunter's Hill with North Shore by means of a bridge over Lane Cove River? Yes.
242. What is the distance of Hunter's Hill to the North Shore Ferry by that route? From Joubert-street to the North Shore Ferry it is, I think, about the same distance as it is to Sydney by Harris-street.
243. That is by the present road? Yes.
244. I suppose if there was a bridge connecting the North Shore with Sydney that would be a favourite route from Sydney to Hunter's Hill? Undoubtedly.

245. Is not Hunter's Hill a widespread municipality? There are no shops for any distance along the street. The main street from the Field of Mars to Woolwich—a distance of  $2\frac{1}{2}$  miles—is very thickly populated.

246. But that is all to the eastward of this proposed bridge? Two miles of it would be.

247. And would not the people living along that 2 miles be better served by steamer communication with Sydney than by going away from Sydney and coming back by means of the road? They are served in that way now, but unquestionably the main traffic would always be by the river, especially if a tramway is constructed, as is expected. It is the same with regard to Balmain. The people of Balmain will go across by steamer instead of going to Sydney by Harris-street or Pyrmont.

248. Then I suppose we must look at this bridge as much in the nature of a luxury, and not a necessity? You cannot say that it is an absolute necessity at the present time. As I said before, if the inhabitants had not a special claim upon the Government it would, perhaps, be expecting rather much that the Government should construct that expensive bridge just at the present time, although in the near future I think the people might have a very strong claim for it.

249. You made some reference in your evidence to a statement in *Hansard*, and to some statement made by Mr. Garrett when he was Minister for Lands; would you look those up and forward them to the Secretary? Mr. Frank Farnell, who, I understand, is to be examined, has a much more accurate knowledge of the correspondence than I have, and no doubt he will be able to give you the information.

250. But you say there was a statement in *Hansard*? There was a statement made in the House which I shall be very glad to look up and send to the Committee.

251. *Dr. Garran.*] Reckoning from the obelisk in Macquarie Place, how far do you call it from Sydney to Solomon's Corner by Pyrmont Bridge? I think it is about  $6\frac{1}{2}$  miles. It is  $7\frac{1}{2}$  miles by Harris-street.

252. How far is it from the same point by way of North Shore and the Lane Cove Bridge? I think it is about the same distance.

253. Then so far as a person living at Solomon's Corner is concerned, if this bridge is made it will be as short to go one way as the other? Certainly not—they will save one mile and a quarter.

254. I thought you said it was the same distance? It is the same distance round both ways as the roads are at present, but if a bridge were put across Tarban Creek as proposed there would be a saving of about one mile and a quarter.

255. So far as the people on the North Shore side of Lane Cove are concerned they are reasonably provided for by the new railway are they not? I do not see that the railway is any great advantage to them.

256. Will they not make to the railway? I do not think so.

257. Do you believe that the people living there would cross this bridge and come to Sydney by road? Certainly not. I am speaking of the general population. I do not think that the railway is any use to the people over there at present.

258. But supposing the railway has a good terminus do you not think that it will accommodate the Lane Cove Road population? Yes, the Lane Cove-road, but not the Lane Cove River. It would run along the road.

259. Then you do not look at this bridge as being of any service to them whatsoever? I do not think it is of any service to them.

260. No service purely to Hunter's Hill? No, of service to the general community who like to drive about and see the country. It is a very nice drive—one of the best, if not the best drives about Sydney. You must have noticed the beauty of the drive yesterday.

261. Do you advocate it merely as a tourists route? It is to a large extent a tourists route. It is a very favourite drive from Sydney.

262. It is not so much required for the service of the Hunter's Hill residents as for the convenience of pleasure drivers? That is the case.

263. I understood you to say that you would not advocate this bridge on its own merits purely and simply, if it were not for the funds derivable from the Field of Mars Common? Well, it is my duty to advocate it as a representative of the municipality in these days when a man is bound to get everything he can.

264. I am speaking of the question on its merits? I hardly think, candidly speaking, that we should be justified in asking for the bridge if we had not some special claim.

265. Granting that this fund is still in existence as you contend, is there not also a supposed charge upon it on account of the new tramway? Yes a small amount—only about £19,520.

266. Do you not think, as Mayor of the municipality, that a tramway is on the whole a superior advantage to the proposed bridge? Unquestionably.

267. Then do you not think that the tramway expenditure should be the first charge upon any balance? I do.

268. Then even admitting that there is a sum of money available you do not propose to spend any money on this bridge until you have seen how much it will cost to make the tramway? No. I think the tramway is the first thing that should be considered.

269. Then on your own argument you would not vote anything for the bridge until you had seen whether the tramway would exhaust all the balance? If the tramway was to be secondary to the bridge I certainly should not, because I consider the tramway to be of paramount importance.

270. And you put the bridge second? Yes.

271. Then on your own showing this bridge should wait until we see whether the tramway will exhaust all the available resources? I do not think there is any question about available resources because the Government have already estimated the cost.

272. But they may have over-estimated the cost? But even making a liberal allowance for an over-estimate.

273. Surely as a man with a knowledge of finance you would say "let us see what the tramway will cost first"? Well if I had the disposal of the common I should carry out both works, for I am satisfied that by doing so the Government would be largely in pocket.

274. You would carry out both works if you had to pay any loss out of your own pocket afterwards? I should certainly take the risk of it if I had the common. I would pay for both if they would give me the balance of the common.

C. E.  
Jeanneret,  
Esq.

6 Mar., 1890.

C. E.  
Jeanneret,  
Esq.  
6 Mar., 1890.

275. At any rate you admit that the tramway has the first claim? Yes.
276. *Vice-Chairman.*] Have you any recollection of the circumstances under which the common known as the Field of Mars was originally granted? Yes.
277. It was granted to certain trustees for certain commoners? Yes.
278. I have just looked at the Act, and I see that those commoners were described as "settlers, cultivators, and other inhabitants of the Field of Mars and eastern farms, in the county of Cumberland." Do you know whether the residents of what are now called Hunter's Hill and Gladsville came within the category of the Field of Mars? They called them the eastern farms, I think.
279. Is it the case that certain grantees had Crown land in the eastern farms with the rights of commonage? I happen to be interested myself in one of the barren blocks that lie about Woolwich. It is utterly destitute of grass and would not feed a mouse, and yet it is described as one of the eastern farms. At any rate we all took part in the surrender of the common, and in fact the Hunter's Hill people were the principal agitators.
280. But the common was in the hands of trustees—those trustees being the Revd. Mr. Turner, Mr. Devlin, and Mr. Isaac Shepherd? Yes, they were elected by the commoners and we always took part in the election.
281. You had a vote in the elections? Yes.
282. You are sure of that? I am certain.
283. Did you own any part of the eastern farms yourself originally, which embraced commonage rights? Yes.
284. Were the commonage rights provided for in the original grant? All I know about it is that I was often called upon to vote for the election of trustees, and one thing and another. I had the right of depasturing my stock, and the right of cutting timber, which other people had not. No one could cut timber on the common, except these who had commonage rights, without express permission from the trustees.
285. You had that right? Yes.
286. Where was your property? At Hunter's Hill.
287. *Mr. Copeland.*] How did you get that right? By virtue of being a freeholder.
288. But did your Crown grant stipulate that you should have any special commonage rights? No, I do not think so. I do not think any of the grants specified that.
289. Then it was simply a common for the use of owners of land, just the same as every other common in the country, except that, along with a few others, it was dedicated for commonage use, and vested in the hands of trustees? Yes. I was under the impression that the parish of Hunter's Hill was more particularly described than appears to be the case from Mr. Lackey's quotation from the Act. When I speak of the parish of Hunter's Hill, I do not mean that portion which is now known as Hunter's Hill, as distinct from the parish of Ryde; but I refer to the whole of that district as the parish of Hunter's Hill. It is now the parish of Hunter's Hill.
290. *Vice-Chairman.*] Hunter's Hill was originally the name of a private property, was it not? I fancy Hunter's Hill is what is now called Ryde. What we call the Municipality of Hunter's Hill was comprised in not more than five or six grants, and a few whaling allotments, and that would embrace the whole parish of Hunter's Hill.
291. *Mr. Copeland.*] Do you know of a single grant, in the whole of that neighbourhood, that had any special conveyance of commonage rights, or any provision with reference to commonage rights? No, I do not.
292. Then it follows that this common was exactly the same as dozens of other commons in other parts of the country? It was granted as a common, and vested in trustees for the use of the people resident in the neighbourhood; but on account of its having been vested in trustees it could not be resumed by the Government at that time, without a special Act of resumption? I think it was vested and re-vested. I think there was a promise, or dedication in some way, and then there was a re-vesting under some special conditions.
293. *Mr. O'Sullivan.*] Would not a large proportion of the traffic that would cross the proposed bridge, be that of pleasure-seekers? A very large proportion of it—persons coming out for a drive, taking a circuit from Sydney to North Shore, and back again over the bridges. It is a favourite drive.
294. Do you think those pleasure-seekers would object very much to drive one mile and a quarter through that beautiful country? I do not think they would make any great objection, but still they would like to shorten the distance, because it is a good long drive—about 14 or 15 miles round—and a great many more would take the drive if it were a mile or so shorter.
295. If, as you admit, the population to the east of the bridge, at what we now call Hunter's Hill, are served by the ferry boats, and if a large proportion of the traffic across the bridge would be that of pleasure-seekers, there would seem to be no immediate necessity for this work? I think it might be taken into consideration that nearly all the people at Hunter's Hill are supplied with their necessaries from Sydney, and that all the working men going to work there drive round in their spring carts. I see great numbers of them going round that way, and the provisions are nearly all drawn by the road. All the business people in Sydney send their carts round that way.
296. Do you think that the construction of this bridge would be likely to militate against your chance of getting a tramway? I do not think it would in the slightest degree.
297. *Mr. Humphery.*] How long does the steamer take to travel between Hunter's Hill and Sydney? From Hunter's Hill wharf to Sydney from 25 to 30 minutes.
298. How long does it take to drive from Hunter's Hill to Sydney? It depends upon the speed of the horse. I can never do it under an hour and 10 minutes.
299. If the bridge were constructed the time would be reduced by 7 or 8 minutes, or at the most 10 minutes? The distance would be reduced by one mile and a quarter.
300. By a mile and 5 chains? That would be about 10 minutes.
301. So that there is a steamer journey of less than 30 minutes against a road journey of an hour? Yes. People would not drive into Sydney on business, that is certain.
302. Is there one public vehicle plying for hire between Hunter's Hill by the road? No.
303. Who are the people who travel from Hunter's Hill to Sydney by road? Only persons who want to drive round to see their friends—persons calling or something of that sort, and persons who want to go to Petersham,

Petersham, Ashfield, Burwood, or any of those western suburbs. All persons wanting to go to any of the western suburbs will, of course, drive; and also all people sending round provisions, goods, and building material, or anything of that sort.

C. E.  
Jeanneret,  
Esq.

304. If the bridge were constructed the saving in time would not exceed 10 minutes? Not for a swift-going vehicle, but I should think that a horse and cart conveying building material would save 20 or 25 minutes, besides avoiding some very steep grades.

6 Mar., 1890.

305. *Mr. Garrard.*] That would be a very slow horse? Well, it would save a good bit.

Frank Farnell, Esq., M.P., sworn, and examined:—

306. *Vice-Chairman.*] You are a member of the Legislative Assembly, representing Central Cumberland? Yes.

F. Farnell,  
Esq., M.P.

307. How long have you represented that district? For three years.

308. You know the site of the proposed bridge over Tarban Creek? Yes.

6 Mar., 1890.

309. Do you think it is a desirable work? Well, there are other works of a more urgent character that might be carried out—for instance, there is a bridge over George's River at Liverpool. At the same time I think it is a necessity that the bridge should be constructed.

310. Do you know anything about the history of the Field of Mars Common? Yes; in 1804 the original grant was issued and trustees were appointed, but owing to disinclination on the part of the trustees to act, the deed of trust lapsed and new trustees were appointed in 1849. Time went on, and the people living at Ryde, Hunter's Hill, and Gladesville were anxious for a quicker means of getting to town. The only accommodation for crossing the river which existed in those days was afforded by a punt. They made a bargain with the Government that if two bridges were constructed, one over Iron Cove and one over the Parramatta River they would cede the Field of Mars Common to the Government on the understanding that if the common were sold the cost of the bridge should be taken from the proceeds, and any surplus should be spent on improvements in the district. In verification of this statement I may quote the following letter, written to Mr. Joubert by Mr. Fitzpatrick in 1861, when the latter gentleman was Under Secretary for Lands. It is as follows:—

Department of Lands, Sydney, 10 July, 1861.

Sir,

Referring to your letter of the 20th February last, submitting, on behalf of some residents of Hunter's Hill and Five Dock, observations in support of the petition presented by Messrs. Lyons, Blaxland, and others from certain persons holding a right of commonage over the Field of Mars Common, I am directed to inform you that, a report having been received from the Acting Surveyor General as to the value of the land, Mr. Secretary Robertson consulted his colleagues on this matter, and they concur in the desirability of obtaining legislative powers to enable the Government to sell the common, as prayed for in the petition under reference, and to apply the money derivable therefrom to the formation of a road and the construction of bridges, so as to connect the north side of the Parramatta River more directly with Sydney, as proposed by the petitioners. Any surplus funds to be expended in other public works of general advantage to the people having a right to enjoy the commonage reserve in question. I am to add that the necessary communication has been made to the Crown law officers, for the preparation of the requisite bill for the purpose.

I have, &c.,

MICHAEL FITZPATRICK.

In conformity with the request of the Minister for Lands a Bill was submitted to Parliament and passed, and it now stands on the Statute Book as 38 Victoria, No. 3.

311. That Act says nothing about building bridges? No; but a distinct promise was made that any surplus after paying for the erection of the bridges should be spent on works which would be of advantage to those who had a right over the common.

312. Do you recollect who were the commoners originally? The commoners were those people who were resident in the Ryde District.

313. Those holding certain grants which carried with them commonage rights? Yes.

314. Do you know who they were? I think Mr. Devlin was one, and the others were Mr. Squire and Mr. O'Donnell.

315. Certain grants were given in the early days to the occupants of what were called the eastern farms with the right of commonage? Yes.

316. What I want to get at is whether the neighbourhood in which the proposed bridges are to be constructed comprised land belonging to the original owners? Yes; it did.

317. Do you recollect who were the original holders of what are now called Gladesville and Hunter's Hill? My father's predecessors were holders of a large estate there containing, I think, 1,000 acres, and which was known as the Squire Estate.

318. That was near Ryde? No; it was within the present boundary of the Municipality of Hunter's Hill.

319. *Mr. Garrard.*] Where is the boundary of Hunter's Hill;—how close is it to Gladesville? Gladesville just joins Hunter's Hill.

320. It comes across Tarban Creek westerly? Tarban Creek forms a division between the Ryde Municipality and Hunter's Hill.

321. Hunter's Hill does not go into Gladesville? No.

322. You do not know of your own knowledge whether any of the grants for the eastern farms, Ryde, or Hunter's Hill, contained any special reference to the rights of the grantees to the common? That I could not say. I can only speak from hearsay.

323. There were certain grantees there, then a common was given to them, and there were no specific rights under their deed of grant to this common? I do not know the provisions contained in the deed.

324. Do you think the Government would be justified in spending money on a bridge at this particular place, which would serve so few people and cost so much, when after all it would only save about 1 mile and 5 chains? It saves backwards and forwards over 2 miles. As I said before, it is under peculiar circumstances that we ask for the construction of this bridge.

325. Putting on one side altogether any compact between the Government and the commoners as to the expenditure of money realised from the sale of the Field of Mars, do you think the Government would be justified in erecting a bridge there now, if the money had to come out of the ordinary consolidated revenue? If the money were to come out of the ordinary consolidated revenue and there were funds at the disposal of the Government, I should say, "Yes." But if the money were to come of a loan, I should say, "No;" because I do not believe in that principle. I have always opposed the building of bridges out of loan votes.

- F. Farnell,  
Esq., M.P.  
6 Mar., 1890
326. Is it not a fact that the people of Hunter's Hill and those on the northern side of Lane Cove River who would be served primarily by the erection of this bridge now go to and from Sydney principally by boats? A great many people travel by the boats, but a greater number of pleasure seekers drive round the road on Saturday afternoons and Sundays. And then there are a lot of people who live over Hornsby way who take a route across Lane Cove bridge, and right round past the Gladesville Asylum. The people of Hunter's Hill who have rights in connection with the Field of Mars, and who claim that this bridge should be built, are not influenced in the matter by selfish motives but are acting more in the interests of tourists and others who would use the bridge. It is in the interests of the general public that we are asking for this bridge, and not in the interests only of the people who live at Hunter's Hill.
327. So far as the people of Hunter's Hill are concerned very few of them would use it if it were built? They would all use it who had vehicles and wanted to go to Sydney.
328. How many people at Hunter's Hill have vehicles of their own? I do not know. There is a population in the district of about 4,000.
329. But as a matter of fact, when they come to town they usually come by the steamer? Yes; but if they wanted to visit any of the other suburbs they would have to go round by the road, which is not all that could be desired.
330. Will you look at this plan. The red line across Tarban Creek shows the proposal before the Committee. The blue line shows the alternative proposal of the Department for a bridge. Do you think the latter would be of any use to the people of Hunter's Hill and Lane Cove? If you could construct that at a somewhat less cost and make it a wooden instead of an iron bridge it would meet the requirements and would shorten the distance.
331. Not so much? No; but the people would be satisfied to take the alternative proposal.
332. And with regard to the proposal indicated by the pencil line further up? It would be better not to have it at all. We might just as well go right round.
333. *Mr. Trickett.*] With regard to people going to the Field of Mars, I apprehend that this bridge would not be of very much use? Yes, it would be of use to those people who have purchased land at the point nearest to Sydney.
334. But the Field of Mars is considerably to the west of Hunter's Hill, is it not? No, not exactly to the west, more to the north-west.
335. However, the bridge would be of greater benefit to the people of Hunter's Hill than to those living at the Field of Mars? It would be of equal benefit to the purchasers of the Field of Mars, who, I believe, had a promise that the bridge would be erected.
336. What promise was that? It was a sort of informal promise made by the Minister.
337. On what occasion was it made? It was made by my father when he was Minister for Lands; but I think his proposal was vetoed by the other members of the Cabinet—the same as the tramway proposal.
338. *Mr. Jeanneret*, in his evidence, said that some statement as to this bridge was made in Parliament by *Mr. Garrett*; do you know of any such statement? Not as to the bridge, but as to the tramway. I have had promise after promise.
339. But not as to the bridge? No.
340. We would be glad if you could enable us to ascertain whether any promise with regard to the bridge has ever been made; are you aware of any? I know it was stated by my father at the sale, or at any rate to the purchasers—it may have been stated by the auctioneer on my father's behalf,—that the bridge would be constructed. This matter was first taken up by *Mr. Tornaghi*, when he was Mayor of Hunter's Hill, about ten years ago, and I renewed the application a few months ago, with the result that the proposal was referred to this Committee, but further than that I know nothing. I do not know of any direct promise having been made in the Assembly.
341. Has there been any agitation for this bridge in Hunter's Hill that you are aware of? I know this, that when I first contested the constituency I advocated the construction of the bridge, and my sentiments were cheered, if that can be taken as any indication.
342. Do you not consider that the construction of this bridge at the present time at such a large expense would be more a luxury than a necessity? It is not of that urgent nature that other proposals might be, as, for instance, a bridge over George's River, where 30 lives have been lost, and where nothing has been done. I should say that that deserves to be attended to before Tarban Creek, most certainly.
343. You look upon it rather as completing the series of bridges? Yes.
344. That connecting the Parramatta bridge with the Lane Cove bridge, it would make a direct line of bridges in that direction? Yes.
345. I think in one of your letters to the Department you said that a foot-bridge might answer all purposes? Yes; I think a foot-bridge might answer. It would shorten the distance for foot passengers. At one time it was proposed to have a tramway running across the Parramatta River bridge, and I thought the people of Hunter's Hill might use the tramway, and that a foot-bridge would give them easier access to the tramway.
346. Even if the bridge were constructed, would not the greater part of the people of Hunter's Hill still go to Sydney by the steamers as the quickest and shortest route? There is no doubt about that.
347. *Mr. O'Sullivan.*] From your evidence I gather that you consider that this bridge is not a pressing work? No; it is not a pressing work.
348. And that, if the alternative bridge were constructed, that would satisfy the requirements of the district for some time to come? Yes. I should like to say in regard to the sale of the Field of Mars, that the highest price realised at the sale was £300 per acre. When my father was Minister for Lands he received an offer to purchase the whole common for £750,000, but he could not deal with the matter except by special Act of Parliament.

Angelo Tornaghi, Esq., sworn, and examined:—

- A. Tornaghi, Esq.  
6 Mar., 1890
349. *Acting Chairman.*] You live in the neighbourhood of Hunter's Hill? Yes; I have lived there for twenty-eight years.
350. You know the site of the proposed bridge? Yes.
- 350½. Do you consider the work a desirable one? If a bridge were constructed there it would shorten the distance to Sydney by a mile and a quarter, and avoid a big hill. I may say that I was a large purchaser of land at the Field of Mars, and gave as much as £300 an acre because I heard that there was to be a bridge and a tramway, otherwise I would not have paid such a price. 351.

351. Is the proposed site the one where the people desire to have a bridge? Yes; the matter was decided long ago. A. Tornaghi,  
Esq.
352. Is there any division of opinion as to the site? I have never heard of any.
353. All agree that it is the proper place? Yes. It is in a straight line from one bridge to the North Shore. It will be quite a straight line all through. 6 Mar., 1890.
354. In what parish is your property? Hunter's Hill.
355. Do you come under the denomination of a commoner. Are commonage rights attached to your property? No. The property I bought was in Ryde, but we expect to divide it and make it so that it will always be in Hunter's Hill. The common was in the Ryde district.
356. *Mr. Copeland.*] I believe you were present when the Field of Mars Common was sold by auction? Yes.
357. Did you make any purchases at that sale? Yes. Mr. Farnell was there, and he said there was to be a bridge and a tramway soon, and it was on the strength of that statement that I bought the land. I was the biggest buyer and paid a very high price.
358. I suppose there were a good many people present at the sale? Yes. At the second sale, which took place at the auction rooms, I bought some more land, and on that occasion the auctioneer stated that it had been decided in the Cabinet that there should be a tramway and communication to the spot.
359. Do you say that the auctioneer made that statement when he was selling the land? Yes; on the second occasion.
360. Did the auctioneer make any public statement when the first sale took place? No; the statement was made by Mr. Farnell.
361. The auctioneer himself made no public announcement at the first sale? No.
362. Did Mr. Farnell make a public announcement, or was it merely a conversation? He made it there. He said that a tramway would soon be there, that it would be a great convenience to go quickly to Sydney, and I bought land on that very account.
363. The Committee would like to know how Mr. Farnell made this statement. Did he get up and make a speech, or did he get on a stump and make the announcement? It is some years ago now, and I could not say. He was close to the auctioneer, and I heard him say that a tramway or communication would soon be made to the spot to bring it within 25 minutes of Sydney.
364. If this tramway is constructed, I suppose that all Mr. Farnell promised will have been carried out? From that point of view it might be so, but if I am not mistaken, I remember on one occasion going with a deputation to Mr. Lackey, then Minister for Public Works, when I heard it stated that a bridge was required.
365. Are you alluding to the bridge over Tarban Creek? Yes.
366. Did Mr. Farnell make any statement at the time of the auction sale to the effect that a bridge would be built by the Government over Tarban Creek? No; I do not remember that he made any statement of that kind.
367. Were you at the second sale? Yes.
368. And heard what was said by the auctioneer? Yes. The auctioneer said that the Cabinet had decided to have quick communication by tramway.
369. Did he make that statement publicly before the sale took place? Yes.
370. That a tramway was to be built? A tramway—very quick conveyance to the place.
371. But did the auctioneer make any reference to a bridge over Tarban Creek? No; that I do not remember.
372. Suppose the Government construct this tramway to the Field of Mars, will you not then consider that they have complied with all their promises? I suppose it is what I understood at the time, but the bridge was promised to us long ago. I was Mayor at the time, and I came to Sydney and went to some expense to have soundings taken.
373. Have you not had sufficient experience of Ministers to know that a great many things are promised that are not performed? But I think that when a Minister promises a thing it should be performed.
374. You know that promises are generally made under the supposition that they will be carried out if convenient? Well, this bridge is very much needed to open up all that country, and afford communication right through with the North Shore.
375. With regard to the first sale at the Field of Mars, are you quite sure that Mr. Farnell, standing alongside the auctioneer, made that public announcement? Yes, I am positive of that.
376. Before the sale took place? I cannot say whether it was before or after the sale, but I clearly heard Mr. Farnell, standing close by the auctioneer's side, make that statement.
377. What did he say? He said "We will soon have communication to go through in 20 or 30 minutes from Sydney."
378. *Mr. Garrard.*] By road? I believe he meant a tramway.
379. *Mr. Copeland.*] Did he mention the word tramway? I believe he did.
380. What year was that in? I cannot remember. It was five or six years ago. I bought on that day over £3,000 worth of land.
381. *Mr. Garrard.*] Will you tell us the name of the auctioneer who was on the ground, and also the auctioneer who sold at his rooms? I cannot recollect the names.
382. Were the auctioneers Messrs. Mills and Pile? It was the stout gentleman, Mr. Pile.
383. Was he the auctioneer on both occasions? Both Mr. Mills and Mr. Pile were at the sale on the ground, and at that which took place at the auction room there was only Mr. Pile.
384. *Mr. O'Sullivan.*] When you gave £300 per acre for the land did you have much competition? Yes, there was competition. Of course, directly it was stated that we should have such quick communication, there was competition at once. I should not have bought so much but for that statement, as I already had plenty of land.
385. Was it the competition that forced you to pay the £300, or were you induced to do so by the prospect of getting a tramway? It was the prospect of the tramway that caused the competition.
386. You believe that the prospect of getting a tramway induced a brisk competition? Certainly; it induced me to compete at all events.

TUESDAY, 11 MARCH, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN.)

The Hon. JOHN LACKEY.

The Hon. ANDREW GARRAN.

The Hon. FREDERICK THOMAS HUMPHERY.

The Hon. WILLIAM JOSEPH TRICKETT.

JACOB GARRARD, Esq.

HENRY COPELAND, Esq.

EDWARD WILLIAM O'SULLIVAN, Esq.

JOHN HURLEY, Esq.

The Committee further considered the proposed Bridge over Tarban Creek, Parramatta River.

George Pile, Esq., auctioneer, sworn, and examined.—

- G. Pile, Esq. 387. *Mr. Copeland.*] I believe you were the auctioneer who sold the land at the Field of Mars on the occasion of the first sale. Yes.
- 11 Mar., 1890. 388. Did you receive any instructions in writing from the Lands Department prior to the day of the sale? I do not recollect receiving any special written instructions beyond our appointment as the auctioneers for the sale.
389. Did you receive any authority in writing from the Department to make any statement with reference to the future intentions of the Government about spending the proceeds of the sale. No.
390. Did you at the time of the sale make any statement in a business way to the effect that the proceeds of the sale would be expended in constructing a tramway or in building bridges? No, neither verbally, nor in writing, did I make such a statement.
391. What statement did you make? At the first sale we, as auctioneers, made no promises on the ground, but promises were made in my hearing by the then Minister for Lands, Mr. Farnell.
392. Was that at the first or at the second sale? At the first sale. Mr. Farnell made this statement on the ground. We made no promises.
393. Did Mr. Farnell make the statement publicly, the same as you read out the conditions of sale? Mr. Farnell was surrounded by a number of friends and purchasers, and he told them in my hearing, not as to how he would expend the money, but that the Government would construct a tramway.
394. That was said merely in a conversational way? Yes.
395. It was not stated from the rostrum? No. But at the second sale we were authorized by the Department to promise a tramway.
396. What was the date of the first sale? It was about 1885, I think, and the second sale was held in our rooms a few days afterwards.
397. The second sale was merely to sell the odd pieces, I suppose? Yes.
398. On that occasion you were instructed in writing by the Department to make this promise? Probably by the officers of the Department.
399. By whom? By a Mr. De Lowe.
400. He instructed you to state that the Government would build a tramway to the Field of Mars? I think it was at that sale. I was informed that there was a Cabinet meeting over the question.
401. I suppose you made the statement? We did at the time of the sale. At the first sale the only promise made was by the Minister for Lands himself.
402. Do you think the making of that promise induced any persons to purchase lots? Yes. The general question asked of us by numbers of purchasers at the sale was, "will there be a tramway constructed, because otherwise how are we going to get to this land?" and we said: "We will make no promises at all." In point of fact, at the commencement of that sale I made no speech whatever; I simply read the conditions of sale.
403. At the first sale? Yes.
404. But at a subsequent sale, on the authority of the Department, you stated publicly, as a condition of the sale, that a tramway would be made? Yes.
405. Are you sure it was Mr. De Lowe who authorized you to make the statement? He was the principal who instructed us, there were two other clerks. My memory is quite clear that the instruction was given by one of the officers of the department, and I think it was Mr. De Lowe.
406. *Mr. Trickett.*] Was Mr. Farnell's promise made at the outset or at the conclusion of the sale? The sale was a very long one, and at the end of three hours I got down from the rostrum, and my partner, Mr. Mills, took my place. I went over to speak to Mr. Farnell. I had to wait a little while before I could get an opportunity of saying anything to him. But I heard him promise distinctly to a number of people—at least half-a-dozen—that there would be a tramway, or that the Government would construct a tramway.
407. Had much of the property been sold then? A very large quantity.
408. The bulk of it? When I got down from the rostrum I suppose that fully one-half of the land submitted to auction had passed the hammer, one way or the other.
409. Would that be the greater part that would be benefited by a tramway? I cannot say that. The lots are so irregularly arranged in numbers, jumping from one side to the other, that it is very difficult to say that.
410. If you do not remember who was the officer that gave the instructions to you, possibly you would remember when you received them—was it on the morning of the sale? It is such a long time ago that I cannot pretend to remember positively, but on the morning of the sale we were informed that there had been a Cabinet meeting, and we were authorised to announce that a tramway would be constructed to the Field of Mars, and we made the announcement.
411. Were many allotments sold at that sale? A considerable number.
412. *Mr. Garrard.*] For how long did Mr. Mills continue the sale after you left the rostrum on the first occasion? I got into my buggy almost at once and drove home as quickly as I could.
413. You don't know how much Mr. Mills sold that day. Did he sell as much as you did? About half as much in area.
414. Do you think that the making of this promise by Mr. Farnell had anything to do with the sales effected by him? I think so, for from what I subsequently heard, I think it had also with regard to a large

large portion of the land which I sold. Mr Farnell was surrounded by a number of friends and admirers, G. Pile, Esq. and he was within twenty yards of the rostrum for a considerable time before I got down.

415. So you have every reason to believe that Mr. Farnell made this promise some time prior to your getting down from the rostrum, and that it had a good deal to do with the success of your sale? I think that to a large extent the very high prices I got—three or four times the value—were due to the belief that there would be a tramway constructed to the ground. 11 Mar., 1890.

416. *Mr. O'Sullivan.*] You said just now that when Mr. Farnell made this statement he was surrounded by a number of friends and purchasers? Admirers I said.

417. But you used the word "purchasers" in the first instance. Would not that imply that it was made after the land had been sold to them? I cannot pretend to say that. I only know that what he said was heard not only by those he was addressing, but by others who were standing near him.

418. Could his voice be heard above the voices of the bidders? I think it was pretty well understood by the crowd that Mr. Farnell had promised that there should be a tramway.

419. Had he been promising that all the time the sale was on? I think that for a considerable portion of the time he had made the statement and it was generally understood that he had.

420. *Mr. Copeland.*] It was "in the air,"? Yes, like federation is now.

421. *Mr. Humphery.*] Do you remember the amount realized at the second sale, at which a distinct promise was given? I cannot recollect the amount, but the total sum realized at these sales was somewhere about £57,000.

422. *Mr. Hurley.*] Can you give us any idea as to the value per acre of the lands still unsold in the whole of the Common? I should think it is worth from £15 to £20 an acre.

423. Do you think it would average that price right through? I think so from what I know of the land.

Mr. Robert Henry De Low, Officer-in-charge of the Miscellaneous and Alienation Branches in the Lands Department, sworn, and examined:—

424. *Mr. Copeland.*] What position do you occupy in the Lands Department? I am officer-in-charge of the Miscellaneous and Alienation Branches. Mr. R. H. De Low.

425. You held a similar position when the Field of Mars Common was sold by subdivision? I was in charge of the Alienation Branch at the first sale, and in charge of both branches at the second sale. 11 Mar., 1890.

426. Do you remember giving instructions to Mr. Pile, of the firm of Mills & Pile, to sell the allotments at the first sale? I recollect that instructions were given to him, and I take it that they would go through me—of course with the authority of my superior officer.

427. Do you remember the instructions which were given at the second sale? Yes.

428. Do you remember giving those instructions yourself? I believe I gave them myself.

429. Did you give any instruction with reference to the auctioneer announcing that the Government had decided to build a tramway to the common? I do not recollect positively giving that instruction, but I have every reason to believe that I did, because I find a Cabinet minute amongst the papers.

430. Will you read the minute? It reads as follows:—"Cabinet authorize the Minister for Lands to announce in connection with the sale of the Field of Mars Common that the Government intend to construct a tramway to that locality." It is initialled H.P., and dated 18th April, 1887.

431. The Parkes Government were in office at that time? Yes.

432. Who was Minister for Lands then? Mr. Garrett.

433. I suppose you conveyed that decision to the auctioneers? I have every reason to believe I did.

434. I suppose, as a matter of fact, that decision was arrived at with a view to induce persons to buy the land? I have every reason to believe so from the papers. The sale to which reference is made there—the second sale—was announced to take place at the rooms of Mills & Pile, on the 24th March, 1887. Mr. Garrett announced to the Legislative Assembly a day or two before the date of the sale that he had decided to postpone the sale in order to consider the fate of the Land Bill then before Parliament, and the route which the tramway should take to the Field of Mars. The sale was postponed and it took place on the 5th May, 1887.

435. *Mr. Garrard.*] What is the date of the first sale? Saturday, 26th September, 1885.

436. And there was a continuation sale—which has been referred to as the second sale—in Mills & Pile's rooms two or three days afterwards? On Wednesday, the 30th September, that is part and parcel of the first sale.

437. You speak of it as one sale? Yes.

438. Did you give any instructions with reference to that sale? None whatever.

439. Were you on the ground on the Saturday? I was.

440. Was Mr. Farnell present? Yes, he was not near the auctioneers but in the crowd at the back.

441. Did you hear him promise or say anything in connection with the construction of a tramway? No. I heard no promise whatever made by Mr. Farnell.

442. Who officiated as auctioneer? Mr. Pile started the sale, and Mr. Mills relieved him when I should say he was really worn out.

443. Was much land sold after Mr. Mills mounted the rostrum? Yes a fair quantity.

444. Half as much as Mr. Pile had previously sold? I am not in a position to say that.

445. Were you close to Mr. Farnell during the sale? No.

446. So that, without you hearing it, he might have stated, not to the auctioneers, but to the people round about him that a tramway was to be constructed? It was possible for him to do so.

447. In connection with the continuation sale was any instruction given to Mills & Pile about the construction of a tramway? None whatever that I know of.

448. They had no instructions in addition to what they had for the previous Saturday's sale? None whatever.

449. You are quite sure that none were given? Quite, because they would have come through me if they had been given.

450. The second sale took place on the 5th May, 1887, were you present on that occasion? I was.

451. Was any promise held out by the auctioneer, on behalf of the Government, with reference to a tramway? I believe Mr. Pile announced the contents of the minute which I have just read.

452. On the ground? In the rooms, in Pitt-street.

453. There was no continuation of that sale? No.

£454.

Mr. R. H.  
De Low.  
11 Mar., 1890.

454. Were you instructed by the Minister, or by your superior officer, to inform Mr. Pile of the contents of the minute? I was instructed to convey the terms of the minute to the firm.
455. Do you think that the publication of that minute had anything to do with the getting of the prices which were obtained at the second sale? I think it influenced the sale.
456. Very much? I am not prepared to say that.
457. It had an influence on the sale? That it had an influence I feel certain.
458. There have been no other sales since then in connection with this common? There have been sales since then of parts of the Field of Mars, more particularly those near the Homebush-Waratah line. The parts referred to in the minute are those which are known in the office as the Lane Cove parts of the common.
459. Have there been any auction sales of parts of the common near Ryde? No; but there have been sales of the parts situated at Beecroft and Carlingford.
460. Was any promise made then about expending the proceeds of the sale in improving the district? Not that I know of.
461. As a matter of fact large improvements—particularly the construction of roads—had been made before the sales took place? Yes, by the Government.
462. How much was realised at the first sale, in 1885, and at the sale in 1887? Speaking from memory I believe that the sale held on the 26th and 30th September realised £52,000. I am not in a position to say what was realised at the sale in 1887.
463. Can you state the amount approximately—was it more or less? Far less.
464. Whatever promise was made about the tramway would only apply to the sale on the 5th May, 1887? In my opinion it would apply only to that sale.
465. *Mr. O'Sullivan.*] Had you heard anything of this promise before the sale of 1887? I had heard it rumoured that the Government had promised at the sale, on the 26th September, 1885, that a tramway would be made. I had heard it as a matter of talk amongst citizens.
466. Did it come before you, as a public officer, having charge of that sale? No.
467. The first official notification you got of the promise was the Minute of 1887? Yes.
468. *Chairman.*] Will you supply a return, showing what was realised for each allotment at the different sales? Yes.
469. *Mr. Garrard.*] Can you state whether the sale on the 5th May, 1887, comprised parts of the Lane Cove portion of the common, the same as the sale of 1885 did? It comprised the lots unsold on the 26th September, 1885, and a few in the Homebush-Waratah part of the common.
470. The bulk of the sale was virtually the ground which was unsold in 1885? The greater part of it was.
471. *Mr. Copeland.*] At either of these sales was any reference made to building a bridge over Tarban Creek with the money? Not that I know of.
472. Do you know that the Department were in any way committed to the building of a bridge over this creek? Only so far as I was aware from the contents of the Field of Mars Resumption Act.
473. Does it contain any reference to that bridge? Not by name.
474. It refers to a bridge across the Parramatta River? Yes.
475. And that bridge was built. Yes.
476. There is no reference in it to a bridge over Tarban Creek? None whatever.
477. You are not aware of your Department being committed in any way to building a bridge over the creek? No.
478. *Mr. Garrard.*] Is there any record in the office of the conditions under which the commoners gave up this common to the Government—is there any correspondence from the commoners agreeing to give up the common on certain conditions? It is some time since I looked through the papers, but I am of opinion that there is a very old letter amongst the papers containing some expressions to the effect that the people up there gave up their common on condition that money should be spent in the district.
479. Did not the Field of Mars Resumption Act virtually embrace, and was it not accepted by the Commoners as a contract of the Government with them? I am not quite prepared to speak on that point. My view of the matter, from my official knowledge, is this; the common was resumed because it was nothing more or less than a piece of waste land at the time, and it was not right that it should remain so close to Sydney without there being any means of alienating or dealing with it.
480. *Mr. Copeland.*] There were a number of alienations of land round this common in the early days of the colony—have you ever seen a copy of any of the original grants? No.
481. Do you know whether any of those original grants conveyed any right of commonage to the Field of Mars Common? No.
482. How did these people come into the position that they were able to dictate to the Government or to offer any terms to the Government as to what was to be done with the proceeds of the sale of the common? I do not know.
483. Was not the position taken up by these commoners different from the position taken up with reference to any other common in the colony? I think not.
484. Do you know any other instance where commoners have had the proceeds of the sale of their common expended or promised to be expended in constructing a bridge or a tramway? I do not.
485. Would you not be able under the present law to resume this common without any necessity for a special Act of Parliament? I am inclined to think not, unless it can be clearly shown that the use for which it was granted has failed.
486. But when land is required for public purposes can it not be resumed in this way by laying a notice on the table of the Assembly for so many days, and then if no objection be taken to the proposed resumption within that time the notice has the force of law? The 105th Section of the Act of 1884 requires, according to the way I have been reading it that the purposes of the trust shall have failed.
487. Do you remember that a large common was resumed during 1886, when I was in office, somewhere near Windsor? Yes; the Wilberforce Common.
488. No special Act of Parliament was passed in the case of that common, and it was vested in trustees the same as the Field of Mars was, was it not? Yes.
489. Under the present law there would be no necessity to pass a special Act of Parliament, in order to resume the Field of Mars Common, it would be resumed under the Act of 1884? No. In the case of the Wilberforce Common we did issue a notice under the 105th section of the Act of 1884. We thought at the

the time that the notice was effective, but shortly afterwards when the commoners called the whole action into question the Attorney-General gave it as his opinion that our notice under that section could in no way cut out the deed of grant, that the deed of grant having issued it must prevail, and therefore the action of the Department was all null and void.

Mr. R. H.  
De Low.  
11 Mar., 1890.

490. Who gave that opinion? I do not remember at this moment.

491. Has not that common been resumed? No.

492. *Mr. Lackey.*] I suppose you know from the circumstances under which the commoners held the Field of Mars Common that their rights were given in the early days of the colony? Yes.

493. You have heard of the Eastern Farms? Yes.

494. They consisted of grants of land by deed of grant, or by purchase out in the Ryde district and that locality? Yes.

495. And as an inducement to people to purchase or reside there, and cultivate commonage was given over the Field of Mars Common, was that not so? I am not acquainted with the early details, because the office records do not help us in that respect. I rather take that to be the correct view, following the old English precedent as regards commoners' and villagers' rights.

496. Of course you know that the locality was one of the earliest settled agricultural places in Australia? Yes.

497. And that a great number of farmers settled there and were given grants in the early days of the colony owing to its contiguity to Sydney, and its adaptability for agricultural pursuits? Yes.

498. I think the Ham Common was granted about the same time under similar circumstances? Yes.

499. Pasturage rights were given to the Ham Common on the banks of the Hawkesbury in addition to whatever rights were conveyed by the grants of land; so that the commoners in each instance had an inherent right to the common, and the common could not be taken away from them under similar conditions to those under which reserves can be taken under the present law;—has that point occurred in the administration of commonage rights in the Lands Office? Not that I am aware of.

500. I suppose you do not recollect much of the early history of the Field of Mars Common? Only as regards some of the trespasses there, the greater number of them were rather encroachers than trespassers on the common owing to mistaken boundaries.

501. Are you aware that the commoners never agreed unanimously to any single act? No.

502. Are you aware that a resolution or Bill was brought before Parliament in 1862 or 1863 to enable the Government to dispose of the common? I have seen either a resolution or a reference to the matter among the official papers.

503. It was brought forward by a commoner who was a member of the Assembly? I do not recollect the particulars.

504. Do you recollect the rights of commonage followed the issue of grants? I do not.

505. *Mr. Copeland.*] Did you ever know a Crown grant which did convey rights of commonage? I never knew of a case of that kind.

506. *Chairman.*] Under the "Field of Mars Resumption Act" the Government are required to carry the proceeds of the sale of this land to a separate account, are they not? Yes.

507. Has that been done? I have reason to believe it has been done in the Treasury books.

WEDNESDAY, 12 MARCH, 1890.

Present:—

JOSEPH PALMER ABBOTT, Esq. (CHAIRMAN).

The Hon. JOHN LACKEY,  
The Hon. ANDREW GARRAN,  
The Hon. FREDERICK THOMAS HUMPHERY,  
The Hon. WILLIAM JOSEPH TRICKETT,

JACOB GARRARD, Esq.,  
HENRY COPELAND, Esq.,  
EDWARD WILLIAM O'SULLIVAN, Esq.,  
JOHN HURLEY, Esq.

The Committee further considered the proposed bridge over Tarban Creek, Parramatta River.

Francis Kirkpatrick, Esq., Chief Inspector of Public Accounts, and Consulting Accountant, sworn, and examined:—

508. *Chairman.*] What is your position in the Treasury? I am Chief Inspector of Public Accounts and Consulting Accountant.

509. You are aware that in 1874 an Act was passed to authorise the resumption and sale of the Field of Mars Common? Yes.

510. Provision was made in that Act by which the proceeds of the sale should be carried to a separate account from the Consolidated Revenue; has that been done? No. I might, perhaps, explain to the Committee that the authority is to carry the money "to the credit of a separate fund." That generally means a trust account; but the Act goes on to say "or account as part of the public revenue," consequently it was credited to the public revenue.

511. Has it been carried to a separate fund or account? No; it has been carried to the public revenue included in the heading—"Auction sales, Crown Lands."

512. Then you have no account in the Treasury which will separately show the proceeds of the sale of the land resumed under the Act? Not separately.

513. And the proceeds have been carried to the general revenue account under the heading of Auction Sales? Yes.

514. And no separate account has been kept? No.

515. When was the first sale? In September, 1885.

516. What were the proceeds of the sale? Perhaps it would be more satisfactory if I were to put in a statement showing the whole amount realised, although it has not yet all been received. The total amount we have received from the sales of 1885 is £61,473 15s. 11d.

517. When did the Act giving credit come into operation? In 1887.

518. Has the whole of the money been paid on account of the sales of 1885? Yes.

519. When was the next sale? In October, 1886; it realised £6,637 5s. 9d.

520.

F.  
Kirkpatrick,  
Esq.  
12 Mar., 1890.

F.  
Kirkpatrick,  
Esq.  
12 Mar., 1890.

520. What was the acreage at each sale? I have not that information with me. I should like to explain that in connection with the sales of 1885 and 1886 there were balances unpaid, the deposits having been forfeited to the extent of £2,737 16s., which would, of course, reduce the figures I have given to that extent.
521. Why? Because we shall not receive the amount.
522. That is the whole amount paid to the Treasury? No, payable to the Treasury.
523. When was the next sale? In May, 1887; it realized £1,915 7s. 7d.
524. The credit system came in then. What balances are due on those sales now? It was impossible for me to ascertain in the limited time I had to make up this statement.
525. You only know the amount you have received? The total amount of the sales.
526. *Mr. Copeland.*] The first sale in 1887 was held before the Deferred Payments Bill was passed? Yes.
527. They were all cash sales prior to that time? Yes.
528. I take it that you are getting your information from the Lands Department? No, it is taken from our own books in the Treasury.
529. *Chairman.*] But the information as to the sales and the cash payment would be furnished in the first instance by the Lands Department? Undoubtedly.
530. *Mr. Garrard.*] I understand that the first three sales were lump sums before the deferred payment system came in, and are subject only to those lapses which have been mentioned? Yes, to the extent of £2,737 16s.
531. *Chairman.*] When was the next sale held? On the 9th July, 1887, at Beecroft, it realized £3,851 15s.
532. Was that the cash paid on the total amount? As I understand it, it is the total amount of the sale.
533. When was the next sale? At Beecroft, on the 27th August; it realised £8,095.
534. Do you mean to say that in the Treasury you have no means of showing what money has been paid on each of those sales? Yes, we have, but it would take some little time to take it out.
535. You can get a return for the Committee giving this information? Yes.
536. Do you know what sum has been debited against these proceeds for the erection of bridges over the Parramatta River, or any other river up there? I could not say.
537. Are there no accounts in the Treasury to show that? We could make it out.
538. As a charge against the general revenue but not as against these particular proceeds? We have not got a separate account of these particular proceeds.
539. What is the explanation for not carrying these amounts to a separate account—it is public revenue? It is.
540. Does that do away with the obligation to keep a separate account as the Legislature has said you shall do; the assessments under the Sheep Act and Rabbit Act are treated as part of the public accounts, but separate accounts are kept for each of them? Yes, they are different accounts, they are both trust accounts.
541. Is not this? This is a revenue account.
542. Do you not see that the Legislature has said that you shall keep a separate account. What right has the Treasury officers to say they shall not? I do not know, unless perhaps they may have understood it to mean that it is to form part of the revenue as stated in this section.
543. Can you give any reason why the Treasury has said there shall not be a separate account kept as this Act provides? I cannot give any reason except that it has not been done.
544. You have treated the proceeds as part of the public revenue, and carried them generally to the account under the head of auction sales? Just so.
545. *Mr. Copeland.*] Have you any separate account for the Church and School Lands? Yes.
546. Are the proceeds from these lands kept in a separate account? That is a trust account.
547. And it is kept separately? Entirely.
548. Still the proceeds are treated as revenue? At the end of the year the amount which is over and above what is required, is transferred to the consolidated revenue. It goes into the general revenue at the end of the year.
549. It is merely kept separately so as to comply with the Church and School Lands Act? Yes; and, furthermore, the expenditure all through the year is charged to the receipts of the year, and at the end of the year the balance is transferred to the consolidated revenue.
550. Was there anything to prevent you giving effect to this Act any more than there is to the Church and Schools Land Act, could you not have kept this account separately, the same as you have kept other accounts? The Church and School Lands account is not kept separately under revenue, it is kept separately as a trust fund; but the proceeds of the sale of the Field of Mars the law directs should be kept as part of the public revenue. There seems to have been some misunderstanding in that respect.
551. The Church and School Lands account is a separate and distinct account by itself? Yes.
552. No funds from any source except from the Church and School Lands are paid into that account? That is quite correct.
553. Is there any accountant's reason why these funds should not have been treated in exactly the same way as the Church and School Lands fund? No, with the exception, that the Act says it is to form part of the public revenue.
554. Does not the money from the Church and School Lands form part of the public revenue at the end of the year? Yes; the balance over and above what is required is transferred at the end of the year.
555. I suppose you are aware that the Act provides that the money shall be kept in a separate account, and that the proceeds shall be devoted towards building a bridge over the river? I am aware that the Act provides the funds shall be kept in a separate account. With reference to the appropriation, I think that it is a matter for Parliament, as the Act says that the proceeds of the sale "may" be applied—not "shall" be applied.
556. If I understand you aright the land sales at the Field of Mars realized a total of over £81,970? As a matter of fact, the total sales amount to £95,938 7s. 6d. less £2,737 16s., being the amount of the balances unpaid, the deposits having been forfeited.
557. There were other sales then? On the 10th March, 1888, there was a sale at Beecroft realizing £4,360 10s.; on 30th November, 1889, one at Carlingford, realizing £6,121 12s. 1d.; on the 7th December, one at Beecroft, realizing £2,153 10s.; and on the 19th December, one at the Field of Mars, realizing £1,329 11s. 2d.

558. There has been no special appropriation from that fund? I can scarcely answer your question, as the revenue is treated as a whole.
559. There has been no special appropriation from these particular proceeds? Not that I am aware of.
560. Can you state from what source the funds were provided for building the bridge over the Parramatta River? No, not at this moment.
561. At any rate, you can tell us that the money was not specially appropriated from the proceeds of these land sales? No, no separate account was kept of them.
562. Can you state the cost of the bridge over the Parramatta River, and of the bridge over Iron Cove? No; I have not looked up these matters.
563. *Chairman.*] Will you supply a return showing the cost of each bridge, and whether the money came from the general revenue or from the loan funds? I will obtain the information for the Committee.

F.  
Kirkpatrick,  
Esq.  
12 Mar., 1890.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

Bridge over Tarban Creek, Parramatta River.

APPENDIX.

A.

PRECIS OF PAPERS RELATING TO THE PROPOSED BRIDGE OVER TARBAN CREEK, PARRAMATTA RIVER.

THE papers in this case, as submitted, are very meagre, and are evidently incomplete. It is admitted that there are other papers, and efforts are being made to recover them from the Lands Department (Surveyor-General's Branch). The following is the case as disclosed by the available papers—

18/9/83.—Mr. Rothwell, in compliance with instructions, submitted section, &c. of Tarban Creek, and estimated the cost of a bridge of one span of 450 feet, or three spans of 150 feet, at £30,000, without approaches.

21/1/84.—The same officer submitted an estimate for a bridge of five spans of 100 feet each—amount, £24,048—stating that that span was the most economical that could be adopted.

7/7/85.—In accordance with a resolution of the Borough Council of North Willoughby, the Mayor addressed the Minister, urging that the Tarban Creek bridge might be constructed as speedily as possible to complete the communication between Sydney and Lane Cove.

Mr. Bennett minuted that a bridge here would cost £18,000, and would shorten the distance from Sydney to the North Shore by 1½ mile. It was with a view to this bridge that the site of the Lane Cove bridge was changed to Figtree.

16/7/85.—The Mayor of Hunter's Hill addressed the Minister, urging the same point, and was informed, in reply, that favourable consideration would be given to the matter.

17/9/88.—Mr. F. Farnell, M.P. wrote to the Minister, expressing a hope that the Government would, without delay, carry out this "desirable and necessary" work.

Mr. Bennett minuted that, doubtless, a bridge would shorten the distance—at a cost of £18,000—and that a bridge *must* be built some day.

1889.—Mr. Secretary Bruce Smith minuted that this bridge was intended to complete the line of communication by the shortest route between the Parramatta iron bridge and the bridge over Lane Cove, giving access to the North Shore, and that it would save 1½ mile.

An amount of £24,000 was placed on the Draft Loan Estimates for this bridge, of which the following is the official account:—"This will either be an arch, in steel, of 370 feet span, with steel approaches, or iron lattice bridge, 600 feet long, on iron piers. Until borings are taken the most economical of the two designs cannot be ascertained."

This bridge was referred for the consideration and report of the Public Works Committee.

10/2/90.—Mr. Hickson minuted that he was of opinion that Tarban Creek Bridge should be withdrawn from the Committee, as it could be constructed for less than £20,000; and, in any case, further investigation was necessary as to whether any expenditure was justifiable in this case.

The Minister directed to withdraw all the iron bridges, except Cowra, and to explain to the Committee.

C. A. B., 17/2/90.

B.

EXTRACT FROM MINUTE PAPER BY THE COMMISSIONER AND ENGINEER-IN-CHIEF FOR ROADS AND BRIDGES TO THE UNDER SECRETARY FOR PUBLIC WORKS, &C.

"JERRY'S Plains and Tarban Creek Bridges should also be withdrawn, as they can be erected for an amount under £20,000, and in any case further investigation is necessary as to whether any expenditure at those places is justifiable."

C.

LETTER FROM THE UNDER SECRETARY FOR PUBLIC WORKS PROPOSING THE WITHDRAWAL OF THE BRIDGE FROM INQUIRY.

Sir,

Public Works Department, Sydney, 25 February, 1890.

With reference to the three proposals for construction of bridges, viz., at Tarban Creek, Jerry's Plains, and Bullock Island, which are now before your Honorable Committee, I would desire to point out that when I appeared before the Committee in regard to these matters I asked, on behalf of the Minister, that the proposals might be negatived, on the ground that since the introduction by him of a new system of dealing with bridges, it had been ascertained that these particular works could be carried out for a very much less sum than that submitted to Parliament as the estimated cost.

The Minister now learns that the professional officers of the Department, and especially the Commissioner for Roads, have given evidence to the effect that there is no necessity at all for these works, and I have therefore to point out that the evidence upon which the Minister determined to submit the proposals to Parliament was that of the late Commissioner for Roads, who was then the official adviser of the Government on such matters. As, however, the Minister finds that the present Commissioner holds opinions differing from those of his predecessor, he is desirous of reviewing the matters not only from the standpoint of cost, but also from the more radical one of necessity; and I have therefore to ask on these further grounds that the proposals may be negatived.

I have, &c.,

J. BARLING.

Under Secretary.

J. P. Abbott, Esq., M.P., Chairman of the Public Works Committee.

D.

[To Evidence of Mr. R. H. De Loo.]

STATEMENT SHOWING THE NUMBER OF LOTS AND AREA SOLD, AND THE AMOUNT REALIZED, ON ACCOUNT OF SALES OF CROWN LAND, IN THE YEARS SPECIFIED, UPON THE FIELD OF MARS, AT HUNTER'S HILL.

Date of sale.	Number of lots.	Area.			Realized.	
		a.	r.	p.	£	s. d.
1885.						
26 and 30 September .....	212	495	3	0	57,808	3 4
21 October.....	17	36	4	0	3,615	7 6
	229	532	3	0	61,423	10 10
1887.						
5 May .....	59	45	1	3	1,915	7 7

APPENDIX.

E.

[To Evidence of F. Kirkpatrick, Esq.]

STATEMENT SHOWING THE AMOUNTS REALIZED BY SALE OF LAND UNDER "FIELD OF MARS RESUMPTION ACT OF 1874," 38 VIC. NO. 3.

Date of sale.	Place of sale.	Amount the land was sold for.	Amount paid.	Amount owing to date.
1885.				
26 September .....	Field of Mars .....	£ 49,329 16 11	£ 47,064 19 7	*2,264 17 4
30 " .....	" " .....	8,523 18 6	8,194 13 0	*329 5 6
21 October .....	" " .....	3,620 0 6	3,620 0 6	
1886.				
2 October .....	" " .....	4,053 6 7	3,993 17 4	*59 9 3
16 " .....	" " .....	2,583 19 2	2,499 15 3	*84 3 11
1887.				
5 May .....	" " .....	1,915 7 7	1,915 7 7	
9 July .....	Beccroft .....	3,851 15 0	3,566 8 0	285 7 0
27 August .....	" .....	8,095 0 0	7,458 19 0	636 1 0
1888.				
10 March .....	" .....	4,360 10 0	3,424 13 4	935 16 8
1889.				
30 November .....	Carlingford .....	6,121 12 1	2,336 11 9	3,785 0 4
7 December .....	Beccroft .....	2,153 10 0	1,299 0 0	854 10 0
19 " .....	Field of Mars .....	1,329 11 2	333 8 2	996 3 0
Totals .....		95,938 7 6	85,707 13 6	10,230 14 0

NOTE.—The sums marked \* (amounting to £2,737 10s.) will not be paid—deposits forfeited and sale annulled. Sales from 9 July (inclusive) under "Auction Balances Act," 50 Vic. No. 39. Terms: 25 per cent. deposit; balance, three equal annual instalments with 5 per cent. interest added.

The Treasury, 11 March, 1890.

W. NEWCOMBE, Receiver.

E 1.

STATEMENT SHOWING THE AMOUNT VOTED, EXPENDED, AND THE BALANCE UNEXPENDED ON ACCOUNT OF THE BRIDGES OVER THE PARRAMATTA RIVER AND IRON COVE CREEK, EXCLUSIVE OF THE RAILWAY-BRIDGE.

Year of Vote.	Act.	Particulars.	Amount Voted.	Amount Expended.	Balance.
1873.	Loan—36 Vic. No. 21 ..	Bridges over Parramatta River at Five Dock, and at Iron Cove Creek (the money to be expended on condition of the Field of Mars Common, about 6,235 acres, being resumed by the Government under Act of Parliament.	£ 50,000	£ 50,000 0 0	£ Nil.
1876...	Loan—40 Vic. No. 12 ...	Bridges over Iron Cove Creek and Parramatta River—further sum.	40,000	40,000 0 0	Nil.
1882...	Consolidated Revenue Fund—45 Vic. No. 21.	Bridges, Parramatta and Iron Cove, including embanked approaches—further sum.	9,000	8,996 17 5	3 2 7 Written off.

The Treasury, New South Wales, 13th March, 1890.

J. PEARSON, Accountant.

F.

FIELD OF MARS COMMON RESUMPTION.

An Act to authorize the Resumption and Sale of the Field of Mars Common. [Assented to, 25th June, 1874.]

WHEREAS by a certain instrument bearing date the eleventh day of August in the year one thousand eight hundred and four under the seal of the territory of New South Wales and under the hand of His Excellency Philip Gidley King Esquire then Captain General and Governor-in-Chief of the said territory the lands hereinafter in the Schedule hereto described were allotted as Common lands for the use of the settlers cultivators and other inhabitants of the district of the Field of Mars and Eastern Farms in the County of Cumberland in the Colony of New South Wales. And whereas by a deed of grant under the Great Seal of the said Colony bearing date the tenth day of November one thousand eight hundred and forty-nine it was amongst other things recited that the said first-recited instrument was deemed insufficient in law for the purpose of securing and regulating the right of Common intended to be thereby granted And it was further recited that by a certain Act of the Governor and Legislative Council of New South Wales passed in the eleventh year of the reign of Her present Majesty intituled "An Act to enable Trustees of Commons in New South Wales to have perpetual succession and to empower them to regulate the use of such lands as may be granted as Commons within the said Colony and for other purposes relating thereto" certain provisions were made for the purposes in the title to the said Act mentioned And whereas by the said lastly-recited deed of grant the lands therein particularly described (being the lands also described in the Schedule hereto) were given and granted unto the Reverend George Edward Turner Duncan Mackellar and James Devlin and their successors to be appointed as in and by the said Act provided as trustees of the Field of Mars Common situated in the district formerly known as the Field of Mars and Eastern Farms upon the trusts and subject to the reservations and conditions thereinafter in such deed of grant expressed And whereas the said Act of the eleventh year of Her present Majesty was repealed by an Act passed in the thirty-sixth year of Her Majesty's reign and numbered twenty-three being the "Commons Regulation Act of 1873" and other provisions for the incorporation of trustees and the regulation of Commons have amongst other things been thereby enacted but no provision has been made for the surrender or resumption of Common Lands And whereas it is deemed expedient that the lands included in such grant as aforesaid and known as the Field of Mars Common shall be resumed by the Crown free from all trusts affecting the same in order that such lands may be sold and that the proceeds of the sale thereof may be devoted towards defraying the cost of a bridge suitable for general traffic intended to be constructed by the Governor with the advice of the Executive Council across the Parramatta River at some point to be hereafter determined by the Governor with the said advice Be it therefore enacted by the Queen's Most Excellent Majesty by and with the advice and consent of the Legislative Council and Legislative Assembly of New South Wales in Parliament assembled and by the authority of the same as follows:—

38 VICTORIA,  
No. 3.  
Preamble.

1. From and after the day of the passing of this Act the land described in the Schedule hereto being the land known as the Field of Mars Common together with the fee-simple and inheritance thereof is hereby declared to be resumed by and to be vested in Her Majesty her heirs and successors absolutely free from all trusts conditions reservations rights-of-way Common easements and other rights whatsoever.

2.

Land to be surveyed &amp;c.

2. It shall be lawful for the Governor with the advice of the Executive Council to cause a survey and plan of the said land so resumed to be made in which plan shall be marked out such roads streets public thoroughfares and other reserves for public purposes and also such subdivisions or allotments of the said land for the purposes of sale as the Governor with the said advice may think proper to reserve or make. And such plan when completed shall be open for inspection without fee at all reasonable hours at the office of the Secretary for Lands and at such other places as he may appoint.

Sale of land resumed.

3. The land so resumed as aforesaid shall at such times (not being less than one calendar month after the completion of the said plan) and at such places as may be appointed by the Secretary for Lands be put up for sale by public auction. And fourteen days notice at the least of every such sale shall be given by publication in the *Gazette*. And in such notice the allotments to be sold shall be designated in accordance with the said plan. And the Crown shall have all powers of sale and grant in respect of such lands as are incident by law to the sale of Crown lands and the proceeds of every such sale (after deducting therefrom any costs or charges incurred thereon) shall be paid to the Colonial Treasurer and by him be carried to the credit of a separate fund or account as part of the Public Revenue.

Short title.

4. This Act may be cited as the "Field of Mars Common Resumption Act of 1874."

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SCHEDULE.

ALL that piece or parcel of land situate in the county of Cumberland parishes of South Colah the Field of Mars and Hunter's Hill containing six thousand two hundred and thirty-five acres Bounded first by the north side-line of Haynes' thirty acres in the parish of Hunter's Hill commencing at a marked rock on Lane Cove River being the north-east corner of the said thirty acres and bearing south seventy-four degrees forty-five minutes west then by the north side-line of Everard's thirty acres bearing west nineteen degrees forty-five minutes north then by part of the east side-line of Sarah Field's sixty acres bearing north nineteen degrees forty-five minutes east then by the north side-line of the said sixty acres bearing west nineteen degrees forty-five minutes north then by part of the west side-line of the said sixty acres bearing south nineteen degrees forty-five minutes west by the north side-line of Tyrrell's thirty acres bearing west thirty-one degrees forty-five minutes north then by part of the east side-line of Raven's two hundred and eighty-five acres bearing north thirty-one degrees forty-five minutes east then by the north side-line of the grants to Raven Morrison Hatton and by part of the north side-line of Lawrel's thirty acres bearing west thirty-one degrees forty-five minutes north then by the east side-line of Small's thirty acres bearing north thirty-one degrees forty-five minutes east then by part of the south side-line of Brown's one hundred and fifty acres bearing east thirty-one degrees forty-five minutes south then by the south side-line of Connor's one hundred and forty acres bearing east thirty-one degrees forty-five minutes south then by the east side-line of Connor's one hundred and forty acres bearing north thirty-one degrees forty-five minutes east then by the north side-lines of the grants to Connor's and Weaver's bearing west thirty-one degrees forty-five minutes north then by part of the east side-line of Kent's five hundred and seventy acres bearing north thirty-one degrees forty-five minutes east then by the north side-line of the said five hundred and seventy acres bearing west thirty-one degrees forty-five minutes north then by the west side-line of the said five hundred and seventy acres bearing south thirty-one degrees forty-five minutes west then by the north-east side-line of Moore's grant bearing north thirty-two degrees twenty minutes west then by the north-west side-line of Bradyn's two hundred acres bearing west thirty-eight degrees ten minutes south then by the north-west side-line of Harding's twenty-five acres bearing west twenty-four degrees ten minutes south then by a reserved road of one chain width dividing it from the grants of Kent's one hundred and seventy acres and four hundred and sixty acres bearing north twenty-four degrees ten minutes west to a creek then by that creek bearing north and westerly (being the northern boundary of Kent's four hundred and sixty acres and some Crown land) to Rowland Hassel's one hundred acres then by a part of the north-east side-line of the said one hundred acres bearing north twenty-one degrees west then by a part of the south-east side-line of Savage's two hundred and ninety acres bearing east twenty-one degrees north then by the north east side-line of the grants to Savage Russell and by a part of the north-east side-line of Pincham's fifty acres bearing north twenty-one degrees west then by a line bearing east twenty-five degrees forty-five minutes south to the Lane Cove River and by that river bearing easterly and southerly to the aforesaid marked rock advertised as number four in the Government notice dated the twenty-ninth day of August one thousand eight hundred and forty-eight.

[One plan.]

1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## BRIDGES AT MORPETH AND HINTON.

(REPORT BY THE EXAMINERS OF PUBLIC WORKS PROPOSALS.)

*Ordered by the Legislative Assembly to be printed, 26 November, 1890.*Public Works Department, New South Wales,  
Office of Examiners of Public Works Proposals, 27 October, 1890.

Report by the Examiners of Public Works Proposals on the proposed bridges at Morpeth and Hinton.

The construction of bridges over the Hunter River, at Morpeth, and on the Paterson River, at Hinton, has been agitated for many years. The movement may probably have commenced or have been concurrent with the proposals for bridging these rivers at the other places at which bridges have been built, for it is claimed that their construction, and the consequent determination of the general traffic along the permanent thoroughfares thus opened, has had the effect of reducing Morpeth from the position of a centre of commerce, of diverting from it the traffic from the whole of the country between the Hunter and the Paterson Rivers, and east of the Paterson, and of rendering it dependent solely upon the small tract of country in its immediate vicinity, and upon the advantages it possesses in being at once at the head of the navigable portion of the rivers and the terminal point of a branch from the main line of railway.

2. The Paterson River was bridged in 1864 at Woodville (the Dunmore bridge), on the direct line of road from Seaham, on the Williams, towards West Maitland; and the Belmore bridge, over the Hunter River, was built in 1869, at the Falls, at the north end of West Maitland. By these two bridges the communication with West Maitland from the districts east of the Hunter and Paterson Rivers was completed. During 1865 the Hunter River was bridged (the Pituaeree bridge) at a point opposite East Maitland, on a road connecting at Largs with the main road between the Belmore and the Dunmore bridges. Thus the traffic was afforded permanent approaches to both East and West Maitland, and to the main line of railway. The following tolls were levied on these bridges until abolished on 31st December, 1882:—

Foot passengers ... ..	1d.
Vehicles ... ..	6d.
Horses drawing or not drawing ... ..	3d.
Cattle ... ..	2d.
Sheep, lambs, &c. ... ..	2d.

But the tolls on the ferries on the approaches to Morpeth have remained in force all along.

3. It is claimed that the course of a large part of the traffic had up to that time been through Hinton and across the Hunter River below the confluence of the Paterson to Morpeth. Prior to the erection of the bridge the service of all the roads leading from the districts east of the Hunter and Paterson Rivers to West and East Maitland and to Morpeth was carried across the rivers by punts. By the substitution of bridges for punts for access to East and West Maitland it is contended that the interests of Morpeth trade suffered twofold injustice, for not only was the trade of the place diverted by the creation of sure means of access in all weathers to other centres, but, while Morpeth trade was left with a handicap of ferry charges upon all traffic entering or leaving the place, these restrictions were removed from the traffic to the other places, for the bridges were freed from tolls on December 31st, 1882.

4. As a proof that the course of traffic was in those days through Morpeth, it is stated that the punts for which bridges have been substituted were worked at lower rentals than those by which access was had to Morpeth. And this condition of things, as affecting Morpeth, has hitherto been relieved only by the substitution, in 1876, of a steam ferry for the hand punt at the Hinton crossing over the Hunter River.

5. The sole means of access to Morpeth from the districts lying between the Hunter and Paterson Rivers are by two hand punts, which are worked over the Hunter River. From the districts lying between the Paterson and Williams Rivers the only access is by the steam ferry at Hinton.

6. The districts served by the two hand punts over the Hunter River, near Morpeth, are traversed by the roads already noticed as bifurcating at Largs, and leading across the Pituaeree and Belmore bridges to East and West Maitland; and the whole of the country north of Hinton village, extending to Seaham

Seaham and Clarence Town, on the Williams River, is carried by the same road which crosses the Paterson at Woodville by the Dunmore bridge. Thus the area served by the Hinton steam ferry is reduced to a small tract in the immediate neighbourhood of Hinton.

7. The traffic from the districts on the Upper Williams, about Dungog, is served by two distinct routes. The direct and shortest road crosses the Bollarobba range of hills, and traverses the valley of the Paterson, passing close to West and East Maitland. The second route passes down the valley of the Williams River, avoiding the Bollarobba Range, through Clarence Town and Seaham, and thence it cuts across the country south-westwards to the Wine-shop, a point within 3 miles both of Hinton steam ferry and the Dunmore bridge over the Paterson. At this point the road bifurcates. The distance thence to Morpeth *via* the Hinton steam ferry is 4 miles, while to West and East Maitland *via* the bridges over the Paterson and Hunter Rivers the distance is 8 miles.

8. This road, from the Upper Williams through Clarence Town, though some miles longer than that *via* the Paterson Valley, is the route taken by all heavy traffic and live stock for Maitland, as by it the Bollarobba Range is avoided, and a tolerably level road is secured throughout.

9. A permanent bridge over the Williams at Clarence Town gives access to this road from Stroud, where the main north road from Hexham and Raymond Terrace to the Manning River is met. At the extreme south end of this long road from the north the communication with the railway is at Hexham by a steam ferry. This is the route traversed by the mails to and from the north coast districts. Hexham is distant 40 miles from Stroud.

10. The communication between Stroud and East and West Maitland, *via* Clarence Town, is uninterrupted, as the whole is securely bridged. The distance from Stroud to the nearest accessible points on the railway are here given for comparison:—

From Stroud to Hexham, crossing the Hunter River by steam ferry	... 40 miles
From Stroud to West Maitland and to East Maitland, crossing the Williams, Paterson, and Hunter Rivers by bridges	... 46½ "
From Stroud to Morpeth, crossing the Williams River by bridge, branching off the Maitland road at the Wine-shop, and crossing the Hunter River by steam ferry	... 42½ "

11. It seems, therefore, that Morpeth is on a par with Hexham as regards accessibility, as both can only be reached by a steam ferry, but that it is 2½ miles further from Stroud. As compared with West and East Maitland, Morpeth is a mile nearer to Stroud, but these places are reached over bridges which secure passage at all times.

12. The distances by the railway from Newcastle to the points met by these roads are:—

From Newcastle to Hexham	... 10 miles.
" to East Maitland	... 18 "
" to West Maitland	... 20 "
" to Morpeth	... 22 "

13. In former times, during the prosperity that is claimed to have existed in Morpeth, it is probable that the traffic from the Upper Williams passed through that place by way of Hinton ferry. In 1880, however, the Williams River Company commenced running steamers, with the result that this waterway has served the whole district very effectually. Clarence Town is at the head of navigation on the Williams, and the shipping-port for all the districts in the valley of the river on the north. About half of the traffic that passes through Stroud is also said to be brought for shipment to Clarence Town. The outlet for the other half is *via* Raymond Terrace, which is but a few miles further. The whole of the timber from the Upper Williams north of Dungog is shipped at Clarence Town, except such as is required for local consumption in Maitland. Sailing vessels, drawing up to 13 feet 6 inches of water, are loaded here with timber for the intercolonial trade, and barges for the trade of Newcastle. It is said that the depth of water in the Williams admits of vessels of deeper draught than in the Hunter, but that the volume of trade is not sufficient to support larger vessels than are used. These vessels trade with Newcastle only, so all goods destined for other ports must be transhipped at Newcastle. Timber destined for delivery at places north of Maitland is sent thence by water to Newcastle, and despatched by train in preference to the road journey across to Maitland. The staple product of the lands on the Upper Williams is maize. The market for this is in Newcastle, whence it is despatched inland. During 1889, 25,000 bags of maize were shipped from Clarence Town to Newcastle. It seems that for a very long series of years Newcastle has been the chief market for maize grown in these districts. The Sydney market has all along been supplied from the northern rivers, and the demand in Newcastle has generally been greater than the local supply, but this state of things has lately been modified by delivery being made at Newcastle from the northern rivers. It is, therefore, highly improbable than any direct trade with Sydney can be done in maize grown north of Clarence Town in competition with the sea-borne product of the northern parts of the coast. Oaten hay is produced in large quantities on the Williams below Clarence Town. The market for this also is Newcastle. There can be no trade in this direct with Sydney in competition with the product of other ports, which are generally of superior quality. There is no lucerne grown on the Williams above Clarence Town, and all produced below it is taken by the steamers in passing. The chief market for live stock is Maitland. All accounts agree that for stock, whether intended for transport to Sydney or Newcastle, or for sale in Maitland, the route *via* Hinton and Morpeth is the most suitable. It appears there is a decided preference for the sea route over that by railway, and that the steamers on the Hunter carry much larger numbers of stock than those on the Williams; also, that transhipment at Newcastle is avoided by the Hunter River steamers being used, and the railway at Morpeth gives a choice of routes and markets to the senders. For stock intended for shipment or sale in East Maitland the advantage in distance is nil in the route *via* Morpeth, but the road is less uneven, and is said to be more suitable in other respects. There is again a large quantity of timber on lands between the Paterson and Williams Rivers in situations, for which Morpeth is the nearest point of shipment by rail or vessel. For transport of such goods the punts may be taken to be unsuitable.

14. The conclusion drawn from the inquiry into the trade from the Williams River districts is that, as the live stock and timber traffic usually take the route *via* Clarence Town, the opening of a certain route to Morpeth would deflect much of it to that place; that the passenger traffic now carried on the Williams is unimportant, being given at six passengers each way daily, but it is said that there is

a gain of four or five hours in the journey to Sydney by the Morpeth route; that in farm produce there would be absolutely no traffic between Clarence Town and Morpeth; and, finally, that no appreciable development or progress could be expected to result in the Upper Williams River districts by the small advantages to be gained by better communication with Morpeth.

15. The districts traversed by the Paterson River are comparatively limited in area, but they are of exceptional richness, and capable of very great development. It is futile now to speculate on what may have been the course and extent of the traffic from these districts in the past. This course has now been determined by the main thoroughfares that have been created to West and East Maitland, and it remains but to complete these works by bridging or other devices, so as to make these roads passable at all times, to render the outlet from the Paterson districts to their natural markets perfect.

16. Reference is here made to a point on the road near the Dunmore bridge which is deeply submerged by floods, and to two places, one on each side of the Pitnacree bridge, which are not only submerged but impassable for some time after the subsidence of the water. These three difficulties having been referred to by witnesses as evidence of the need for opening another road into Morpeth, it is necessary to mention them, and to point out that they are defects in the continuity of the road which do not affect the material question in any way.

17. It cannot now be doubted that, whatever injury may have been done to the interests of Morpeth in the past by the opening of these roads, their course has been wisely determined on in the interests of the community, and they have efficiently served their purpose.

18. One of the proposals forming the subject of this inquiry is a bridge over the Paterson River at Hinton, as a substitute for the steam punt that is working over the Hunter River below the confluence of the Paterson. As this bridge alone would be of no use, it would necessitate the construction of another over the Hunter River at Morpeth, and of a road across Phoenix Park connecting them. This latter bridge is strongly advocated as a measure of necessity in the interests of the farmers on Phoenix Park, who suffer so greatly by floods, to enable them to remove their stock and goods to a place of safety.

19. It is further urged that this bridge would be the means of diverting the traffic from Phoenix Park, which is now carried by the steamers, to the railway.

20. The Commissioner for Roads has supplied, for comparison with these proposals, an estimate for a bridge over the Hunter River at the steam-ferry site, which, however, can be considered merely as improving the access to and from Morpeth.

21. The full extent of country on the left banks of the Paterson and Hunter Rivers from which traffic might be taken into Morpeth has been calculated liberally to include the whole of the river frontage and cultivable land adjoining from the Dunmore bridge down to the confluence of the Williams with the Hunter. The cultivable land only has been taken, and not the grazing land.

22. The farmers estimate that this area is capable of carrying lucerne over two-thirds of the whole, and maize and potatoes over the remaining third, with pumpkins among the maize. The cultivation is necessarily of the highest class of which the farmers are capable, since the acres are each estimated at £50 to £70 in value, and are actually rented from £2 to £2 10s. per acre.

23. The total area included is 2,843 acres, divided among ninety-one farmers, and distributed as follows:—

	Fronting on Hunter.	Fronting on Paterson.	Inland.	Total.
Woodville .....	.....	180	225	405
Wallalong .....	.....	535	.....	535
Bonthorne .....	30	225	393	648
Nulla Nulla .....	45	.....	200	245
Down Park .....	65	.....	65	130
Queen Reach .....	225	.....	60	285
Osterly .....	95	.....	.....	95
Nelson's Plains .....	460	.....	15	475
M'Clement's Swamp .....	.....	.....	25	25
	920	940	983	2,843

24. The possible production from this acreage, according to the scales given in the evidence, would be, of:—

Lucerne ... ..	9,450 tons, or 28,400 bales.
Maize ... ..	500 „ 27,000 bushels.
Pumpkins ... ..	9,000 „ 63,000 dozens.
Potatoes and onions ... ..	480 tons.
Total ... ..	19,460 tons.

25. The number of farmers is 91, giving a population of 455, to which should be added the population of Hinton 475, and of Bonthorne 40, and an estimate of say 400 for residents along the Williams, whose farms are served by that waterway, and are consequently not included, but who individually may fairly claim to derive benefit by improved access to Morpeth. The total thus becomes 1,370.

26. Of this area 1,860 acres are comprised in farms having frontages on the Paterson or Hunter River, and consequently in direct communication with the steamers, and 983 acres are on farms lying back from the river frontage, from which all produce has to be carted for shipment.

27. The distinction is seen to be a very important one when the manner in which the transport of farm produce is conducted is understood. On the farms having water-frontage the homesteads and barns are on the water's edge wherever practicable, and the shipment takes place direct into the droghers. But in the case of the farms having no such frontage the produce must be carted to the water's edge through the neighbouring farm lands, by permission of the tenant, in order that shipment may be made at all. The inquiry has shown that this is the universal practice, and it is believed that it will be continued in the case of all produce grown alongside the water. None of it will in any case be carted to a distant railway station;

station; but from the farms having no water-frontage the necessity for carting may, and very likely will, have the effect of diverting much of the produce to the railway, if an access by a bridge over the river were afforded.

28. The acreage affected, however, is but one-half of the acreage fronting on water, and a proportion only of the produce from this half will be taken to the railway. This portion will probably consist of the lucerne only, for transport to Sydney, and, at a liberal estimate, may be set down at 1,000 tons per annum.

29. The farms are all served by good roads which lead to the steam ferry and to Morpeth, or *via* Largs to East and West Maitland; in fact, some part of the area included is nearer to Maitland than to Morpeth.

Dunmore bridge to West Maitland ... ..	6½ miles.
"    "    East Maitland ... ..	5    "
"    "    Morpeth <i>via</i> Wine-shop and Hinton ... ..	7    "

30. The contention by the advocates for the bridges is, that the punt service is inconvenient, and the tolls are all but prohibitive; that proper full loads cannot be carried over the punts, and that they are obliged to adopt the course of using the steamers, and are precluded from trading to Sydney. Thus the traffic is lost to the railway revenue, and the farmers are debarred from availing themselves of the Sydney market, which has now been opened to their use by the construction of the Hawkesbury bridge.

31. The service of the steam ferry at Hinton has been minutely inquired into. It was instituted in 1876 in place of a hand punt. The engine is of 12 horse-power, the length of the punt is 52 feet, exclusive of flap, and width 22 feet. Its capacity is 140 tons of load. It can carry on a trip six single horse-carts and 10 free horses, or 6 tons of load on an 8-horse waggon. It has taken over fifty-six head of horned cattle at one time. The tolls levied are as follows:—

Each horse, drawing or not drawing ... ..	3d.
Each vehicle ... ..	6d.
Each head of cattle, drawing or not drawing ... ..	2d.
Each sheep under 100 in number ... ..	½d.
Each sheep over 100 in number ... ..	¾d.
Goods not in vehicles, per cwt. ... ..	3d.

One charge to include passing and repassing once a day. In addition, the rates for a period of a week or a month are more favourable.

32. In a special report, Mr. J. Coombs, the engineer in charge, stated that each trip, including loading and unloading, can be made in one minute, and on an average in good weather and water that forty trips can be made in an hour. The approaches on both sides are pitched with stones. The greatest depth of water that can be worked in is 4 feet above H.W.S.T., but, as the strength of the current, which is variable, and the wind affect this, the maximum depth may be taken to be 3 feet 6 inches above H.W.S.T. Owing to the floods this year the ferry was not worked during five days in February and nine and a half days during March. There is a rise and fall of tide of 4 feet at this point on the river. The highest flood recorded was on March 14th this year, when it measured 13 feet 8½ inches above H.W.S.T. The following information on the receipts and expenditure on this ferry has been obtained.

		Receipts.			Expenditure.		
		£	s.	d.	£	s.	d.
1880	... ..	487	9	9	561	3	3
1881	... ..	489	1	7	976	8	11
1882	(seven months)	296	6	4	338	17	4
1884	... ..	526	5	3	.....		
1889	... ..	505	14	9	820	0	0

These details give an average loss on working of about £300 per annum. The service is stopped once each month on a regularly-appointed day at 3 p.m. until the next morning for overhaul and repairs. The service is admitted to be excellent, and no improvement can be suggested.

33. The township of Hinton is on the left bank of the Paterson, within half a mile of its confluence with the Hunter. It is well situated on a hill, round which the flood-waters circulate from the Paterson through M'Clement's swamps, joining the Hunter some miles lower down at Green Rocks. The roads, both southwards towards the steam ferry and northwards towards the Wine-shop and Senham, are deeply submerged by floods. There is here a wharf at which droghers call, and where it is stated 5,000 bales of hay are annually shipped. These are transhipped at Morpeth to the large steamers, which never pass up the Paterson. The population of the town is 475. The Public School has 134 children on the roll. There are two banks. A steam flour-mill, which has been idle for many years, as also has an engineering works which formerly employed twenty-five hands. On the hill in the vicinity are five vineyards, aggregating 83 acres. Morpeth is distant under 2 miles *via* the steam ferry, and East Maitland 5 miles; West Maitland, *via* the Wine-shop and Dunmore Bridge, is distant 12 miles. The site for the proposed bridge over the Paterson is at this township. The place is dependent entirely upon the agricultural interests in the midst of which it is situated, but it claims to have suffered decadence in common with Morpeth from the same causes, *viz.*, the diversion of traffic by other routes to West and East Maitland. The tolls on the ferry are a tax upon its necessary communication with the railway, and the uncertainty of this communication drives traffic to take the longer route.

34. The bridge over the Hunter River at the steam ferry has been estimated to cost, including approaches, £51,000. This bridge must of necessity have swing openings to allow the passage of vessels. The annual cost of working this will amount nearly to the loss now suffered on the ferry. As pointed out before, this estimate has apparently been made for comparison with that for the two bridges connecting with a road across Phoenix Park. The proposal has never been seriously entertained, as it affords no relief to the farmers on Phoenix Park, and but partially satisfies the requirements of Morpeth, affording merely a through road to the railway for traffic from the immediate neighbourhood, the amount of which has already been estimated, and for a possible traffic from Clarence Town and the Upper Williams, which cannot be depended on with confidence.

35. The construction of a bridge over the Paterson at Hinton can be considered only in conjunction with another over the Hunter at Morpeth. The latest estimates for these works are, as given by the Commissioner for Roads and Bridges:—

	£	s.	d.
Bridge over the Hunter River, and the railway connecting with Crown-street, Morpeth ... ..	11,215	0	0
Road construction, 125 chains ... ..	3,750	0	0
Bridge over Paterson River, at Hinton ... ..	26,000	0	0
Total ... ..	£40,965	0	0

The bridge over the Paterson must have a lift span or a swing, as headway is required for droghers. The working expenses of this will be an annual charge.

36. A bridge over the Hunter at Morpeth must necessarily be built to such a height as to allow of headway for the rolling stock on the railway line, which will also have to be spanned, and to connect with the streets in Morpeth; so there will be ample space under it for the passage of droghers. It should be situated above the wharves, and the point beyond which the large steamers have never yet run; but if the improvements in the course of the Hunter River, as recommended by Mr. Gordon, are completed, there must be a swing span in this bridge also, to enable the large ocean-going steamers to pass, for Mr. Gordon proposes to make a new channel sufficient to carry such vessels up to West Maitland.

37. From the deck-levels of both these bridges over the Hunter and Paterson the roads will have to be carried down to the surface of the lands on Phoenix Park at the steepest practicable gradient. The distance between the bridges has been given at 125 chains, and the cost of this piece of road alone at £3,750. The evidence given has pointed to a ridge of land running parallel with the water's edge, at a distance of 4 or 5 chains from it, which is 5 or 6 feet above the general level of the land on Phoenix Park, immediately adjoining, and but 2 feet or so below the level of the highest floods. This ridge is given as being the best line for a road connecting the two bridges. There are three insuperable objections to its adoption:—(1.) The descending gradients from both the bridges will run out into the Park considerably past this ridge; (2.) A line of road along it would cut off the water-frontage from a considerable area of land, and entail a large sum in compensation; and (3.) A road in this position would be eminently inconvenient to the majority of residents on the Park. The objection to any direct road connecting the bridges is, that it would cross the general direction of the flood-waters, which have moulded the land into long hollows and ridges. This is, however, unavoidable, and is best met by avoiding the direct route. The roads already existing should be utilised to the utmost. Land resumption and compensation will thus be avoided. There is a road from Largs, traversing the Park to about its centre, and bifurcating there. One branch connects with the Morpeth punt, and the other passes down to Beattie's Point (at the confluence of the Paterson and Hunter Rivers). This will make a roundabout route between the bridges, but, in consideration of the advantages shown for it, the extra distance to be travelled is immaterial. It has been in use ever since Phoenix Park has been settled upon, and, even if another direct road is formed, it cannot now be abandoned, as the communications of so many farms depend upon it. It is greatly in need, not of repair, but of construction. There is no demand for another road for local purposes, but the need for expenditure on the existing roads is imperative.

38. The *Statistical Register* gives the following details of the town of Morpeth at the end of the year 1889:—

Population ... ..	1,450
Number of dwellings... ..	251
Average annual rental ... ..	£3,410
Capital value of all property ... ..	£115,173
Length of roads and streets—made ... ..	6 miles 7 chains
"    "    unmade ... ..	3 miles 53 chains

There are two banks doing business in the town. The register of the Public School shows 151 children, of whom thirty cannot attend school while the river is in flood. Mr. Myles M'Rae, M.P., states that a mill property which had cost the Honorable J. Rundle £18,000 was purchased by him for £800. Another property has lately been purchased for a sum which formerly was the annual rental given for it. Mr. R. Waddy, the manager of the Commercial Bank, is of opinion that the value of real estate in Morpeth has declined 50 per cent. during the last ten years. There is ample room for expansion into a very large town. The land is all at great elevation above flood-level, and eminently well suited for sites for residential and industrial purposes.

39. The total area of the farm lands on Phoenix Park is 1,158½ acres, divided into thirty-nine farms, averaging 30 acres each, and two aggregating 5 acres. These are in occupation by forty-one families, who are nearly all tenants. The resident population would thus amount to 205. They have all been in occupation of the same lands for long periods extending up to thirty years. The original grant comprised 2,000 acres, which included a portion of the lands now called Golden Grove, outside of Phoenix Park, and thus are considered to be beyond the limits entitled to consideration in this inquiry. It is claimed, however, that, in the event of the Hunter River being bridged at Morpeth, the produce from a considerable area in this locality will thereby be enabled to reach that market and the railway at a saving of 3 miles in distance as compared with West Maitland, and 1½ mile as compared with East Maitland. This is true, but no estimate can be based on the speculation as to the proportion of the farmers who will abandon the good existing roads, and the markets in which they have traded so many years.

40. Of the area given for Phoenix Park, farms aggregating 373 acres have water-frontage on the Hunter, and 348½ acres have water-frontage on the Paterson, and two farms, aggregating 42 acres, front on both rivers at their confluence. The acreage of farms in the interior having no frontage is 395. This means, nearly, that one-fourth of the produce of lands on Phoenix Park has to be carted from the farms on which it is produced to a place of shipment, whereas three-fourths are shipped direct on to the droghers from the barns on the water's edge.

41. Two wharves have been provided by the steamer companies on the Park opposite Morpeth. These are both approached by roads, on which, however, no public money has ever been spent. The inducement

inducement offered by the companies to shipment at these wharves is that no droghage is charged, whereas on all lucerne carried by drogher from other places a charge of 6d. per bale is made for droghage to Morpeth, if intended for transport by steamer, and, if consigned by railway, the charge is 1s. 6d. per bale.

42. The total production of lands on the Park, calculated on the same scale as before, the whole area being cultivable, is of—

Lucerne	...	...	...	...	...	3,870 tons, or 11,610 bales.
Maize	...	...	...	...	...	300 tons, or 14,000 bushels.
Potatoes and onions	...	...	...	...	...	370 tons.
Pumpkins	...	...	...	...	...	3,500 tons, or 24,500 dozen.

Making a total of (say) 8,000 tons. Of this, the proportion due to the farms having no water-frontage, viz., one-fourth, equal to 2,000 tons, having to be carted for shipment, may be taken as likely to be transported over a bridge to Morpeth. Of the other three-fourths, viz., 6,000 tons, a portion may also be included, since variation in markets and competition in Sydney, besides the saving of ferry tolls, and the ease and certainty with which the railway will be reached, will certainly increase the quantity carried by the railway. Of this quantity, therefore, 1,000 tons may fairly be taken credit for in an estimate of this nature, making a total of 3,000 tons which may be carried over the bridge, and possibly become available as tonnage for the railway. Of lucerne alone the quantity will be 4,353 bales, or 1,451 tons.

43. The annual returns by the Railway Commissioners show the following operations at Morpeth:—

	tons.
During 12 months ending 30th June, 1889, the total tonnage of general goods despatched was	13,800
During the same period the hay despatched amounted to 2,114 bales, or	705
During the 12 months ending 30th June, 1890, the total tonnage of general goods despatched was	11,105
During the same period the hay despatched amounted to 1,106 bales, or	367
It is seen again, by a specially-prepared return for the 12 months ending 31st December, 1889, that the total tonnage of general goods despatched was	16,754
During the same period the hay despatched amounted to 1,524 bales, or	508

44. The Hawkesbury bridge was opened for traffic on 1st May, 1890, thus opening a direct road to Sydney by rail, but during that month there was a severe flood in the Hunter, which killed nearly the whole of the crops and plants. The hay despatched from Morpeth during the first four months of 1889 was 339 tons, or 1,017 bales, but for the last eight months of the same year the total tonnage was 169 tons, or 507 bales only. During March, 1890, there was another destructive flood, so the total tonnage shown for the year ending 30th June, 1890, which may be said to have seen two destructions of crops, amounted to only 367 tons, or 1,106 bales. It seems, therefore, that the despatch of hay from Morpeth by railway can be fairly tested only by the operations during the year ending 30th June, 1889, which, however, were somewhat curtailed by the flood during the preceding month (May). The total was 705 tons, or 2,114 bales, of lucerne, and of general goods the total was 13,800 tons. The following extracts from the reports of the Railway Commissioners are here given to show the importance of Morpeth as compared with the neighbouring stations, East and West Maitland.

	Morpeth.		East Maitland.		West Maitland, including High-st.	
	June 30, 1889.	June 30, 1890.	June 30, 1889.	June 30, 1890.	June 30, 1889.	June 30, 1890.
No. of hands employed	27	26	12	11	39	40
No. of tickets issued	17,298	20,102	25,780	26,494	48,624	51,224
	trucks.	trucks.	trucks.	trucks.	trucks.	trucks.
Goods tonnage out	13,842	11,105	6,028	5,074	13,057	12,558
Hay, straw, chaff, out	151	79	234	165	783	426
	bales.	bales.	bales.	bales.	bales.	bales.
Wool	36,300	34,271	42	30	171	2,385
	£	£	£	£	£	£
Revenue from goods	19,981	17,767	4,072	2,150	11,270	11,252
Total earnings	22,036	20,049	8,083	6,371	22,753	23,513
"	.....	19,776	9,606	19,298	.....	.....

45. The directors of the steamer companies have declined to supply information regarding the quantity of goods carried by the steamers from Morpeth. As, however, the droghers collect goods from all parts of the rivers between Paterson township and Maitland down to Raymond Terrace and deliver their cargoes at Morpeth, where they are transhipped into the large steamers, the totals which alone could be obtained from the company's books would be of no service in this inquiry. The droghage charged by the companies on goods intended for transport by railway has very naturally been fixed at a prohibitively high rate. Mr. P. O'Keefe, the local managing director of the H.R.N.S.N. Co. at Morpeth, has stated that his company has several times over-shipped 40,000 bales of hay in the twelve months. This was before the opening of the Hawkesbury bridge.

46. The claims of Morpeth are based on the loss of its trade, carried by its diversion into other channels and the continuance of tolls upon everything approaching it from the whole of the country upon which it is dependent; but the claims of the farmers on Phoenix Park are based on actual hardships and losses suffered from floods, and upon a legitimate desire to be connected with the capital by the readiest means of communication possible.

47. The extent of the damage caused by floods seems to depend upon their duration. The lucerne plant is not always killed by a flood, though the crop is invariably destroyed. The fertilising power of the flood-water seems in some measure to be a recompense for the damage done, but the direct loss caused by two such floods as those of May, 1889, and March, 1890, is very great. As the inquiry was in progress during the flood of March the action of the water during that time was easy to trace, but the accounts of other

other previous floods, and the frequency of their recurrence, and the conditions generally leading up to them, could not be unravelled. The commencement of the flood over the Park was at the north-west corner, where a narrow neck of land divides the two rivers. By this all communication with *terra firma* was at once cut off from the inhabitants of the Park. From this point the course of the water was diagonally across the Park, and also backwards into the Gordon Grove property. Within a short time the waters of the Paterson were joined to those from the Hunter, and then the flood, passing around along the Paterson to the low places near the confluence of the rivers, flowed back and met the advancing current from the north-west, after which there was scarcely any current at all over the flooded land. This is confirmed by a resident farmer, David Jarvis, whose farm of 19 acres, which he has held for twenty-six years, fronts on both rivers at this narrow place. When a flood is expected it is said that numbers of people watch the waters at this place for indications of further rising before removing their stock and movables to places of safety. Floods of such severity are of very rare occurrence—in fact, prior to these two, the last flood of the kind was in 1875. Thus, there had been thirteen years of immunity. There is a sense of security engendered by such immunity, and the damage done by the flood when it does come is all the greater. A flood may be expected, and prepared for, but the water may subside before reaching the point of overflow, and a repetition of such fears and wasted precautions leads to the omission of all precaution at the very time when a severe flood is really about to happen.

48. Mention has been made of wharves that have been provided on Phoenix Park, opposite Morpeth, for receipt of produce. No droghage is charged by the companies on produce taken delivery of there. The freights charged by both steamer companies on the principal articles produced in these districts are, from Morpeth or from wharves on Phoenix Park to Sydney:—

	s.	d.
Hay, per bale	3	0
Droghage on hay, if per steamer, per bale	0	6
"    "    if per railway, per bale	1	6

Thus, on hay carried to the steamer by drogher, the freight to Sydney is 3s. 6d. per bale, but if delivered at the steamer wharf the freight is only 3s. per bale.

	s.	d.
Potatoes (12 bags to the ton) per ton	7	6
Onions (1½ bags to the ton), per ton	7	6
Maize (3½ bushels to the bag), per bag	0	9
Droghage on grain or bags-stuff, per bag	0	3

The freights to Sydney by rail are as follows:—

	s.	d.
Hay, 36s. 7d. per truck of 14 bales, equivalent to, per bale	2	7½
Thus, for hay delivered to the railway by drogher, the freight to Sydney amounts to, per bale	4	1½
If delivered by cart from Phoenix Park, the toll on a cart and horse with 3 bales being 9d., or 3d. per bale, the freight to Sydney becomes	2	10½
Potatoes, average rate, per ton	10	1
Onions, " " "	11	4
Maize, " " "	10	1
Equivalent to per bag	0	7½

The following recapitulation makes these hay freights clear:—

	s.	d.
To Sydney, railway freight only, per bale	2	7½
"    by rail, but carted over ferry, per bale	2	10½
"    by rail, but delivered by drogher, per bale	4	1½
"    by steamer, freight only, per bale	3	0
"    by steamer, but delivered by drogher, per bale	3	6

These and the maize freights are distinctly in favour of transport by railway, but for all other produce the steamer freights are much more favourable.

49. The conditions regulating the delivery to consignees, storage, and demurrage in Sydney have been a good deal commented on. The following particulars make these points clear also:—

The railway rule is that on hay arriving at Darling Harbour demurrage at the rate of 5s. per truck per diem (4½d. per bale) is charged after the expiration of twelve working hours.

The company's rule is, in their own words, "A charge of 1d. per bale per day, or portion of a day, to be paid before delivery, will be made on hay remaining on this company's premises over fourteen days, exclusive of the day of arrival."

The H.R.S.N. Co. have stores in Sydney capable of holding 20,000 bales of wool or hay, or 20,000 tons of grain, and sales are permitted to be held there.

50. The sale of hay is said to be very much affected by the damage done to the exterior of the bales by the treatment they get while being loaded into the droghers from the river banks. There are very few small jetties along these rivers. The absence of all appliances for handling these heavy bales is noticeable. The practice for a full generation has been to roll the bales along planks laid from the bank of the river to the deck of the drogher, or, for lack of planks, over the surface of the ground or the mud. On the Manning River there is a jetty of some sort on the frontage of every farm on the river, where the bank shelves so much as to prevent the drogher coming alongside. The main crop in that district is maize. These bags cannot be rolled on board, but must be carried, so, without a jetty, the loading could hardly be effected at all. Similar arrangements would, on these rivers, save all the damage, and reduce the labour of loading to the last point.

51. Mr. Myles M'Rae has insisted very much on the fact that, the traffic being forced on to the water carriage by the obstacles in the way of delivery to the railway, the sole market open to producers is at the Market and Lane Street wharves, which become glutted and adverse to sellers. Probably, in view of such a condition of things in the past, the companies have given exceptionally ample accommodation and liberal terms of storage, which can only be met by the railways by following the same course.

Storage

Storage on railway trucks beyond the usual limit of time is impracticable, and it is doubtful that the transference of any considerable portion of the tonnage from the stores to the trucks will give much relief to the sellers, since the element of time during which the stock can be retained will remain against them. As to whether the railways could practically supply storage accommodation for farm produce at the metropolitan terminus, the figures to hand give a sufficiently clear answer. If one company—the Hunter River Company—working within comparatively narrow limits, requires room of 20,000 tons of storage for a traffic which has probably reached its limit in expansion, how vast must be the requirement for a system of railway covering the whole Colonies.

52. The foregoing investigation was made by the Examiners by direction of the Hon. the Minister for Public Works, during April and May of the current year. It contains, with the appendices, all the available information on the subject, and it is believed to represent impartially the actual state of the case as it stands now, with respect to the disabilities under which the town of Morpeth labours, the actual cost of the traffic, the possible deviations that may be caused in it by construction of new communications, the action of floods over Phoenix Park, and the losses caused by them.

53. The conclusion drawn from this is, that the great bulk of the traffic on the Upper Williams cannot now be drawn out of the channels in which it flows into Morpeth, that the volume of traffic that would probably be attracted through Morpeth by the construction of a bridge crossing the river on its approach is insignificant, in consideration of the great expense entailed, and the impediments that would be imposed upon the traffic on the river.

54. The immediate and prospective value of a waterway navigable by ocean-going craft is incalculable. No structure should be placed over it which curtails its usefulness in any degree, except for national objects, such as are served by a main line of railway. The interests to be served by bridging at the Hinton steam-ferry site, or at Hinton township, are altogether local, or contained within narrow limits, and are not considered to be important enough to justify the construction of a bridge at either place.

55. With regard to Phoenix Park, the report by Mr. Gordon contains recommendations which, if acted upon, are calculated by him to alter the action of the floods altogether, and thus to relieve the farmers on that tract of what must be taken to be their substantial grounds of complaint. Apart from these recommendations, it is considered that the immense capacity of production of the lands on the Park justify the expenditure of public money on its internal communications and its approach to a railway station, but, in view of the radical changes that are contemplated in the Report, no action should be taken.

STANLEY ALEXANDER,  
HARRY GILLIAT,

Under Secretary for Public Works.

Examiners.

## Bridges at Morpeth and Hinton.

(Evidence in connection with Inquiry of the Examiners of Public Works Proposals, together with Appendices.)

*Ordered by the Legislative Assembly to be printed, 27th November, 1890.*

### *Witnesses examined.*

G. H. Stephens, farmer, Phoenix Park; J. G. White, cabinet-maker, Morpeth; Thos. Campbell, alderman and ex-Mayor, Morpeth; Matthew Murphy, contractor, Morpeth; — Boland, Public Schoolmaster, Morpeth; Patrick O'Keefe, J.P., director H.R.N.S.S. Co., Morpeth; William Adams, late master S. S. Co., Morpeth; Richard Waddy, manager, Commercial Bank, Morpeth; J. Lavis, storekeeper, Hinton; J. D. Beattie, farmer, Phoenix Park; Frank Murphy, produce dealer, Morpeth; Robt. Hamilton, farmer, Phoenix Park; J. W. Pulver, bonded stores, Morpeth; J. B. R. Robertson, J.P., landowner, Oakhampton; James Read, farmer, Phoenix Park; James Stuart, contractor, Hinton; D. J. Carmody, farmer, Nelson's Plains; Malcolm MacRae, farmer, Largs; Chas. Cumming, farmer, Largs; David Jervis, farmer, Phoenix Park; Jas. E. Miller, manager Williams River S.S. Co., Clarence Town; Jos. Windross, timber merchant, Clarence Town; S. W. Dark, storekeeper, Clarence Town; E. S. Field, storekeeper, Clarence Town; C. A. Beck, manager A.J.S. Bank, Clarence Town; W. J. Croker, grazier and timber merchant, Clarence Town; Jas. Coombes, in charge Hinton Steam Ferry, Hinton; Jas. Sponce, master drogher "Anna Maria," Morpeth; Duncan Sims, J.P., agricultural engineer, Morpeth; William Morrow, sergeant of police, Morpeth; J. McFayden, farmer, Phoenix Park; Geo. Blundell, farmer, Narrowgut; G. H. Stephens, farmer, Phoenix Park; Jas. Stuart, contractor, Hinton; H. Geering, agricultural engineer, Bowthorn. Return Public School, Hinton; return Public School, Morpeth; return railway rates, Morpeth; return Hinton and Morpeth ferries; return Borough of Morpeth.

### Inquiry into Morpeth and Hinton Bridges.

Morpeth, 12 March, 1890.

*Mr. Gilliat.] G. H. Stephens, farmer, Phoenix Park:—*He thinks there are from 7,000 to 8,000 tons of lucerne hay grown yearly on Phoenix Park alone for market; owing to the inconvenience and danger of crossing by the punts it is only possible to do so with half a load; he takes his hay to East Maitland; this is 5 miles further than if delivered at Morpeth; the freight by train is 27s. 6d. per truck; a truck-load is fourteen

fourteen bales; the freight from Morpeth by steamer is 3s. per bale; hay, when picked up by drogher, is charged 6d. per bale, but if the hay is to be shipped by rail he has always paid 1s. per bale, but the drogher will only take it as a favour; there is no direct road between the site of the proposed bridges; there is a road to the junction of the two rivers: it would be necessary to resume a road; the best road and least liable to flood would be along the banks of the river; the cost would not be less than £60 per acre; half of this line has not been flooded for the last fifteen years, that is between the bridge site and Reid's shed; the other portion is lower land, but the present road between the steam punt and Hinton is still lower; the point marked red A. is where the flood-water first breaks across; the tolls charged at the punts are 6d. per vehicle and 3d. per horse; the traffic from the Clarence Town Road would come to the railway if the bridges were erected, as the road is so much shorter; the produce of at least 2,000 acres north of the Paterson, which now goes by the Dunmore Bridge, would come to Morpeth; when the punts stop working residents of Hinton have to go round by the Belmore Bridge to reach Morpeth.

GEO. H. STEPHENS.

Received, 16/4/90; the Falls punt was let the year (1869) prior to the erection of Belmore Bridge for £28 5s. per year; the Pitnacree punt I have not been able to get the amount; the Paterson punt, the year prior to erection of bridge, £15 per year.

GEO. H. STEPHENS.

Statement *re* Phoenix Park Bridge.

1st. That a rise of 1 foot above high tide the punt is not workable, consequently we are not able to move stock or produce, which has to remain surrounded by water; and if the flood-water rises to any height are swept away and lost. This I have seen frequently during thirty-six years' residence on Phoenix Park. If we had a bridge we could remove whatever stock or produce we have to the high land at Morpeth any time while the river kept within its banks.

2nd. That the bridge would also be a great boon to surrounding districts, especially to Phoenix Park and adjoining estates; we would then be able to get our produce to the railway, which would be largely patronised, whereas by the delays and dangers of the punts we are unable to do so, and consequently have to find other ways to send it.

3rd. I have not gone into statistics showing the probable amount of traffic that would ensue on the erection of bridges as proposed—the argument that receipts from ferries did not justify the expenditure. I may state the punts in this district (that have been superseded by bridges) let at very low rentals prior to their erection. The bridges I allude to are Belmore, Pitnacree, Dunmore, and Paterson. The punt at Dunmore was a private one.

Some eight or ten years ago I was one of a deputation that waited on the Minister for Works and presented a petition, signed by upwards of 2,000 residents of surrounding districts, in favour of the bridges now asked for.

GEO. H. STEPHENS.

Morpeth, 12 March, 1890.

*Mr. Gilliat.*] *J. G. White*, cabinet-maker, Morpeth:—The Dunmore bridge is a wooden one; there is no road between the proposed bridges across Phoenix Park; there is a road along the bank of the Hunter to the junction of the Paterson—about a mile; that road does not extend up the bank of the Paterson; the land for a road to connect the bridges would have to be resumed; the value would be about £50 per acre: this road is liable to be flooded; the flood-water breaks across first at the narrow neck between the Hunter and Paterson, marked with a red A, preventing the farmers from removing their stock to the Dunmore bridge or the high land at Largs; believes the construction of the bridges would bring the greater portion of the traffic through Morpeth; it would come from Dungog, Clarence Town, Stroud, and Gloucester; the road is much shorter by Morpeth; the punts both stop when the river rises from 3 to 4 feet above high-water level.

J. G. WHITE,

Cabinet-maker and Joiner.

Morpeth, 11 March, 1890.

WHEN I arrived in Morpeth in January, 1839, the whole of the exports and the imports of the Northern District passed through Morpeth up to the time the railway started. Also all the traffic, with a very little exception, from Dungog, Clarence Town, Port Stephens, &c., until the bridges were built at Dunmore, Pitnacree, and West Maitland, when the Morpeth trade was diverted to East and West Maitland. Teams used to come to Morpeth loaded with cedar and other produce, and either ship or sell and take what goods they required from the Morpeth tradesmen, but now nothing of the sort occurs; as I mentioned before, all that trade has gone through the bridges. Another drawback to Morpeth is that the heavy loaded teams will not come this way in consequence of the danger in crossing the punts to their horses or bullocks, and this very day it is difficult to get across the Morpeth punt except at high tide. If we had two bridges after the style of the Dunmore bridges it would greatly benefit Morpeth and the surrounding district, and would also be the means of augmenting the railway traffic.

J. G. WHITE.

*Thomas Campbell*, Alderman and ex-Mayor, Morpeth.

Sir,

Morpeth, 12 March, 1890.

During a residence of ten years in Morpeth, I have observed the great necessity that exists for the erection of bridges at Morpeth and Hinton, for the following reasons:—

1st. To enable the residents of Phoenix Park, Hinton, Wallalong, Seaham, Clarence Town, and intervening places to reach the railway at Morpeth. The only means of access at present is by punts, and during times of flood the punts are off, and people desirous of reaching Morpeth from any of the above-mentioned places are obliged to travel round by Belmore Bridge, and through West Maitland, an extra distance of about 15 miles, and numbers of these people are unable to remove their live stock to high ground, which in many cases are swept away by flood-waters.

2nd. Within a radius of about 5 miles of the proposed bridges the area of land under cultivation is about 6,000 acres, which, at a low estimate, at 5 tons per acre, would give 30,000 tons of produce yearly.

yearly. Some of this is sent up country by train, but owing to the expense and danger attached to the punts, the majority of it is shipped by steamers to Newcastle and Sydney. This estimate is exclusive of all dairy produce and live stock in the district between Morpeth and Dungog. The live stock are obliged to travel *via* Belmore Bridge to market, numbers of them being afterwards shipped at Morpeth.

3rd. The residents of Morpeth and surrounding districts are justly entitled to as good means of access to their natural markets as are residents of other localities, who can travel over bridges free, whilst we are compelled to use punts, and pay for doing so.

4th. Timber bridges could be constructed at a comparatively small cost, as I believe good timber for bridge-building can be obtained in the district, and the present cost of working the Hinton punt would materially lessen the interest on the cost of construction.

For these reasons I advocate the erection of bridges at Morpeth and Hinton.

THOMAS CAMPBELL,  
Alderman and ex-Mayor.

The tolls payable at the Morpeth and Hinton punts are as follows:—

Dray, buggy, &c. ... ..	6d.
Horse ... ..	3d.
Foot passenger ... ..	1d.

I understand there is a loss of about £350 a year on the working expenses of the Hinton punt; this amount would, I think, nearly pay interest on the cost of one of the bridges.

THOMAS CAMPBELL,  
Alderman and ex-Mayor.

Morpeth, 14 March, 1890.

*Mr. Gilliat.*] *Thomas Campbell*, Alderman and ex-Mayor, Morpeth:—Farmers are unable to bring across more than two bales in a one-horse dray, for which the punt toll is 9d.; I concur with Mr. Stuart's opinion as to the site of the proposed bridge over the Paterson; in 1887 there were thirteen freshets in the river, and the punt was idle for at least three months; the cost of land required for the road between the bridges would be about £60 sterling per acre.

THOMAS CAMPBELL.

12 March, 1890.

*Mr. Gilliat.*] *Mat. Murphy*, contractor, Morpeth:—Has been a resident of the district all his life, and remembers all the floods since 1857; lives within 100 yards of the Morpeth punt; land would have to be resumed for a road between the two bridges; the best line would be along the high land on the bank of the Hunter; the value per acre would be £50; does not consider that anyone but the freeholders through whose land the road will pass should bear any portion of the cost of resumption; within a radius of 6 miles considers there are 10,000 acres that would benefit by the erection of the bridge; a lot of pastoral country at the back would also benefit by getting their stock to the railway in a shorter distance; the 10,000 acres referred to produces an average of about 4 tons of hay annually; from want of the bridges the farmers are at a loss by being obliged to ship per drogher and steamer; the hay especially is soiled, and loses in value by being rolled down the bank, and then by transshipment; to land hay at Morpeth for shipment per steamer the droghers charge 6d. per bale; to deliver hay at the same wharf to go by rail they charge 1s. 6d. per bale, and often refuse to bring it; the water breaks over its banks at the Hunter at the place marked A in red before it does anywhere else in the neighbourhood; I consider timber bridges would be quite suitable and much cheaper; they could be erected for £9 sterling per foot for the main span, and £6 sterling per foot for the approach; the facilities for obtaining timber are as good as anywhere.

MAT. MURPHY.

Morpeth, 14 March, 1890.

*Mr. Gilliat.*] *George Boland*, school-master, Morpeth:—Mr. Boland, master of the Morpeth Public School, has thirty children on the roll, who are prevented from attending when the punt ceases working; since January, 1890, this has occasioned a loss of about three weeks; about ten months ago for eight or ten days the same number of children were prevented from attending; during his three years of residence there have been several floods each year.

GEORGE BOLAND.

Morpeth, 14 March, 1890.

*Mr. Gilliat.*] *Patrick O'Keefe, Esq., J.P.*, Local Managing Director of the H.R.N.S.N. Co. at Morpeth:—Has resided for fifty-four years in the district; the bridge would be of the greatest value to enable the farmers to save their stock in time of flood; the farmers own from four to ten or fifteen horses and brood mares, heavy draught stock, some of the brood mares costing £130 sterling, and most of the farmers have several valuable cows; they have large stocks of poultry, which in flood-time are lost by their inability to remove them; the same thing applies to their stock of pigs; the farmers often have stocks of pressed hay waiting for a market; this could be brought over to Morpeth if there were bridges, but which now cannot be removed in flooded or even wet weather by drogher, owing to the muddy or flooded state of the river banks; it is impossible to estimate the large value of the goods and stock that are thus imperilled by the want of the bridges; he thinks the Belmore bridge that cost upwards of £25,000 does not take 30 per cent. of the traffic; that would cross the Morpeth bridge if erected; the same remark applies to the Pitnacree bridge; Morpeth is the natural centre for all the farmers on the other side of the river; he knows this from his connection with the S.S. Co.; the greater part of the Bolwarra, all of the Dunmore and Phoenix Park produce, and most of the trade of the Paterson come to Morpeth by drogher; of this a great deal would be brought in by the farmers themselves if the bridges were built, as the drogher cannot always attend when required, and the farmers may wish to meet a good market; at the very lowest 10,000 acres of first-class land, from which our company has several times overshipped 40,000 bales of hay, in the twelve months, comes to Morpeth, in addition to large quantities of maize, potatoes, pumpkins, and onions, besides a considerable number of cattle, pigs, horses, poultry, &c.; the average production of lucerne hay is about 5 tons per acre, and the average net profit is about £3 per ton;

ton; is of opinion that inexpensive wooden bridges would be amply sufficient; would go to no expense in resuming land for a road between the two bridges; he would like to add that the tonnage of farm produce from Morpeth exceeds the combined export of Maitland and Newcastle; the vicinity of Morpeth is the most productive and richest farming land, not only of the Hunter, but of New South Wales.

P. O'KEEFE.

Morpeth, 14 March, 1890.

*Mr. Gilliat.*] *Captain William Adams*, late commander of the steamer "Coonabarra," and Newcastle A.S.N. and Newcastle Companies:—Has been trading and running up the Hunter River for forty years; as a fact the Hunter River is not navigable above Morpeth or above the junction of the Paterson for the smallest sea-going steamers at present running here; no sea-going steamers have ever run up the Paterson; he took the "Illalong" 3 miles up once just as a test, and had a job to get down again; the "Illalong" was about 400 tons; is not aware of any sea-going steamers ever going higher than the Morpeth punt; considers a headway of 25 feet would be sufficient for any drogher trading in the rivers; is convinced that the bridges are of great importance to the district; putting the benefit they would be to Phoenix Park on one side, the advantage that would be gained by affording direct communication to the residents of Clarence Town, Dungog, Stroud, and all the surrounding country would be of the greatest value; it would complete the communication to those districts; thinks from his observations that the punts cease working with a fresh of about 2 feet above high water; in a flood like the present, which is within 2 feet of the highest here, the bridges would have kept communication open from the time the punts stopped working; under present conditions all communication will be suspended for a week at least.

WM. ADAMS.

Morpeth, 14 March, 1890.

*Mr. Gilliat.*] *Richard Waddy* is the Manager of the Commercial Bank, Morpeth; has resided here twelve and a half years; considers the construction of the two bridges at Morpeth and Hinton would be of material benefit to the farmers of the district, Phoenix Park, Wallalong, Dunmore, Hinton, and the upper portion of Nelson's Plains; does not consider that the construction of the bridges would induce the settlers from the Clarence Town road to bring their produce from Morpeth; the only gain would be that they would escape the charge of the punt, while the distance is no less; the steam punt works very well, with the exception that with a fresh in the river of 3 feet above high water it has to stop working; thinks it is difficult to bring a full load across at low water; considers a full load to be three bales; the most a cart with one horse can bring across is two bales; the farmers on Phoenix Park and Dunmore prefer to go round by East Maitland to coming to Morpeth, owing to the delay and danger to their horses and carts in crossing the Morpeth punt; that naturally takes the business of the farmers to Maitland instead of to Morpeth, which would be their natural market if they had the facilities for reaching it; the bridges would facilitate the traffic by train and steamer; the acreage that would benefit by these bridges extends from the upper portion of Nelson's Plains on the east to Dunmore and Wallalong on the north-west; all of this land may be valued at an average of £60 per acre; the average production of lucerne hay, the principal crop, is at least 5 tons per acre; the net profit of the hay will average £2 per ton; the great proportion of this land is under water in the present flood (14 March, 1890); estimates the acreage at 7,000 acres of first-class land; owing to the want of facilities in reaching Morpeth by the settlers, estimates that during the last twelve years real estate in the town has declined 50 per cent.; considers that during ordinary seasons the existing roads, although of a somewhat lower level than along the bank of the Hunter, would answer all purposes for connecting the bridges; to resume land for a direct road between the bridges would cost £75 per acre.

See Mr. Waddy's note attached, explaining this statement.

R. WADDY.

Reporting on Morpeth and Hinton Bridges.

— Gilliat, Esq.,  
Dear Sir,

Commercial Banking Company of Sydney, Morpeth, 14 March, 1890.

Regarding my evidence as given to you to-day respecting these bridges, there is one point upon which there may be a misconception therein. Referring to the residents of Clarence Town coming to Morpeth or going to Maitland, I stated that the bridges would not offer any inducement for them to come to Morpeth, as the distance would not be shortened; what I mean by this is, that the fact of the bridges being there would not make the road any shorter to Morpeth than it is at present by the punt. It is a self-evident fact that the road to Maitland is much longer than to Morpeth, but the fact of the bridges being built would not, I think, give the residents there any further inducement to bring produce to Morpeth, even though the road were shortened. As the residents generally of those parts send their produce by river drogher or by the W.R.S.N. Co. to Newcastle and Sydney, they might possibly come through Morpeth to Maitland, but that would not be much advantage to us.

Yours, &c.,

R. WADDY.

Morpeth, 14 March, 1890.

*Mr. Gilliat.*] *J. Lavis*, storekeeper, Hinton:—A rise of 3 feet above high tide will stop the steam-punt at Hinton; has been compelled to drive round by the Belmore bridge and West Maitland, a round of 15 miles, three times already during this year; is unable to take more than half a load across when the punt is working owing to the steepness of the approaches.

J. LAVIS.

Morpeth, 14 March, 1890.

*Mr. Gilliat.*] *J. D. Beattie*, farmer, Phoenix Park:—There is no road between the sites of the proposed bridges; the best line for that road would be as close to the bank of the river as convenient; that is the highest ground; the land for the road would have to be resumed; the cost would be from £50 to £60 sterling per acre; from 3 to 4 feet above high-water level will stop the punts working; the first water in a flood breaks across at the point marked red A on tracing, and stock must be removed before that passage becomes too deep. Stock are removed in anticipation of a flood, and sometimes no flood to necessitate it comes; for information of the state of the upper river they are dependent upon a telephone at Hinton, and this is always carried away in flood-time owing to the cable being submerged; the homesteads within Phoenix Park are at least from fifty to sixty in number.

J. D. BEATTIE,  
Morpeth,

Morpeth, 14 March, 1890.

*Mr. Gilliat.] Mr. Frank Murphy, Morpeth, farmer and produce dealer:—*Has been a resident of the district all his life; considers that the punt at Morpeth stops working with a rise of 2 feet above high tide; when the fresh falls the punt frequently cannot be used from several days to a week, owing to the state of the approaches, which will not admit of a horse and cart getting on to the punt; has offered from 5s. to 10s. more per ton for hay delivered in Morpeth than the price on Phoenix Park; considers it dangerous to cross the punt with a full load, say of five bales; does not think it safe to cross with more than two, and this would not pay the farmer who has a toll of 9d. to pay for dray and one horse each time he crosses; wishes to add that by watching the tide and crossing at high-water three bales could be taken across without danger; during westerly winds that sometimes last for a week, occasionally for a fortnight, it is almost impossible to cross even with a saddle-horse; has waited for six hours to cross himself, and has been obliged to ride 7 miles by the Pitnacree bridge to reach his own house, a quarter of a mile from the punt; it is the force of the wind that prevents the punt from working; wishes to add that when the Paterson is in high flood the current in the Hunter is not so strong with a 2-foot rise, and the punt is sometimes able to work at that height; does not think any improvement could be made in working the punts; the punts are often stopped with a fresh of a foot above high water by the heavy timber coming down; it would be necessary to resume land for a road between the two bridges; the land is not worth more than £50 sterling per acre; although he considers the frontage to the river more valuable, does not consider it worth more than £50 sterling; the road is through freehold, but as the whole of the farmers in the surrounding district would have the value of their land enhanced by the bridge communication they should share the cost of resumption amongst themselves, or else reduce the price to a very low one; within the Phoenix Park there are 2,000 acres producing lucerne hay, about 5 tons per acre; with bridge communication the farmer would save at least 5s. per ton by being able to deliver on this side of the river; at present the farmers have to cart nearly the same distance and pay 5s. more; shipping by steamer and drogher the hay is soiled and deteriorated by rolling down the bank and transshipping into the steamer, while by delivering from the dray into the truck the hay is delivered clean and bright in Sydney, and from 3s. to 4s. per ton cheaper, and quite 5s. per ton in better order.

FRANK MURPHY.

*Mr. Gilliat.] Robert Hamilton, farmer, Phoenix Park:—*He lives at Wallalong; there are about 2,000 acres on the estate; the average crop of lucerne hay is about 5 tons per acre; the whole of this is shipped per steamer to Sydney; if the bridges were erected the whole would go by truck from Morpeth; by doing so it would get more quickly to market, and could meet a rising market with quicker sales and returns, and better condition in the trucked hay; can ship by truck much cheaper than by steamer.

ROBERT HAMILTON.

Bonded Warehouse, Morpeth, 13 March, 1890.

*Mr. Gilliat.] J. W. Pulver, Esq.:—*Is a resident of the district for the last twenty years; is of opinion that the site at the Queen's Wharf at Hinton is the better one for the bridge, as affording a better approach on the Hinton side, owing to the road from the Queen's Wharf to the punt being considerably under water in flood-time; wishes to say that the mails for Dungog, Clarence Town, Seaham, and Hinton go *via* Morpeth, and at present are dependent upon the steam-ferry over the Hunter at Hinton; this ferry stops working at every fresh in the river, and every fourth Tuesday for overhaul; he has at present orders waiting to be delivered by coach at Dungog and Clarence Town which have been delayed over ten days owing to traffic being suspended through the want of bridges.

JOHN W. PULVER.

West Maitland, 22 March, 1890.

*Mr. Gilliat.] J. B. R. Robertson, Esq., J.P.:—*Resides at Oakhampton Farm, 3 miles from West Maitland; he considers that a bridge from Morpeth across the Hunter is one of the greatest importance; Phoenix Park is one of the richest agricultural districts in the Colony; it has been called the garden of the Colony; it is a large agricultural district, on which an immense quantity of produce is grown, which would be brought to the railway if the bridge were built, and would soon recoup the cost; he is aware that the traffic is frequently stopped during floods, so that people on the other side have no communication with Morpeth at all; he knows of no place where a bridge is more required than at Morpeth; has been aware of the necessity of the bridge for the last thirty years; the preceding remarks apply to both Hinton and Morpeth bridges; the acreage of alluvial land that would be served by these bridges would amount to 10,000 acres, including Phoenix Park, Hinton, Miller's Forest, and Nelson's Plains; land has been recently sold at Phoenix Park for £100 per acre; the value of the acreage, excluding Phoenix Park, is from £60 to £70 per acre; the average production of lucerne hay, the principal crop, is about 5 tons per acre; has known the water to rise in the river at Phoenix Park 37 feet; thinks that a fresh of 4 or 5 feet will stop the punt from working; is landlord of farms on Phoenix Park, but in any case is convinced that the bridges are most desirable for the people of the district; is of opinion that the traffic for Sydney from Clarence Town and Stroud would come to the railway at Morpeth as the shortest road.

*Mr. Alexander.]* His property on Phoenix Park lies about central; he does not consider that the land having water-frontage on the river is of any greater value than that in the interior by reason of this frontage; the majority of farms on Phoenix Park have access to the river by roads which abut the river, there is no public wharf on the water-frontage of Phoenix Park, excepting opposite Morpeth; this wharf belongs to the Hunter River S. N. Co.; farmers do require to make provision in the way of temporary jetties and wharves from which to load the droghers.

*Mr. Gilliat.]* Is a director of the Hunter River N.S.N. Co.

J. B. R. ROBERTSON.

Morpeth, 24 March, 1890.

*Mr. Gilliat.] Mr. James Read, farmer, Phoenix Park:—*His farm is on Phoenix Park, about 300 yards below the steamship company's wharf, on the bank of the river; can give no estimate of the number of acres of alluvial land that would benefit by the bridges, or the amount of produce; 6 feet of a fresh will cause the punt to stop running; has known the Morpeth punt to be stopped by a strong westerly

westerly wind for three days; the westerly winds do not affect the steam-punt so much; he generally grows hay; sends his hay by the droghers; rolls the hay down the bank on planks; in wet weather the hay is injured by doing this; pays 6d. per bale to take it to the steamer; the same rate is charged per bale from the Paterson, 20 miles away; the steamers' wharf is not a quarter of a mile from his farm: he pays 3s. per bale per steamer to Sydney; could send from the Morpeth railway-station to Darling Harbour for less than 2s. per bale by truck; he is charged 1s. 6d. per bale by the drogher if he ships by railway, but does not think the drogher would take it; considers the average yield of hay about 5 tons; does not use the punt to bring over produce; during ten years has not taken more than 6 tons of hay that way; with a good horse has been unable to take up an empty dray from the Morpeth punt; at high-water can take a ton over; the risk is, however, too great to horse and dray to induce him to use the punt.

*Mr. Alexander.*] His farm is fronting on the Hunter from opposite new company's wharf down to junction of Paterson; his house is about a mile from the Morpeth punt, but by the road it is  $1\frac{1}{2}$  mile; up to the railway-station the distance from his house would be  $2\frac{1}{2}$ ; in addition to this distance is the chance of damage on the punt; on the other hand he does damage to hay in loading on drogher; drogher, 6d.; steamer, 3s.—3s. 6d., against less than 2s. by rail; if the bridge were built the cartage to railway-station would be 2 miles; it has occurred to him that the steamers' company might reduce their charges to less than by rail if bridge were built, but he does not think they can carry the hay for less than present charges; even if they did so reduce, would rather send by rail, because of expedition and care in handling; in his opinion a road across Phoenix Park should come from Queen's Wharf, where the bridge should be, and the road should run down the right bank of the Paterson to the Government Road at junction, then follow this road up to junction of Morpeth and Largs Road; from junction of Paterson and Hunter along left bank of Hunter there is a tolerably high ridge 30 rods back from Hunter frontage; a road along this would require a bridge, but along the line he proposes no bridge would be required; a large part of this road would pass through his land; he would not give it free; would ask £— per acre; depends on the land passed through; would rather not say.

*Mr. Gilliat.*] Considers the land on Phoenix Park as being worth £50 to £60 sterling per acre.

JAMES READ.

*Mr. Gilliat.*] *Mr. James Stuart*, of Hinton, builder and contractor:—Has resided in the district twenty-six years; produce is loaded on to the drogher from what are called wharves—that is, a place sloped down the banks, from which planks are laid to the drogher, and the hay is rolled down the incline on board; is not aware of any wharves or jetties on either the Hunter or Paterson; he is aware that produce suffers by shipping per drogher to such an extent as to decrease its market price; there are 5,000 bales of hay carried annually to the Hinton wharf for shipment per drogher that would go by rail if the bridges were made: the difference of value of hay on the Hinton and Morpeth sides is only that of cartage or drogherage; the Hinton steam-punt is taken off for overhaul once every month; the punt is off from 3 in the afternoon till the next morning; there is a regular day each month for this overhaul; it is known through the district; considers it a necessary work, but that it could be done at night after the traffic has stopped; a strong westerly wind will frequently stop the Morpeth punt working for a day; it is not so bad in its effect at the Hinton steam-ferry, but he has seen that stopped.

Previous  
evidence  
attached.

*Mr. Alexander.*] Is not a farmer; owns no farming land; this evidence given about farming is from his connection with farmers and knowledge of the district: place of business is at Hinton; the seven punts referred to in his statement comprise two at Raymond Terrace, one at Seaham, and one each at Hinton Morpeth, Largs, and Hexham—totalling seven punts, not six; there is no wharf on left bank of Hunter at Hinton at which live stock could be loaded on to ocean steamers, so it all has to travel round by the bridges and back to Morpeth to head of navigation; Messrs. Holms, of Clarence Town; Mr. Fisher, of Brandon; Mr. Carmichael, of Seaham; Mr. Reynolds, of Tocol; another runholder near Hinton;—these have to drive stock all the way round; if these bridges were built stock would come direct to steamer or rail at Morpeth; regarding the statement as to the quantity of ironbark timber in the district, he means to say that the timber left is in paddocks on private lands which have not yet been parted with; as a matter of fact, there is plenty of timber in the district still; squared ironbark delivered in Morpeth costs about 1s. 6d. per foot, and round timber about 10d. or 1s.; has tendered for a shed in Sydney, and expects to get his timber in Morpeth—ironbark; all this timber will be brought him by bullock-teams, not by water, and this timber might come from Seaham, as a tender has been given from that place by road all the way round; if these bridges had been built this timber could be brought direct at less cost; within last twelve months has built a hay-shed on Phoenix Park of large round timber brought from Seaham round by the bridges.

JAMES STUART.

First-class timber has been obtained within 5 miles of Hinton, and shipped to New Zealand for bridge-building; is of opinion that the best site for the bridge across the Paterson would be below Hinton, and nearer the junction of the Hunter; his reasons are that the banks are higher and better, that the road connecting the bridges would be along higher land, and parallel with the current; it would be necessary to resume land for this road; estimates the value to be from £60 to £70 per acre; there are about fifty or sixty homesteads within the bight formed by the two rivers, *i.e.*, Phoenix Park.

JAMES STUART,

Builder and Contractor,

President of the Hinton Progress Committee.

“Royal Hotel,” Morpeth, 25 March, 1890.

*Mr. Alexander.*] *Daniel John Carmody*, farmer, Nelson's Plains:—Farms 34 acres leasehold, about  $1\frac{1}{2}$  mile from confluence of Williams River; there is a road to Hinton—fair road—about 5 miles to Hinton Ferry; has to cross by Williams to get to Raymond Terrace steam-wharf about 3 miles; utmost load that can be taken on Williams punt in dray is a ton; takes about an hour to get to wharf; has never carted produce to Morpeth to go by rail; does not consider it worth while; sends goods by drogher; his farm fronts river; has made up a small jetty on his farm to load from; jetty is fairly convenient; have sometimes to wait a week for a drogher until others are attended to; water at jetty is sufficient for drogher;

drogher; his jetty is the only one thereabouts he believes which is so favoured; others have to wait for tides; pays 3s. 6d. per bale sending by steamer, including drogher; the proposed bridges at Morpeth and Hinton would affect him in this way, that when he has business at Maitland he would have to go round by road by existing bridges when floods are out: for instance, to get to Morpeth to-day he had to leave his horse on left bank of Hunter at Hinton, because punt has stopped running; would pay to send produce by rail to Sydney from his farm if bridges were built, as he could despatch two loads daily.

*Mr. Gilliat.*] Each of these loads would be three bales of lucerne and five bales of oaten hay; considers his hay is injured by forwarding by steamer; one of his neighbours ships from his jetty; his other neighbours have jetties, but most of them have to wait for high water to enable the drogher to get alongside; he obtains all his supplies from Raymond Terrace, Morpeth, and Maitland; a storekeeper in Morpeth and one in Maitland send round frequently for orders; they deliver the orders at his house; thinks that punt at the Williams will stop working with a 3-foot rise.

D. J. CARMODY.

A westerly wind affects the working of the punt; there is but one man in charge, and he is unable to work it without assistance from the persons crossing; the toll is 6d. per vehicle, and 3d. per horse; the punt is leased; the tenant pays £57 sterling per annum.

D. J. CARMODY.

Largs, "Butcher's Arms," 29 March, 1890.

*Mr. Alexander.*] *Malcolm M' Rae*, farmer:—Leasehold 60 acres, 40 acres cultivated, close to Largs, fronting on Paterson River; ships hay by drogher generally, sometimes by rail at Maitland; he has a small wharf on his land; cannot load at this when there is a flood or a fresh; then he has to send to West Maitland; cannot get to East Maitland at flood-time; distance to West Maitland is 5 miles; to Morpeth Bridge, if built, would be 2½ miles; potatoes and onions ought not to be sent by drogher, because it entails an extra handling; such articles are carted either to steamer or to rail; would sooner travel 4 miles round than take his horses over a punt, because they are not quiet on a punt; droghers are sometimes so full of work that they cannot take away the hay; has had hay waiting a fortnight; has carted hay to East Maitland in order to get it away when drogher failed him; the distance is 3½ miles; though the distance is only 1 mile further than to Morpeth by a bridge, yet this Morpeth bridge could be reached during moderate flood when the Pitnacree bridge cannot be got at, because the flood is passing across at Paterson on this side the bridge, and at Porter's on the other side also; produces yearly 30 or 40 tons potatoes and 10 or 15 tons of onions; his hay has not been damaged in loading on to the droghers from his own wharf; Bolwarra and many Dunmore farmers use Bolwarra wharf; but the new courses of the river lately developed are likely to cut off this wharf altogether; there is no proper wharf; the bank has merely been cut away to allow of loading on to the droghers.

*Mr. Gilliat.*] After a flood the road into East Maitland *via* Pitnacree is impassable for a month; this has been the case ever since he knew it for thirty-five years; the last flood has destroyed all the lucerne-fields in this neighbourhood; the cost of ploughing and resowing is not less than £2 stg. per acre; a planting of lucerne will last six or seven years; has known it to do so fourteen; has had three plantings of lucerne destroyed in one year by floods; in good seasons he gets 6 tons of lucerne per acre, and about 40 to 50 bushels of maize per acre.

MALCOLM M'RAE.

Largs, "Butcher's Arms," 29 March, 1890.

*Mr. Alexander.*] *Mr. Charles Cummins*, farmer:—Dunmore Estate, leasehold 33 acres, 15 acres only cultivation, rest grazing, about half a mile from Largs, towards Dunmore Bridge; would use a bridge at Morpeth occasionally for potatoes and onions because these being perishable goods they have to be sent away quickly; his average production per annum about 15 tons of potatoes and 8 tons of onions; is affected by floods; the bridge at Morpeth would not enable him to save any goods.

*Mr. Gilliat.*] Sends his hay and maize by drogher; pays 3s. 6d. per bale of hay to Sydney; from his farm to Morpeth punt is about 2½ miles; thinks with 2s. per bale by rail it is cheaper to ship by drogher; there are other reasons why he prefers to do so; one is that when going by train it is only allowed to stop a certain number of hours on the truck; it must be sold or else removed and stored; if the latter extra expense is incurred, while if shipped by steamer it is unloaded and stored at the company's wharf in Sydney, where it can remain for a fortnight without charge if it is desired to hold for a rising market.

*Mr. Alexander.*] Consigns his hay to an agent in Sydney; the hay is sold in Darling Harbour when it goes by rail.

*Mr. Gilliat.*] With a rise in the Hunter of 28 feet on the Belmore bridge the water overflows the road at the entrance to Phoenix Park; is certain of this from personal investigation; this rise covers the low land at the neck, and commences to flow into the Park; considers the mean reading at the Belmore bridge at the height of the last flood was 34.6 feet; this was on Thursday afternoon the 13th instant; during the last flood the water flooded the neck between 8 and 9 a.m. on Wednesday the 12th instant; is convinced that the inhabitants on Phoenix Park are entitled to a bridge; throughout the rest of the district there are free bridges; around Morpeth they have only punts, and have to pay tolls to use these.

*Mr. Alexander.*] His farm does not front on water; has to draw his produce to Bolwarra public wharf, about a mile from his farm, and ship it then on droghers; the produce spoken of above as being sent by rail to advantage he to East Maitland.

CHARLES CUMMINS.

Largs, "Butcher's Arms," 29 March, 1890.

*Mr. Gilliat.*] *David Jarvis*, farmer:—His farm is on the neck between the Hunter and Paterson Rivers forming the entrance to Phoenix Park; the bridges are necessary in time of flood; the want has been long felt, and they have been agitated for since he was a boy; has lived there for more than thirty-five years; the water from the Hunter first breaks over its banks during flood on his farm and flows across the farm into the Paterson; this is the first part of the Phoenix Park flooded, and persons cannot get into Largs except by boat; his house is raised 1 foot from the ground; during the last flood there were 2 feet of water in the house; did not remove his family; when the Park is flooded there is a good deal of current,

current, but not so strong as on his farm; the current is not all over the Park, but in certain parts; the logs and driftwood on the Park are brought in by the current; has known a flood 18 inches higher than the last; this was in March, 1875; the flood was then 4 feet high in his house; he measured this; the last flood he did not measure; the water must have been higher; sends a good deal of his produce by drogher; the hay he loads by rolling down the bank; pays 3s. 6d. per bale for hay by steamer to Sydney; if it was cheaper to ship by rail, and there was a bridge, he would take it to Morpeth; forgets the freight on hay by rail; does not use the Morpeth punt because it would require three horses, especially at low tide, to take over three bales; this is because the pull out is so heavy; the punt stops working with a fresh of about 4 feet, or even less; unless he could cross the punt at high-water would rather go by Pitnacree bridge to East Maitland; this is about 4 or 5 miles round; does not consider accidents in using the punt arc frequent; having to pay 9d. for a horse and dray at the punt often prevents his using the punt; the average size of the farms is about 30 acres; lucerne averages about 5 tons per acre; maize about 40 bushels; on Phoenix Park the whole of the lucerne will have to be resown; it was destroyed by the late flood; will get nothing from the land until November next; it will cost about £2 15s. sterling per acre to prepare and replant the land; the duration of a planting of lucerne is about five or six years.

*Mr. Alexander.*] When flood breaks over from the Hunter River it first flows down the park, and then back towards Dunmore and Golden Grove; then, after it has risen a little higher, it flows into the Paterson; when at the highest the floods keep the same three directions; droghers have been working in Paterson and Hunter for twenty-six years to his knowledge, and he has been sending by them all along; would use the bridge to Morpeth if he found it to his advantage; he would have to cart to Morpeth, whereas now the droghers come to his barn; keeps two horses and a dray carrying three bales; the saving in freight would have to be set against labour in this carting; no damage has been done to his hay by loading on the droghers; some crops have to be taken to Sydney quickly, such as maize, potatoes, and new hay; there would be a decided advantage in sending these by train, also poultry and pigs; at present he sends very little by rail from Maitland; when roads are passable, East Maitland, *via* Pitnacree bridge, is nearer than West Maitland; he can only say, regarding sending by rail from Morpeth, if bridge were built, that he would have to find out if it would be really to his advantage to send by rail from Morpeth before he could say that he would do so; the bridge to Morpeth would be useful for communication with doctor, or when under need to go across by night; at present would sooner go to Maitland than be delayed at the punt; the bridge would not enable him to save much goods; it might be of such service occasionally; have often seen numbers of farmers from the Park collect on his farm, watching to see if flood is going to rise on the bank from the Hunter; and if it does so, then they go off quickly and drive their cattle across; if there was a bridge at Morpeth the farmers would, as soon as they found water rising over the land at this spot, drive and take away all their live stock and any goods that could be taken quickly across the bridge; they would have more time to save their goods; they would not be cut off as they are at present; the hay is usually stored high up; this, of course, could not be taken away; the live stock and would be saved.

*Mr. Gilliat.*] The water broke over his farm during the last flood at about 9 o'clock a.m.; is not sure whether it was Tuesday or Wednesday.

*Mr. Alexander.*] Leases 19 acres, which extends from river to river.

DAVID JARVIS.

*Mr. Gilliat.*] The water during the last last flood broke over the entrance to Phoenix Park at 9 a.m. on Wednesday, the 12th of March, and was about fifteen hours in getting all over the Park; the flood was highest in his house about Thursday afternoon at 5 o'clock; since giving evidence this morning has measured the flood-level, and finds that it was 22 inches above the floor; he also measured the flood-level of 1875, and finds that it was 38 inches from the floor.

DAVID JARVIS.

Clarence Town, 31 March, 1890.

*Mr. Gilliat.*] *James C. Miller*, Manager of the Williams River S.S. Co.—Has resided in the district for fourteen years; considers that little, if any, produce would go to Morpeth if the bridges were constructed; the carriage would be too costly; is not aware of the cost of carriage from Dungog or Clarence Town to Maitland or Morpeth, but from Maitland to Dungog it is 25s. per ton; believes the distance through Clarence Town is 38 miles; cost of carriage per steamer to Newcastle is 6d. per bag for maize, and to Sydney 13d.; very little hay is shipped from Clarence Town; some is shipped lower down, between Seaham and Raymond Terrace; the freight is 18d. per bale to Newcastle, and to Sydney from 3s. to 3s. 6d.; for the year 1889 there were 25,000 bags of maize shipped from this district; out of that only fifteen bags went to Morpeth; in the first quarter of 1890 sixty bags have been transhipped at Raymond Terrace for Morpeth; the bulk of this 25,000 bags was consigned to Newcastle, and was chiefly for local consumption; quite seven-eighths of the maize is shipped by the local storekeepers; the steamers run daily, leaving Clarence Town at 9-30 every morning, picking up passengers and cargo on their way down; their traffic is confined chiefly to the Williams; their passenger traffic does not exceed six daily.

*Mr. Alexander.*] The market for oaten hay carried by their steamers is mostly in Newcastle, as the quality is not so good as the southern and western, but that of lucerne is mostly in Sydney; the traffic by river between Clarence Town and Morpeth, both ways, transhipped at Raymond Terrace, would not amount to £10 per annum, even at the present exceptionally low rate of freights; have three steamers drawing, "Coorei," 9 feet. "Favourite," about 8 feet, "Williams," about 7 feet; "Coorei" is 92 tons burthen, "Favourite," about 60 tons, "Williams," about 40 tons; there are no droghers in this river; the sailing vessels that come here can load down to 13 feet 6 inches; the "Coonanbara" is the largest steamer that has come up here; loaded, she draws in this river 9 feet to 9 feet 6 inches; can go up to the Falls, about half a mile further up; the bridge is close to the Falls; this company has been working ten years on this river; does not consider that the erection of bridges at Morpeth and Linton would affect the trade on the river; freight to Newcastle on hardwood is 1s. per cent.; on cedar, 1s. 6d.; from Newcastle to Sydney would be 1s. 6d. per cent. in addition on cedar; the road from Clarence Town to Creek, on the Raymond Terrace and Stroud Road, is almost impassable; this is shown by the fact that though the distance from

Creek to Raymond Terrace is 8 to 10 miles further than to Clarence Town, the traffic goes to Raymond Terrace in preference; the state of this road affects the business of the steamer company seriously; the company offer these advantages, storage and weighing free, and several local buyers.

JAMES C. MILLER.

Clarence

Clarence Town, 31 March, 1890.

*Mr. Gilliat.*] *Joseph Windross*, manager for J. C. Ellis, of Sydney and Newcastle, a resident in the district for eleven and a half years:—Having heard Mr. Dart's evidence with regard to maize he concurs with it; in the event of the bridges being constructed he believes a considerable traffic in saw-mill timber (logs) would go that way; a saw-mill proprietor has told him that the distance round by the present bridges is so great that he cannot afford to draw them; the teamsters have informed him they could afford to haul if they could get to Morpeth; it would be a saving of 3 miles to East Maitland; believes that a quantity of timber between Clarence Town and Morpeth would be hauled into the latter place for shipment to Newcastle; the freight from Clarence Town to Newcastle is 3s. per 100 feet super., and the haulage would be about the same to Morpeth as to Clarence Town; there is a lot of saw-mill timber in that direction.

*Mr. Alexander.*] The timber that would go to Maitland as noted above would be in log; a good deal of timber is sent from Clarence Town to Newcastle on lighters; much of this is sent up country; Mr. J. Ellis has now a contract for Government, for 1890, for supply of all timber on Northern Line; this timber he will send to Newcastle on lighters; it will be loaded there on train and distributed along the line; it is a question whether for delivering in Morpeth it would not be cheaper to take it by road, and if so then the route *via* the proposed bridges would certainly be adopted; timber is loaded in Clarence Town for all ports but he sends all his in lighters to Newcastle, where it is transhipped for ports; he is now shipping for New Zealand; this timber could not be taken direct to Morpeth and shipped at once in sea-going vessels because the depth of water at Morpeth will not admit of vessels of the same draught as can come to Clarence Town; the draught admissible here is 13 feet at spring tides; not sure of the depth of water between Morpeth and Raymond Terrace.

*Mr. Gilliat.*] The reason he has discontinued shipping timber from Clarence Town by sea-going vessels is that Mr. Ellis has made other arrangements for doing so, but he may revert at any time to the former practice; has known the "City of Brisbane" to come up to Clarence Town.

*Mr. Alexander.*] The price of squared ironbark is 14d. per foot in Clarence Town; of round piles, 5d. to 1s.

JOSEPH WINDROSS.

*Mr. Gilliat.*] Passengers having to go by steamer from Clarence Town to Newcastle lose two days going by road *via* Morpeth to catch the train; they can be back in Clarence Town the same night; business people leaving Clarence Town lose three days going to Sydney and back, and only one day by train *via* Morpeth.

JOSEPH WINDROSS.

Clarence Town, 31 March, 1890.

*Mr. Alexander.*] *S. W. Dark*, storekeeper:—Resided here for twenty-three or twenty-four years; deals in produce, principally maize: Clarence Town is the port for all the Williams north of this; and much of the traffic from the Port Stephens District also; there is a bridge here across the Williams, on the road from Stroud; from Dungog is the principal traffic; the market for nearly all the grain is Newcastle; at times such as the present, when floods in northern rivers have raised the price in Sydney, maize is consigned to the Sydney market direct, but such rises are only of a temporary nature; Newcastle must, in his opinion, continue to be the market, because there is not enough maize produced in these and the Hunter River districts to supply the consumption in Newcastle itself; of cedar there is a large quantity shipped here; vessels drawing 13 feet of water trade here of from 400 to 600 tons burthen; considers that for goods there would be very little traffic to Morpeth, even if the bridges are built, because the difference in cost of freight from Morpeth to Sydney, and from Clarence Town to Sydney, would not compensate for the land carriage from Clarence Town to Morpeth; there is not enough hay, either lucerne or oaten, grown in this district for its own consumption; freight to Newcastle of maize by steamer is 6d. per bag, and to Sydney 1s. 4d. per bag (not quite sure of this latter); inclusive of all charges to Sydney; Maitland is the principal market for fat cattle; these go by road; these districts are used for fattening all along the Williams; these would be sent to Morpeth to the rail if the bridges were built, if a trade by rail with Sydney is in existence; considers that for passengers and light traffic the bridges to Morpeth would be a great convenience to these districts, but no goods would be taken there.

*Mr. Gilliat.*] Cannot state the cost of carriage per ton to Maitland, the traffic is so unimportant; believes that nineteen-twentieths of the maize grown in the district is purchased from the producer in Dungog and Clarence Town, and shipped by the local buyers to Newcastle.

S. W. DARK.

Clarence Town, 31 March, 1890.

*Mr. Alexander.*] *E. S. Field*, storekeeper:—Has been here for eighteen months; deals in produce of all sorts; for all stations north of Maitland he considers that it would be cheaper to do according to existing practice, *viz.*, to send by steamer to Newcastle, and to use the train thence, rather than to cart from here to Morpeth; at present only dairy produce and eggs and poultry are sent to West Maitland to the weekly market; freight to Newcastle by these boats is 5s. per ton, 6d. per bag; to Sydney, 1s. 3d. or 1s. 4d. per bag; does not think that including cartage it would pay to send by rail from Morpeth or Maitland; not much maize goes to Sydney by sea from Clarence Town; Newcastle is the market; considers that the bridges would facilitate passenger traffic by rail; a person could leave at noon and get to Sydney same evening; the saving would be about four or five hours in favour of the train from Morpeth or West Maitland; up to this year and in former years the price of maize in Newcastle ranged higher than in Sydney; this was due to the supply from the northern rivers to Sydney, but John See has been running steamers to Newcastle lately, and altered the conditions; supplies have also been brought from New Zealand.

*Mr. Gilliat.*] Thinks the bulk of the maize grown is purchased by local buyers before shipping to Newcastle; has no knowledge of the cost of carriage per ton to Morpeth or Maitland; can give no information about fat stock.

E. S. FIELD.

Mr.

1 April, 1890.

*Mr. Alexander.] C. A. Beck, Manager, A.J.S. Bank:—*Has been here between five and six years; the bulk of goods traffic goes from Stroud to Raymond Terrace, though the distance to Clarence Town is shorter; it is principally maize, potatoes, and bacon; a fair proportion, less than half, comes to Clarence Town; this is the port for all districts on north of Clarence Town and on right bank of Williams; farmers all around, especially at Dungog, are shareholders in this steamer company, and are consequently interested; Dungog is 15 miles from Clarence Town; all its goods come here; occasional drayloads of cedar arrive in Clarence Town, and some few do pass on to Maitland, but the bulk goes by river; considers that the existing steamer service on the river serves the districts north of this place efficiently, and that the erection of bridges at Morpeth and Hinton would be a great convenience, but it would not induce an alteration of the trade route in his opinion.

*Mr. Gilliat.]* There is a considerable traffic in fat stock passes through Clarence Town; the calves only are shipped by the river steamers; large stock go on to West Maitland to the market there; is aware that Mr. Holmes in this neighbourhood, the principal cattle-dealer and grazier, ships calves by steamer from Morpeth, and occasionally large stock; the bridges would save between 5 and 6 miles from Dungog to Maitland, and might induce a certain increase in stock traffic; the bridges would not affect the timber traffic; the principal passenger traffic from Clarence Town to Dungog is by steamer to Newcastle, and thence by steamer or train to Sydney; considers this is the more convenient way, as passengers can take the night boat from Newcastle; to do this one has to leave Clarence Town at 9:30 a.m. every day, and reaches Newcastle from 2 to 4 p.m.; the coach taking the mail leaves for Morpeth, *via* Hinton, at 12:30 p.m., reaching Morpeth about two hours later; this is of course subject to the punt at Hinton being able to work; when the punt is not working the mails have to go round by the and Belmore bridges to West Maitland.

*Mr. Alexander.]* Stroud is 30 miles from Clarence Town.

C. A. BECK.

Clarence Town, 1 April, 1890.

*Mr. Alexander.] W. J. Croker, grazier and timber merchant:—*Owns 1,800 acres freehold, and leases 5,500 acres, all in the neighbourhood, and on both sides of river Williams; he charters sailing vessels for ocean trade, and lighters for Newcastle trade; deals largely in stock; principal market for both buying and selling stock is West Maitland; East Maitland would suit better than West if it could be got at; it cannot well be got at now, or rather it is not now more suitable than West Maitland, because, even by

bridge it is very little nearer, and also that by this bridge the road is frequently impassable; for stock going to Sydney he would use the train at Morpeth if the bridges were built; also if he were sending by steamer, because the steamers trading to that place are so much larger than those coming to Clarence Town; also for stock to be sold in East Maitland he would travel them by these bridges; ships on steamers calves, fat cattle, and horses, and milking cows for Sydney; considers the sea route is best for such; has never sent by rail, because he thinks they are less knocked about on vessels; steamers on Williams, can only take about four cows or twenty calves, or four horses at once; these, if to go to Sydney, would have to be transhipped in Newcastle; the steamers on Hunter can take about forty or fifty cows, or about thirty horses at once, and then go direct without transhipping; the Hunter River steamers could come here as far as draught of water is concerned, but there is not trade enough for them on the Williams; they used to come here at one time; is of opinion that the Morpeth and Hinton bridges would be of great service to the stock trade of these northern districts; they would be of no use for timber trade from the Williams, but from the Paterson to the Clarence Town side for timber to be delivered in Maitland or at stations north the best route would be *via* these bridges if built.

*Mr. Gilliat.]* Mr. had the Government contract for timber in the northern district for five years, during which contract he supplied him with the timber; last year Mr. Ellis had this contract, and he supplied him also with the timber for twelve months; if the bridges were constructed he would cut the timber from the Paterson and truck it at Morpeth; this would comprise from 400 to 500 logs annually (girders); in his shipments of stock he would be guided by the prices ruling in Sydney or Maitland, and would ship to the highest market, but in either case it would be the shortest route to go *via* Morpeth; the freight for large stock from Clarence Town to Sydney is 20s. per head; the freight per steamer from Morpeth is 17s. per head; this is the cheaper route of the two, apart from the advantage of sending down a large mob at once; the freight for timber from Clarence Town to Newcastle by drogher is 3d. per foot for running foot piles and cube foot girders; in supplying contract, if delivered in Morpeth *via* the bridges, this freight would be saved, and fully 3d. more expense of loading and trucking to Maitland; this refers to timber that would be cut between the Paterson and Clarence Town; there are large quantities of timber in that direction; is now in treaty with Mr. T. Cooper for 500 acres of timber there.

*Mr. Alexander.]* This timber (some of it) would have to be delivered at a railway station. As the case stands at present he would deliver it by road to West Maitland, but if the bridges were built he would cart *via* Hinton and deliver at Morpeth, and he considers that the saving in distance by this route is worth 3d. per foot.

WILLIAM J. CROKER.

Morpeth, 2 April, 1890.

*Mr. Alexander.] Mr. James Coombs, engineer, steam ferry, Roads Department:—*Has been in charge of the steam ferry for sixteen years, but has known the district since 1856; steam ferry was first instituted in 1876; the same steam-punt is working now; engines are rated at 12 h.p.; length, exclusive of slopes, 52 feet; width, clear, 22; she can carry 140 tons of load; can carry six single-horse carts and about ten horses in addition when packed; have known this to be done on several occasions; has known this ferry boat to take across an eight-horse waggon with 6 tons of loading; there is no room for more, but a few loose horses might be put in also; for such a team he considers that no improvement could be made on the Hinton side; but on the Morpeth side the stone-pitched pavement, which has been down for eighteen years, might be improved by being replaced with smaller stones; these are very large, and make rough travelling; on the Hinton side the approach is pitched also, but with proper-sized stones, bluestone; on the Morpeth side the stones are sandstone; floods cover these approaches with silt, and when floods subside this has to be cleared away; this causes some inconvenience to traffic; remembers one accident on

this

this ferry punt; it happened thus: a jibbing horse with a loaded cart behind it, on arrival at Hinton side, refused to leave the punt, backed the cart through the chains, which he broke, and fell off the flap, cart and all, into the river; have never known any other accident from the punt; have known harness to be broken by horses entering or leaving the punt, but believes this was due chiefly to the rottenness of the harness; does not remember any accident having happened to the mail-cart; the ordinary rise and fall of spring tides is 4 feet, but with a southerly gale outside this tide may rise another 6 inches; the ferry is more convenient for traffic during high than low tide, because at high tides the grades on the approaches are less steep than at low tides; on the Morpeth side one of the guide-posts is more down the approach than on the Hinton side; this limits the working of the punt to a certain height of water; this height is 3 feet 6 inches above high water of spring tides; if the Morpeth and Hinton posts were made on same level some advantage in length of working would be gained, but the time for stopping the punt is usually controlled by the rate of the current, so at the outside a rise of 4 feet of water may be taken as the utmost depth of water above high spring tide in which the punt can be safely worked; returns, weekly, are sent into head office of the traffic; the tolls are the same now as from the beginning; the number of horned cattle that have been taken over at one time is fifty-six; the depth of water in the channel 20 feet from the Hinton approach is 40 feet at high water; does not know of any rock being in the bed; respecting the Morpeth punt, capacity is about 40 tons; have seen two three-horse teams with loads of gravel on her at once; the approaches are pitched; an improvement might be made on the Morpeth side by repitching with smaller stones; but the Phoenix Park approach he considers to be in very fair condition; cannot call to mind any accident having happened on this punt due to defective construction or working of the punt or approaches; considers that she compares very well as a hand punt with any on the river; it is leased; no returns are sent in of traffic; considers that no more damage is done to vehicles in getting off and on this punt than on punts in general; this punt is off before the steam-punt: it cannot run in strong current; cannot tell the rise, but any strong current, or a strong westerly gale, on a falling tide, will stop the punt; portion of the river bottom on the Morpeth side is hard clay; on the other side it is mud.

*Mr. Gilliat.*] With good horses, 6 tons can be taken out of the steam punt at any tide; will furnish a statement\* of the days the punt has not worked during the first quarter of the present year, and the cause of prevention; the maximum height of the 15th March flood, 1890, was 13 feet 8½ inches at the Hinton steam punt; this is the highest flood he has known; the road between Hinton and the punt within 100 yards of the river was covered with about 5 feet of water; the Morpeth side was flooded half-way to the town; he brought a boat nearly to Mr. Gordon's house: on the Hinton side the flood-water extended all the way to the hotel in the township; if the tolls were reduced or removed considers the produce traffic would be largely increased; they were removed a few years ago for eleven months, during which time the traffic was almost doubled, comprising a great deal of heavy traffic; great quantities of farm produce were brought across which is now sent by the droghers; if the tolls were reduced or removed at the Morpeth punt it would increase the light traffic, but no other.

*Mr. Alexander.*] The greatest depth of water between Morpeth and the punt on the road was about 4 feet.

JAMES COOMBS.

Proposed Bridges at Morpeth and Hinton.

Stanley Alexander, Esq.,

Dear Sir,

I received yours of the 23rd last night, delayed in being addressed to Hinton, but I now respectfully enclose the test and result of time with punts running. If the vehicles are prompt in coming in, we can go over and return in two minutes, including loading and discharging, and on an average it is possible to do about forty trips an hour, although we have never been instructed to do so.

Yours, &c.,

JAS. COOMBS,

Hinton Ferry,

Morpeth.

Re Statement Hinton Ferry.

Examiners Public Works Proposals.

I RESPECTFULLY submit for your information numbers of days that steam-punt was not available for vehicular traffic during the recent floods for quarter ending 31st March:—

January	...	...	...	...	...	...	...	...	...	...	Nil.
February	...	...	...	...	...	...	...	...	...	...	5 days.
March	...	...	...	...	...	...	...	...	...	...	9½ days.
Total	...	...	...	...	...	...	...	...	...	...	14½ days.

I wish to state that it is only vehicular traffic that is stopped during flood-time at this ferry. At all times communication has been kept up either by boat or steam launch for foot passengers and light goods. Such an extraordinary time of delay through flood-water has not been known at this ferry during the fourteen years the steam-punt has been stationed here, and I do not suppose the like has ever been known at this ferry before.

Correction.—Please insert fourteen years instead of sixteen years, an error which was made by me in giving evidence at Morpeth, as you will observe from 1876 to 1890 to be fourteen years' term of steam-punts working here.

J. COOMBS,

Hinton Ferry.

"Royal Hotel," Morpeth, 2 April, 1890.

*Mr. Alexander.*] *James Spence*, engineer, New Hunter River S.N. Co., on the drogher "Anna Maria":—She draws 4½ feet loaded, 56 tons register, about 70 or 80 tons gross; 25 h.p.; can carry 200 bales of hay, or about 700 bags of maize; never carries cattle: occasionally gets pigs, no horses; works principally between Paterson township up the Hunter to wharf and down to Raymond Terrace; some of the farmers have jetties; if none, they go alongside the bank and lay two 24-foot planks ashore, and roll the bags or bales on board; hears a good deal of talk about the damage to hay in loading, but does not consider that much damage is done: farmers do make jetties where water is shallow or loading on droghers

\* Attached.

droghers could not be done; charges for droghage, 6d. per bale for hay going by steamer; for hay going by train the charge is 1s. 6d. per bale, which includes loading on the train; by steamer to Sydney, including droghage, the charge on hay is 3s. 6d. per bale; the "Boomerang" draws loaded about 10 feet 6 inches (not quite sure of this); there are plenty of droghers for all the work; each company has one at Morpeth, and others come up from Newcastle.

*Mr. Gilliat.*] When the banks are cut away to load hay or corn the farmers lay planks or poles to protect it from being soiled; bales of hay, bags of maize, or any produce are not left on the banks from day to day, but if notice is given at the office or as the drogher passes up the river it is picked up on the return journey; it has happened, though very rarely, that the drogher returns loaded, and is unable to take the produce as promised; produce left exposed to the weather in this way he would endeavour to remove on the following day; only remembers one or two cases in which the produce was left out all night; as a rule he does not bring the drogher into Morpeth fully loaded; gives no preference to produce to be shipped by steamer over that going by rail; the extra 1s. freight charged for produce for the railway was put on some eight or ten years ago to check the large consignments of hay sent up the Northern line; the height of crane and funnel above water-level when light is 24 feet; 24 feet is about the headway that would be required for all the droghers trading here.

JAMES SPENCE.

"Royal Hotel," Morpeth, 2 April, 1890.

*Mr. Gilliat.*] *Duncan Sims, J.P.*, agricultural engineer—Resident in the district forty-seven years; is of opinion that until steps are taken to regulate or straighten the course of the river the construction of bridges is inadvisable; the position of the bridge is an illustration of what he means; the construction of the upper bridge at Belmore and the extension of the railway has diverted the traffic that originally came to Morpeth; does not consider the trade would be brought back by the construction of the proposed bridges; they would be more a convenience to light traffic than for produce; does not consider the reduction or removal of the tolls would increase the traffic.

D. SIMS, J.P.,  
(Per H. GILLIAT).

"Royal Hotel," Morpeth, 2 April, 1890.

*William Morrow*, sergeant of police:—Has been here almost two years; at East Maitland four years previous to coming here; according to Constable Murphy's note-book there are thirty-one farms on Phoenix Park; has observed a fair traffic in cattle from Dungog passing across Hinton punt to be shipped by steamer for Sydney at Morpeth; has a recollection of a mob of horses having been brought here round by Maitland shipped in Morpeth for Sydney.

W. MORROW.

Phoenix Park, 12 May, 1890.

*Mr. Alexander.*] *John McFadyen*, farmer (tenant) on 50 acres, close to Morpeth punt:—Each steamer company has an acre of land on Phoenix Park, opposite their own wharf; on this land they each have a wharf and a shed; all goods delivered at these wharves are carried by the companies steamers free of droghage, viz., at the same freight as from Morpeth; the road to these wharves joins the main road near Morpeth punt; this is a surveyed road through private property which has been in use all along as an approach to the companies' wharves; there is also another road approach to the wharves from the Beattie's Point road; no Government money has ever been spent on these roads.

JOHN M'FADYEN.

Narrowgut, 12 May, 1890.

*Mr. Alexander.*] *George Blundell*, farmer, Narrowgut, half a mile from Morpeth; 16½ acres leasehold on property of the Close family; has been on this farm thirty-seven years; his frontage is not on the Hunter River, but on the creek from Hume's lagoon; sends hay, corn, and potatoes to Sydney by steamer; carts to steamer with his own teams; pays 3s. and 3s. 6d. per bale freight, according to size; on potatoes freight is 10s. per ton, twelve bags per ton; onions the same, but fourteen bags per ton; dairy and garden and orchard produce is sold in Morpeth market; has never sent goods by train; the reason he sends by steamer is that the companies house goods in Sydney for a fortnight free of charge, but if sent by rail goods must be sold from the truck within a certain number of hours; his neighbours on this part of Narrowgut, who have no water-frontage, all despatch their goods in the same way; further away, past the creek, all farms have water-frontage; when roads are good they all despatch in the same way, because they save cost of droghage by doing so, but when roads are not good they ship by drogher; the same course is adopted by all farmers, his immediate neighbours, who have water-frontage.

GEORGE BLUNDELL.

Phoenix Park, 12 May, 1890.

*Mr. Alexander.*] *Mr. G. H. Stephens*, farmer, Phoenix Park, gives list of farmers on Phoenix Park having frontage on a river:—

David Jervis...	...	19 acres, fronting both rivers—tenant.
Dennis Maher	...	14½ acres, fronting Paterson River—tenant.
D. O'Toole	...	19 acres, fronting Paterson River—tenant.
W. Eliason	...	25 acres, fronting Paterson River—tenant.
P. Maher	...	25 acres, fronting Paterson River—tenant.
G. H. Stevens	...	50 acres, fronting Paterson River—tenant.
A. Hooke	...	46 acres, fronting Paterson River—freehold.
Mrs. Morris	...	46 acres, fronting Paterson River—freehold.
R. Wilkinson	...	50 acres, fronting Paterson River—freehold.
D. Hickey	...	30 acres, fronting Paterson River—tenant.
A. Richardson	...	18 acres, fronting Paterson River—tenant.
J. Beattie	...	25 acres, fronting Paterson River—freehold.
W. Gear (Beattie's Pr.)	...	23 acres, fronting Paterson and Hunter Rivers—freehold.

J.

J. Read ... ..	28 acres, fronting Hunter River—freehold.
J. Maher ... ..	22 acres, fronting Hunter River—tenant.
M. Duggan ... ..	24 acres, fronting Hunter River—tenant.
T. Wright ... ..	25 acres, fronting Hunter River—tenant.
— Baker ... ..	2 acres, fronting Hunter River—freehold.
J. Wright ... ..	20 acres, fronting Hunter River—tenant.
G. H. Stevens ... ..	3 acres, fronting Hunter River—freehold.
M. Maher ... ..	47 acres, fronting Hunter River—tenant.
J. M'Fadden ... ..	50 acres, fronting Hunter River—tenant.
J. Campbell ... ..	26 acres, fronting Hunter River—freehold.
Mrs. Maher ... ..	36 acres, fronting Hunter River—freehold.
J. Aitchison ... ..	34 acres, fronting Hunter River—freehold.
P. Grace ... ..	26 acres, fronting Hunter River—freehold.
J. Campbell ... ..	30 acres, fronting Hunter River—freehold.

Total... .. 763½ acres with water-frontage.

Farmers on Phoenix Park not having frontage to river:—

J. O'Toole, 32 acres—18 acres, freehold; 14 acres, tenant.	G. Lawler, 28 acres—tenant.
R. M'Cann, 20 acres—freehold.	J. Lawler, 26 acres—tenant.
T. Wright, 16 acres—freehold.	J. Corbett, 26 acres—tenant.
J. Harris, 50 acres—tenant.	J. Hawley, 25 acres—tenant.
J. Handley, 16 acres—tenant.	P. Burke, 25 acres—freehold.
J. Gliesan, 25 acres—tenant.	T. M'Mann, 18 acres—freehold.
P. Holborn, 36 acres—tenant.	Total—395 acres without water-frontage.
E. Pearce, 52 acres—tenant.	Total—1,158½ acres of land farmed on Phoenix Park.

The original grant of Phoenix Park included a portion of Golden Grove. The total of grant was 2,000 acres. The list now given of holdings comprises the whole of the lands, to the best of his recollection, now called Phoenix Park.

Considers that the acreage under lucerne is generally about two-thirds of the whole acreage. Of the rest the chief part would be planted in maize and the rest in potatoes. Of pumpkins, which are grown through the corn, each acre can be relied on to produce 10 tons (7 dozen to the ton) in a fair season. Not a great many onions are produced. Green barley is produced for private consumption.

*Mr. Gilliat.*] From nearest portions of Bolwarra, Golden Grove, and Dunmore, all produce, when not loaded on droghers, is carted to East Maitland over Pittwater Bridge. When this road is impassable all but the hay is carted through Phoenix Park to the wharf or occasionally to the train.

GEO. H. STEPHENS.

Hinton, 13 May, 1890.

*Mr. Alexander.*] *James Stuart*, builder and contractor, Hinton, has gone over the names of farmers on Woodville, Warralong, Nulla Nulla, Park, Swan Reach, Osterley, Nelson's Plains, given in Mr. Geering's evidence, and wishes to add the following, viz.:—

On Woodville.—G. Bishop, 50 acres, tenant; Logan, 60 acres, freehold, 20 acres, tenant. These do not front the river.

On Warralong.—Kelly and Clarke, 40 acres, tenant; A King, 30 acres, tenant. These farms have water-frontage.

On —W. Byron, 20 acres, tenant. This farm does not front water.

On M'Clement's Swamp there are fully 1,000 acres which would be all good for cultivation in lucerne and maize if drained. There is a prospect of this being done. It is owned by several owners, all freehold, on M'Clement's Swamp Corner, 25 acres. These do not front water.

On Nulla Nulla Estate.—Has frontage—F. Moore, 5 acres, freehold. No frontage—T. Mann, 20 acres, tenant; W. O'Brien, 40 acres, tenant; T. O'Brien, 30 acres, tenant; J. Watson, 30 acres, tenant=125.

On Osterley Estate.—Has frontage—O'Rourke, 15 acres, freehold.

On Nelson's Plains.—Has frontage—Davis, 25 acres, tenant; J. Fortc, 25 acres, tenant; G. Footc, 25 acres, tenant; J. Goswell, 30 acres, tenant. No frontage—W. Halpin, 15 acres, tenant. Has frontage—J. Priddle, 40 acres, tenant; J. Pearce, 30 acres, tenant=190.

In Hinton there are three stores, two hotels, post and telegraph office, police station, places of worship, Anglican, Presbyterian, and Baptist, resident Ministers two, Public School, steam flour-mill, not working, also two banks, agricultural implement factory, School of Arts. The population of the place, 475, is dependent upon the agricultural industries. There are fifty-six electors on electoral roll with residence or householders in Hinton. The site is very well fitted for a township, being very extensive, and raised above floods, capable of carrying a large population. There are five vineyards on this hill aggregating about 83 acres under vines. Mr. Christian has applied for right to mine for coal here. The flood during March rose 4 feet on the road between Hinton and , and about 3 feet on the road to the punt. It mounted up the street from Queen's Wharf as far as the junction with the main road. Regarding the decadence of Hinton since the bridges were built directing traffic to Maitland,—in 1864, when he came here, the two machine factories were flourishing, employing fully twenty-five hands. There was a tobacco factory. The hotel let for £120 per annum, now the rent is £60. The trade from the Williams and Paterson came through here. The steam flour-mill, now silent, was working in those days.

JAMES STUART.

Barethorne, 13 May, 1890.

*Mr. Alexander.*] *H. Geering*, blacksmith and land-owner:—Has been here forty-two years; property is at Barethorne, about 70 acres. List of land-holders having farms fronting on Paterson River, commencing from the bridge, at Woodville:—H. Croker, 90 acres, tenant; D. Newton, 25 acres, tenant; T. Butler, 20 acres, tenant; N. Carter, 20 acres, tenant; J. Volnier, 25 acres, tenant; total, 180 acres

acres. Without water-frontage—Mrs. Carter, 20 acres, freehold; T. Carter, 25 acres, tenant; T. Watson, 30 acres, tenant; Carl Volnier, 20 acres, tenant; total, 95 acres. Fronting Paterson River—J. M'Donnell, 40 acres, tenant; M. Clarke, 30 acres, tenant; J. M'Donald, 50 acres, tenant; W. Read, 30 acres, tenant; A. M'Murry, 30 acres, tenant; W. Wingartner, 30 acres, tenant; J. Carroll, 50 acres, tenant; J. Hickie, 50 acres, tenant; J. King, 50 acres, tenant; J. See, 25 acres, tenant; J. Todd, 25 acres, tenant; R. Hamilton, 25 acres, tenant; Mrs. Tidyman, 30 acres, tenant; total, 465 acres. Fronting on Paterson River—W. Christian, 70 acres, freehold; Mrs. See, 20 acres, freehold; J. Morrow, 40 acres, tenant; Mrs. Cameron, 20 acres, tenant; W. Morrow, 30 acres, tenant; J. Whiffen, 25 acres, tenant; H. Morrow, 20 acres, tenant. Fronting on Hunter—W. Stevens, 30 acres, tenant; total, 255 acres. Not fronting on Paterson—H. Gearing, 30 acres, freehold; H. and A. Beevis, 30 acres, freehold; Miss Pearce, 70 acres, freehold; P. Flynn, 20 acres, tenant; C. Tidyman, 25 acres, tenant; W. Digby, 18 acres, tenant; J. Minslorne, 100 acres, tenant; T. Watkins, 40 acres, freehold; J. Macpherson, 40 acres, freehold; total, 373 acres. Total, Barethorne, 628 acres. The above comprises all arable land between Dunmore bridge and half a mile beyond Hunter steam-ferry, and extending back between Barethorne and Hinton as far as M'Clement's Swamp; considers that the farmers on Woodville Estate would carry lucerne over two-thirds of the whole, and that the other third would be planted in corn similarly on the Barethorne lands; the rent paid for lucerne land on river is £3 per acre, and on swamp land £2 per acre; for maize-growing; the above average of crop and rent also applies to Warralong lands. The following farms are on the left bank of Hunter River:—The Nulla Nulla Estate, Wilson; Mrs. Smith, 20 acres, freehold; W. Gear, 20 acres, tenant. Not fronting river:—F. Wilson, 25 acres, freehold; W. Newman, 20 acres, tenant; J. Priddle, 20 acres, tenant; J. Pearce, 15 acres, tenant. Total, 120 acres. The following farms are on left bank of Hunter River:—The Park Estate, Mrs. Mann. Fronting Hunter River:—W. Bunt, 25 acres, tenant; T. Mann, 40 acres, freehold. Not fronting Hunter River:—J. Hicks, 20 acres, tenant; T. Burgess, 20 acres, tenant; W. Somers, 25 acres, tenant. Total, 130 acres. The following farms are on left bank of Hunter River:—Swan Reach Estate, John Eaves. Fronting Hunter River:—R. Bailey, 30 acres, tenant; J. Hayes, 30 acres, tenant; A. Kennedy, 25 acres, tenant; J. Dwyer, 25 acres, tenant; T. Donnelly, 35 acres, tenant; R. Watson, 30 acres, tenant; T. Watson, 30 acres, tenant; P. Shannon, 60 acres, tenant. Not fronting Hunter River:—J. O'Rourke, 20 acres, tenant. Total, 285 acres. The following farmers are on left bank of Hunter River:—Osterley Estate, Mr. Hickey. Fronting Hunter River:—J. Reynolds, 30 acres, freehold; P. Reynolds, 20 acres, freehold; H. Johnson, 30 acres, tenant. Total, 80 acres. The following farmers are on left bank of Hunter River:—Nelson's Plains, John Eaves. Fronting Hunter River:—S. Foote, 25 acres, tenant; M. Malcolm, 30 acres, tenant; R. Carroll, 30 acres, tenant; A. Parsons, 40 acres, tenant; S. Brown, 40 acres, tenant; T. Hallwell, 30 acres, tenant; W. Newman, 20 acres, tenant; J. Perrott, 40 acres, tenant; J. Camody, 30 acres, tenant. Total, 285 acres. At Barethorne is his blacksmith's shop, containing lathes, steam-hammer, and much machinery for making agricultural implements; has made hay-presses, mowing machinery, and all classes of tools and machinery required by farmers; has to bring his coal from Morpeth—not by river, but by road; also gets it from Five-mile Creek beyond East Maitland; this also is brought over the Hinton punt; uses about 40 tons of coal per annum, and would use more if more easily got; uses wood fuel as much as possible; all steel and iron for work he gets up from Sydney by steamer; the amount of work turned out by him has diminished very much of late years; Carisford is a private township, as Barethorne, of no importance.

H. GEARING.

Public School, Hinton, 13 May, 1890.

Children on roll.—Boys, 68; girls, 59; absent, 7; total, 134.  
From Phoenix Park, 5 children.

M. THOMPSON.

Copy of Return asked for in Examiners' No. 10, of 2/4/90, to the Under Secretary for Works, attached to P.W., Roads and Bridges, 90-2,814.

Hinton Ferry.

(a) Annual cost of maintenance, including all charges for repairs and working expenses	£820	0	0
(b) Total collections of tolls for year 1889	505	14	9

Morpeth Ferry.

Yearly rental at which punt has been leased.

(a) Leased for 1890 at £10, and tolls retained by lessee.	£100	0	0
(b) Expenditure upon repairs for 1890 and maintenance	...	...	...

Morpeth, 13 May, 1890.

Subject:—Morpeth and Hinton Bridges.

Public School, Morpeth.

Children on roll.—Boys, 84; girls, 67; total, 151.

Morpeth Railway Station.—Rates obtained from station-master.

	Newcastle.			Sydney.		
	£	s.	d.	£	s.	d.
Hay	0	12	5	1	16	7 per truck, 14 bales.
Maize	*0	2	7	*0	9	2 per ton.
Potatoes	0	2	8	0	11	3 £3/4/3 per truck to Sydney.
Onions	...	...	...	...	...	.....

\* Under By-law 37. Old rates come into force after 31st August, 1890.

Sydney,

Sydney, 27 May, 1890.

Hunter River New Steam Navigation Co.—Freights charged from Morpeth to Sydney on the following produce, viz. :—

Hay, per bale, not exceeding 50 cubic feet .. .. .	3s.
Hay, small bales (not exceeding 40 cubic feet), per cubic foot .. .. .	two-thirds of 1d.
Grain (3½ bushels) per bag .. .. .	9d.

Hunter River New Steam Navigation Company, Sydney, 27 May, 1890.

Messrs. Gilliat and Alexander, Examiners of Public Works Proposals, West Maitland,—  
Gentlemen,

In reply to your letter (15/5/90, No. 16) of 15th instant, I beg leave to inform you respecting query A \* \* \* Yes; query B \* \* \* No; query C \* \* \* Statement enclosed showing freight charged on hay and maize from Morpeth wharf and Phoenix Park wharf to Sydney by H.R.N.S.N. Co.'s steamers.

On further consideration, my directors decline to furnish the information required respecting the quantity of goods\* of each kind taken away by this Company's steamers from Morpeth during the year 1889, because the Government compete most unfairly against the steamers at the present time, and under these circumstances it would not be advisable to supply information which might be utilised to our disadvantage.

I have, &c.,  
F. J. THOMAS,  
Manager.

RETURN A.

Borough of Morpeth.—Return for the year ending 3rd February, 1890.

Estimated population .. .. .	1,450
Estimated number of dwellings .. .. .	251
	£ s. d.
Amount of rate levied in the £—ordinary .. .. .	0 1 0
Capital value of fee-simple of unimproved lands .. .. .	4,353 0 0
Fair average annual rental of buildings, cultivated lands, &c., upon which rates are struck .. .. .	8,410 2 0
Estimated capital value of all property in the municipality .. .. .	115,173 15 0
Receipts from ordinary rates .. .. .	482 7 9
Government .. .. .	662 16 6
Other sources .. .. .	57 10 7
Total receipts, exclusive of loans .. .. .	1,202 14 10
Expenditure—Salaries and office expenses .. .. .	136 4 11
For public works .. .. .	918 10 1
Miscellaneous .. .. .	59 16 7
Total expenditure .. .. .	1,134 11 7
Assets at date of balancing .. .. .	118 3 3
Total extent of roads and streets made .. .. .	6 miles 7 chains
Do do do unmade .. .. .	3 " 53 "
Estimated value of made roads and streets .. .. .	£10,273

JOHN F. BUTLER,  
Council Clerk.

3 April, 1890.

*Mr. Alexander.] Myles M. Rae, M.L.A.*—Has interest in Morpeth: owns the mill property only there; notices in the annual report for 30th June, 1889, by the Railway Commissioners that 151 trucks, loaded, were despatched from Morpeth with hay; wishes to explain on this that the Hawkesbury bridge was only opened on 1st May, 1889, and that there was a severe flood in the river in May, 1889, so that though traffic to Sydney by rail only obtained for eight months of that year, 151 trucks at 14 bales gives 2,114 bales=705 tons; notice also that for the year ending 31st December, 1889, the railway returns show 508 tons of hay despatched; this gives 1,524 bales; on this points out that up to May, when the flood occurred, the tonnage amounted to 339, or 1,017 bales; and that for the eight months after the flood 169 tons=507 bales only were despatched; these supplies come from a limited area—from Narrow-gut and Brisbane-field, including about 500 acres; also Berryfield, about another 100 acres; were the bridges built fully twenty times that area would be affected, extending down to Raymond Terrace along the Hunter, but as regards the country along the Williams to Seaham, from the confluence with the Hunter; does not consider that all the hay would be brought to Morpeth; farmers on that side who have no frontage do now occasionally send produce to Hinton, and if the bridges were constructed many more farmers would do so, even from the banks of the Williams; this would be to take advantage of cheapness of carriage and of the facilities afforded by Darling Harbour (see paragraph on this subject later on); the railway does not insist on charging demurrage on trucks detained loaded in Darling Harbour, if they are satisfied that reasonable despatch is being used; also produce at Darling Harbour is sold every day or so by auction, and the purchaser has to bear the risk of demurrage; as to the permission said to be given by the steamer companies to store hay at their sheds in Sydney, the fact is that commission agents are compelled to sell hay as it arrives when the market is fairly supplied; failing this the charge is 3d. per bale per day; this exorbitant charge compels agents to sell at a reduction rather than submit; wishes to point out that the opening of the Hawkesbury bridge has introduced elements into the trade in hay which in their effects upon it can hardly be foretold; that there have been two very severe floods since the bridge was opened; both these killed nearly the whole of the plant; as an extensive buyer of hay, he points out the fact that farmers in Phoenix Park will not accept 5s. or 7s. per ton extra for hay on condition of its being carted across the river to Morpeth; has inspected the details of statistics collected by the Examiners; notices that these comprise lands from the confluence of the Hunter and Williams Rivers along the bank of the Hunter and Paterson to Dunmore bridge; also the whole of Phoenix Park; points out that in his opinion the lands of Golden Grove and Dunmore up to the main road between Dunmore bridge and Largs, so far as the bridge, should be included, because the distance to Morpeth is less, to most of the farmers, than to Maitland, and also because at Morpeth they have the choice of two markets; that is that they have the option of sending produce to Darling Harbour by rail

or

or to the wharves in Sydney; also because there is a weekly market in Morpeth; none in East Maitland, and that in West Maitland is too far; the saving in distance from Largs to Morpeth, as compared with West Maitland, is  $3\frac{1}{2}$  miles; regarding storage at Darling Harbour, auction sales are held three times weekly, and trucks are allowed to be detained forty-eight hours; a shed has been constructed for storage of hay, free of charge, for a reasonable time; regarding the lands along the Williams, which have not been included in Examiners' statistics, wishes to add that the bridges would enable the farmers on those lands to send their produce to Morpeth and participate in the competition which takes place in Morpeth amongst the local buyers at auction sales; buyers from Newcastle on the south, and from stations up the line to Tamworth on the north, come to Morpeth in dry seasons or buy through agents there; the delivery to this market is now restricted by the lack of communication; farmers are compelled to pay 1s. 6d. per bale droghage for delivery to the rail at Morpeth.

*Mr. Gilliat.*] The hay grown upon the Williams River is chiefly eaten; the land is not of the same rich alluvial character as that fronting the Paterson and the Hunter River; a fair average of oaten hay is  $1\frac{1}{2}$  ton to the acre; with reference to droghage charges of 1s. 6d. per bale for hay consigned to railway covers the cost of loading on trucks, but the cost of trucking is a mere trifle, as the distance between the drogher's wharf and the siding does not exceed 100 feet, and the drogher crew is assisted by the railway porters; the charge made for loading by the railway is 1s. per truck, but is seldom enforced; the steam-packet companies made an arrangement with him, owing to the difficulty in inducing the farmers to cart to Morpeth, to put lucerne hay into his store for 1s. 6d. per bale, but agreed to allow a rebate of 1s. per bale, provided the same hay was reshipped to Sydney by their steamers, but if forwarded by rail the 1s. 6d. was enforced; is distinctly of opinion that the construction of the bridges would open to the railway at least 10,000 tons of hay per annum, the most of which is now prevented from coming into Morpeth by the tolls imposed at the ferry, the suspension of the traffic during freshes or floods, and the danger or risk in crossing the punt; wishes to say that the bridges would effect a saving of £1,200 in transit, and £2,500 in deterioration occasioned by shipping into drogher, and transhipping from drogher to wharf at Morpeth, reshipment to steamer, and unloading on to Sydney wharves; the deterioration is to the appearance of the bale, from the knocking about and lifting with hay-hooks and exposure; he makes these statements as an expert; the income to the railway would be £3,000 per annum.

*Mr. Alexander.*] Is aware that both steamer companies have wharves on Phoenix Park at which produce is received and despatched by steamer free of droghage; these are used only by a few farmers in the immediate vicinity; attaches as part of this evidence a corrected copy of a letter addressed to the Minister for Public Works of 24th August, 1880.

MYLES M'RAE.

Legislative Assembly, Sydney, 24 August, 1880.

Hon. Bruce Smith, Minister for Works,—

The following are undeniable reasons why the bridge at Morpeth and the other at Hinton should be at once proceeded with in the interests of the townspeople of Morpeth and Hinton, the agriculturists of the electorate of Morpeth, and the taxpayers of New South Wales:—

- 1st. Because, by the action of previous Governments providing, during the past twenty-five years, free access to East and West Maitland by the construction of the Pinacree, Dunmore, Belmore, and Victoria bridges, and at the same time neglecting to construct the bridges referred to, equally important, the legitimate traffic has been completely diverted from Morpeth and Hinton to Maitland to such an extent that recently the fee-simple of a property at Morpeth has been sold for the annual rental derivable therefrom some eighteen years ago. I myself purchased a mill from the Hon. J. Rundle, Esq., for £800 which at the time stood him in £18,000.
2. The bridges are urgently required to connect the rich agricultural lands of Phoenix Park, Dunmore, Wallalong, Hinton, Swan Reach, and Burrora, with Morpeth, thereby enabling the producers of those places to send their produce to the metropolitan markets by the Great Northern Railway, the freight by rail being cheaper than by steamer, and making the branch line to Morpeth highly reproductive to the State, an enormous trade awaiting the construction of the bridges. Up to the present time the steam companies have had a monopoly, besides their charge for droghage being 6d. per bale on hay brought to their head-quarters, Morpeth, and afterwards forwarded by their steamers to Sydney; but if the farmer wishes to send his hay to the Great Northern Railway the companies increase their charges for droghage to 1s. 6d. per bale, protection in favour of the latter to the extent of 200 per cent.; whereas, if the bridges were constructed, the farmers would cart their hay to Morpeth, and put it on the railway trucks, thereby getting rid of the charge altogether. This is not the worst feature. All the hay shipped to Sydney by steamer lands on the Market Wharf and the Lime-street Wharf. An extra quantity arriving, the buyers withhold their hands, and immediately a fall in price takes place; whereas, if half of the hay arrived by railway at Darling Harbour and Milson's Point, no such fall would take place in the price of hay, and the farmers, who are already handicapped by the importations from the adjoining colonies, would be in a better position to compete, the cartage from the Market Wharf to Milson's Point alone being 7s. 6d. per ton.

Morpeth is the head of the navigation of the Hunter and Paterson Rivers, and situated on the southern bank of the Hunter River, is fully 100 feet above the level of the highest flood ever known on the Hunter; hence, everything else being equal, the bridges erected, has attractions and material for development that Maitland does not possess, the latter place being subject to inundation. If the late Squire Close had accepted a reasonable price thirty or forty years ago for allotments of land in Morpeth, his prices averaging then up to £500 per acre, the greater portion of West Maitland to-day would have been a lucerne paddock, and Morpeth would have been the principal town in the northern district.

The richest lands of the valley of the Hunter stretch forth from the northern bank of the Hunter, opposite the town of Morpeth, almost as far as the eye can see, embracing both sides of the Paterson River; hence, the town of Morpeth, through the non-erection of the bridges, is actually cut off its bread and butter, the trade naturally belonging to it. I venture to say that there is not another instance of the kind in New South Wales. To give you an idea of the trade, a greater tonnage has been shipped annually at Morpeth, until recently, than at Newcastle.

Yours faithfully,

MYLES M'RAE.

#### Morpeth and Hinton Bridges.

Messrs. Gilliat and Alexander, Examiners of Public Works,—  
Gentlemen,

Parliament House, Sydney, 23 June, 1880.

I wish you to append the following to my evidence concerning the construction of the bridges at Hinton and Morpeth.

I find, upon reference to Coghlan's Statistical Register, Part 4, referring to the state of agriculture in New South Wales during the year ending 31st March, 1880, that the Morpeth electorate produced 22,147 tons lucerne and sown grasses, while all the other electorates in New South Wales only produced 43,153 tons, not half the tonnage produced in my electorate. Had it not been for the May flood, 1880, which killed a great deal of the plant, the tonnage would have been nearly double, and equal to the production of all the electorates of New South Wales.

I wish also to remind you that the tonnage of lucerne hay and sown grasses produced in East Maitland, West Maitland, and the Hunter electorates during the year ending 31st March, 1880, was, according to the same authority, Coghlan, 9,988 tons, a little over a third of that produced in my electorate, still they have got and are getting splendid bridges.

If

If a private company owned the branch railway at Morpeth the first thing they would do in order to encompass and participate in the patronage of the enormous production of that electorate would be to make terms with the Government concerning the Hinton and Morpeth punts, and afterwards allow all traffic to cross them free of charge; immediately afterwards start constructing the bridges; after constructed, sinking the punts into the bottom of the river.

The railway now is like a pig with one ear, nay, half an ear, at the mouth of the biggest tonnage in New South Wales, awaiting the bridging of the Hunter at Morpeth and Paterson at Hunter.

Yours faithfully,

W. Gilliat, Esq.,  
Sir,

Hinton Ferry, 21 June, 1890.

In reference to yours of the 16th instant, I beg to state there was a high fresh in the Hunter River on Tuesday, 18th February, 1890, about 8 feet above high-water mark. 2nd. Also another one on Monday, the 24th February, same month, the maximum rise being 11 feet above high-water mark. 3rd. The last-named flood partly submerged the Phoenix Park.

Yours obediently,

JAS. COOMBS.

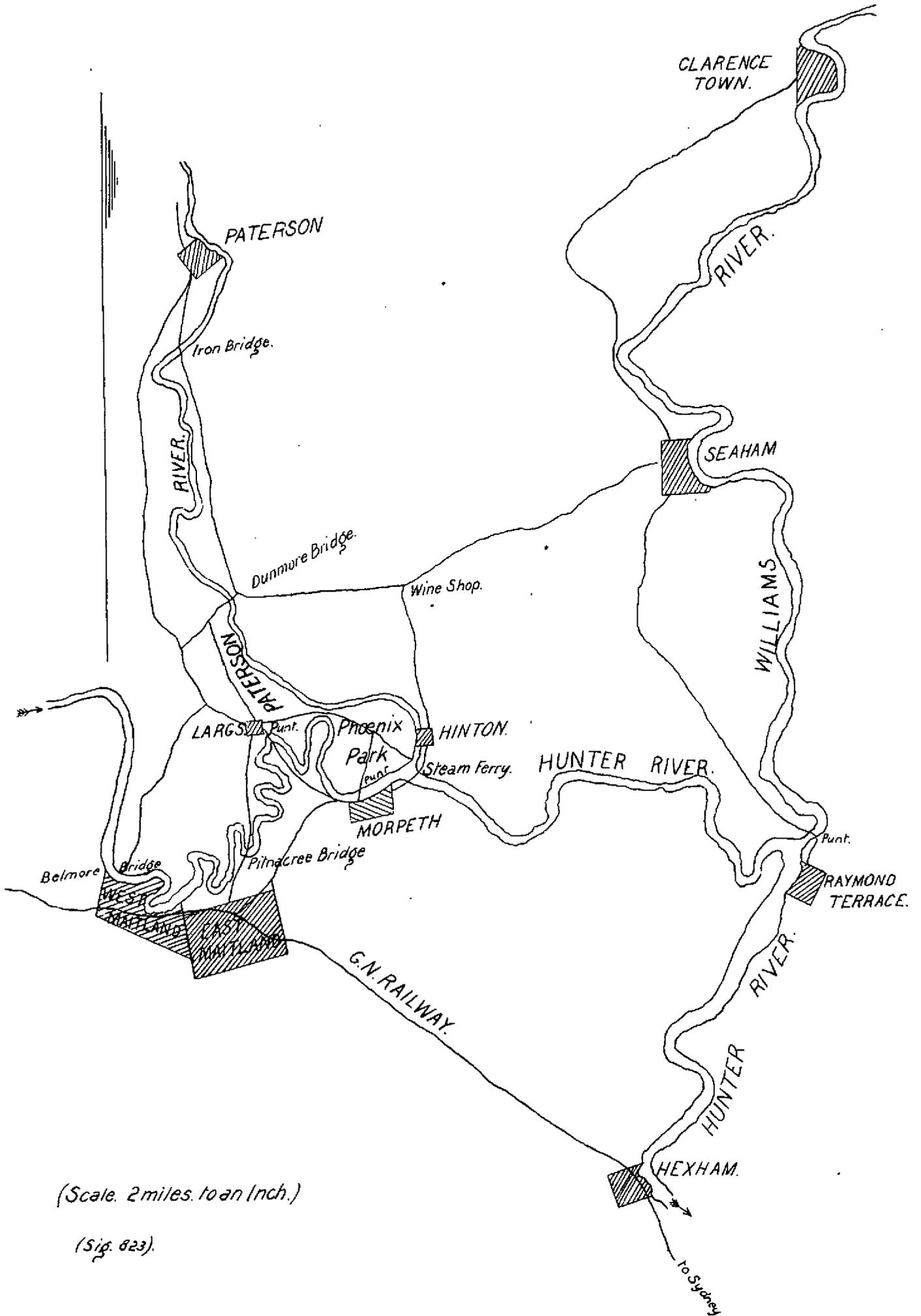
[Two Plans.]

Sydney: Charles Potter, Government Printer.—1890.

{1x 9d.]

# SKETCH PLAN.

To accompany the examiners report on the proposed bridges at Morpeth and Hinton.



(Scale. 2 miles. to an Inch.)

(Sig. 823).

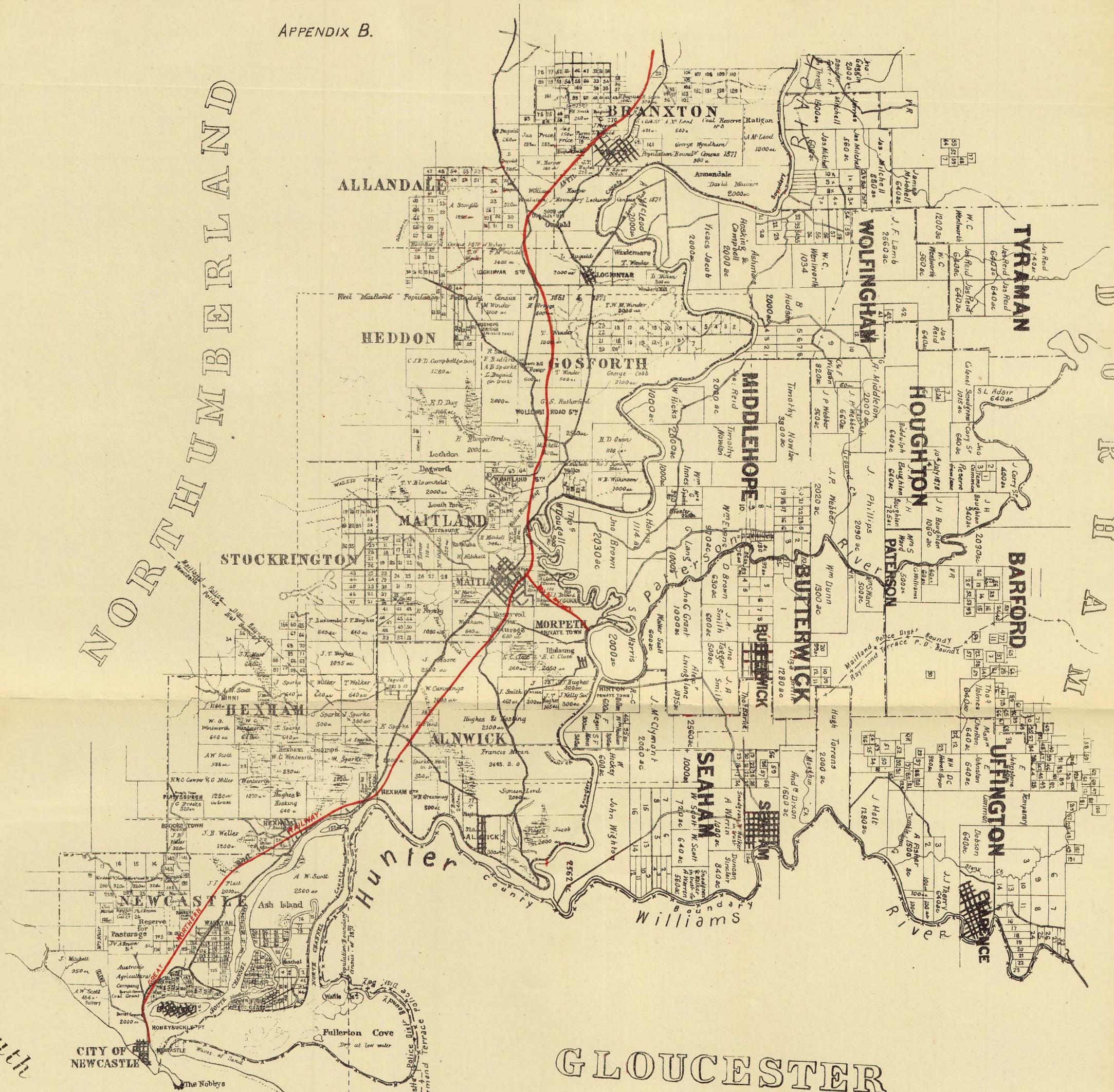
NORTH UMBERLAND

D  
U  
R  
B  
A  
M

South

Pacific

Ocean



(Sig 823).

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

BRIDGE TO NORTH SHORE.

(FURTHER CORRESPONDENCE RESPECTING.)

*Ordered by the Legislative Assembly to be printed, 10 September, 1890.*

RETURN to an *Order* made by the Honorable the Legislative Assembly of New South Wales, dated 17th July, 1890, That there be laid upon the Table of this House,—

“Copies of all papers, plans, and documents having reference to the  
erection of a Bridge connecting Sydney with the North Shore.”

(*Mr. J. P. Garvan.*)

SCHEDULE.

NO.		PAGE.
1.	Mr. A. R. Terry to Minister for Works, <i>re</i> plans submitted by him in 1881, and minutes thereon. 19 March, 1884	1
2.	Colonial Secretary's (Mr. Dibbs') minute. 17 July, 1887	2
3.	Mr. E. Pritchard to Minister for Public Works proposing to erect a bridge, and minutes thereon by Commissioner for Railways. 30 August, 1887	2
4.	Extract from <i>Daily Telegraph</i> , and minutes thereon. 12 January, 1888	2
5.	Memorandum handed to Colonial Secretary (Sir Henry Parkes) by deputation on 13 January, 1888	3
6.	Mr. R. J. Hardy to Colonial Secretary proposing to erect a bridge. 10 February, 1888	3
7.	Mr. A. R. Perry to Colonial Secretary; proposal as to erection of bridge. 7 March, 1889	4
8.	Mr. S. Pollitzer to Minister for Works, proposing to erect bridge. 17 October, 1889	4
9.	Council Clerk, St. Leonards, to the Colonial Secretary, urging erection of bridge	4

No. 1.

Mr. A. R. Terry to The Secretary for Public Works.

Bridge to connect Sydney with North Shore.

Sir,

Frances Cottage, Point Piper Road, Woollahra, Sydney, 19 March, 1884.

Referring to the plans submitted by me in April, 1881, for a bridge to be constructed to connect Sydney with North Shore, and upon which a report was ordered to be prepared by the Commissioner for Roads, I have the honor to request you will order me to be furnished with a copy of the Report in question.

I have, &c.,

ALLEN R. TERRY.

Does Mr. Bennett know anything of this matter?—F.A.W., 20/11/84.

Roads.—J.R., B.C., 21/11/84.

There does not appear to have been any report made, after seeing the drawings, as the agreement with Mr. Garbett made it unnecessary. The only opinion given was that without seeing the drawings I thought an arch of 1,500 feet impracticable; I think so still.—W.C.B., 28/11/84.

Department of Public Works, Sydney, 18 March, 1884.—Mr. Flynn inquire if there are highly coloured drawings of a bridge to the North Shore, one arch springing from rock, by a Mr. Terry; they were missing for some time and ultimately found, Mr. FitzGerald or Mr. Burton may know.

Can find no trace of this drawing.—R. D. FITZGERALD. Can find no trace of this plan.—A.

R. BURTON.

No. 2.

610—

[920 copies—Approximate Cost of Printing (labour and material), £3 3s. 3d.]

## No. 2.

## Minute by The Colonial Secretary.

17 July, 1887.

## North Shore Bridge.

It is but a question of time when the suburb of St. Leonards will be joined to the metropolis by a bridge.

It is impossible to believe that with the very rapidly increasing population of the northern shores of the harbour, the people will long remain satisfied with the present system of communication.

The creation of a tram system, already decided upon by the Executive, will tend to develop St. Leonards and its surroundings with further numbers, while the fortifications of Middle Harbour, Middle Head, torpedo stations, &c., point to the necessity for a means of passage across the harbour more certain and rapid than the present. A bridge is, therefore, in my opinion, a necessity for the immediate future.

I should be glad if Mr. Moriarty will have the necessary soundings made across the harbour, and, in conjunction with Mr. Whitton, report on the best form of bridge to join the two shores.

The co-operation of Messrs. Whitton and Moriarty is desirable in this proposed structure. Upon the former will devolve the necessity of considering the propriety of a bridge for connecting the northern railway with the city, and on the latter, more particularly, the plan for making provision for protecting the shipping interest of the port.

Engineer-in-Chief for Harbours and Rivers.

G.R.D.

## No. 3.

## Mr. E. Pritchard to The Secretary for Public Works.

Sir,

Railway Contractor's Office, Chatswood, North Shore, 30 August, 1887.

I have the honor to inform you that plans and details of a bridge from Sydney to North Shore have been prepared under my direction.

In the event of your Government being willing to entertain any scheme for the erection of the proposed bridge on the guarantee principle, I shall be glad to submit the whole proposal for your favourable consideration at such a time as will best suit your convenience.

I have, &amp;c.,

E. PRITCHARD

(Per J. M'KAY).

There are papers about a guarantee bridge. I think they were laid upon the table of the House some five or six years ago.—*CH. A. G.*, 8/9/87. Herewith.—*A. R.*, 12/9/87.

It would seem, from Mr. Pritchard's letter, that the submission of his proposal—that is, the scheme of erecting and working the bridge, rates of toll to be charged, &c.—is dependent upon the Government expressing their willingness to entertain it on the guarantee principle. A similar proposal was before the Government in 1881—Mr. Garbett's scheme, the Government to guarantee  $3\frac{1}{2}$  per cent., "less net receipts," on an outlay not exceeding £750,000. The amount named was to be the full extent of the liability of the Government. If the bridge cost more, no interest upon a larger capital than £750,000 was to be guaranteed, but the Government were to have the benefit of this outlay short of the amount named. The only advantage in the guarantee principle is that the Company or firm guaranteed would charge toll for the use of the bridge which, possibly, would amount to a sum equal to the interest guaranteed. If, however, it were a Government bridge, public pressure would no doubt be brought to bear to make it a free bridge.—*CH. A. G.*, 12/9/87.

Seen; put by for the present.—*J. S.*, 22/9/87.

## No. 4.

Extract from the *Sydney Daily Telegraph*, Thursday, January 12, 1888.

REPRESENTATIVES appointed by the Municipal Councils of St. Leonards, North Willoughby, Victoria, East St. Leonards, and Manly, appointed upon a resolution introduced into the Council of St. Leonards by Alderman F. Punch, and endorsed by the four Councils named, to the effect that the construction of a high-level bridge connecting Sydney and St. Leonards should be a work undertaken to mark the centenary of the Colony, held a meeting at the offices of Mr. Armstrong, 70, Pitt-street, yesterday, at which the five Councils were represented. Captain B. Jenkins, Mayor of St. Leonards, was voted to the chair, and the five mayors were appointed a Committee to prepare a statement of facts and statistics for presentation to Sir Henry Parkes at a deputation arranged for to-morrow. Alderman M'Mahon, F. Punch, and A. Armstrong were appointed hon. secretaries to the Committee.

The question of unity of action in the matter of agitating for the erection of a bridge was discussed, and it was resolved that those present resolve themselves into a North Shore Bridge League, and preliminary steps were taken to that effect.

Mr. Bennett.—*J. S.*, B.C., 12/1/88. Road very urgent. Mr. Flynn.—Get previous papers. This matter was some two years ago given over to Mr. Whitton and Mr. Moriarty to report on.—*W. C. B.*, 14/1/88. Herewith, 84-10,772.

Mr. Dibbs' minute of 17/7/87 asks for a report on this from Mr. Whitton and Mr. Moriarty. I am still of the same opinion as I was in 1878, except that I would not advise a three-span bridge in the event of a bridge being built at all. Subsequent experience warrants the erection of a single span with half spans.—*W. C. B.*, P.W.O., 30/1/88.

Will Mr. Whitton and Mr. Moriarty kindly say what steps they have taken in the matter?—*J. R.*, B.C., 2/2/88. No steps have been taken, as Sir John Fowler furnished Sir Henry Parkes with a design for a bridge some time ago.—*J. W.*, 22/6/88. Under Secretary.—*P. W. O.*, 26/6/88. B.C. Submitted, 27/6/88. Put by for the present.—*J. S.*, 29/6/88.

## No. 5.

## Memo. handed in by Deputation.

Bridge to St. Leonards.

Submitted, 19/1/88.

THE united Municipal Councils of St. Leonards, East St. Leonards, Victoria, North Willoughby, and Manly submit for the consideration of your Government that the time has arrived for commencing the important undertaking of connection between the northern and southern shores of Port Jackson, for the following reasons:—

- 1st. The undertaking is in every way a fitting one to mark the first centenary of the Colony, its certain effect being an important development of the utility of an already world-famed port by providing means for the utilisation of both sides, instead of, as in the first century of the Colony's growth, restricting accommodation of shipping and wharfage to the south side only.
- 2nd. The vast area of Crown lands which will be enormously advanced in value will, at the enhanced value which such undertaking would cause to accrue in the course of a limited time, render the cost of such undertaking one of direct profit to the State. The area of such land, embracing only within the suburban area of Sydney, is approximately *sixteen thousand acres*, the greater part of which, it is estimated, would be increased in value by five times its present selling price. Such increased value, it is assumed, would far more than return to the State the cost of erection of a high-level bridge.
- 3rd. In order to render the recent extensions of the Great Northern Railway more profitable, it is essential that the through line from Queensland to Adelaide should pass directly through the city of Sydney, and the existing detour from Hornsby to Sydney be avoided, as a line calculated to add materially to the discomforts and delays of travel upon what must eventually prove the most important line of railway within Australasia.
- 4th. The importance of such means of connection of the intercolonial system of railways jointly with the increased area of harbour accommodation, which connection with the north would develop, must prove an enormous national advantage, and one calculated to aid materially in the more rapid development of the Colony's growth and importance.
- 5th. The present rapid growth of the Colony, and the proved value of its resources, pastoral, agricultural, and mining, render the difficulty of raising capital for sound undertakings slight, and especially so at the present time when the price of money on the London market is so low that capital can be obtained on especially easy terms.
- 6th. That increased facilities for the transmission of heavy goods would have the effect of developing the manufacture of potters' clay, into a class of goods largely used throughout the colonies, now imported at a severe loss owing to such a class of goods suffering severely in loss by breakages, and the freight being excessive. The deposits of clay for manufacturing all classes of potters' goods, found in the immediate vicinity of St. Leonards are proved to be equal to the most superior Staffordshire clays for all classes of delf-wares, and for the inferior goods such as drain-pipes, tilings, bricks, &c.
- 7th. The amount of the traffic passing between Sydney and St. Leonards, in 1884, amount to *two millions* of ferry passengers and *one hundred thousand* horses and vehicles, and it may fairly be assumed that this traffic has since increased by at least 50 per cent. In addition to this traffic a very large number of persons interested in lands lying between St. Leonards and Manly, would drive to their residences, and a large increase of traffic would follow such communication as would be offered by a bridge, and this traffic, it may be anticipated, would, at slight toll, return a fair interest upon cost. Such direct connection would undoubtedly have the effect of populating the northern suburbs to an extent equal to that already settled south and west of Sydney, and the traffic which at present exists may fairly be assumed to more than double itself immediately upon direct connection being established, and continue to increase and multiply to sufficient extent to render the bridge a good paying investment of State money.
- 8th. Within a radius of 10 miles northward of Hornsby and through the Lane Cove District through which the branch line of railway from the Great Northern Railway is being constructed, large areas of land suitable for the growth of fruit exist, and the difficulties of bringing to market the produce of these lands has had a deterrent effect in the development of this really important industry. With increased facilities for reaching the Metropolis a considerable impetus may be relied upon to be given to the growth and shipment of the production of a large area of country now comparatively idle.

For these reasons the boroughs named asked the favour of full consideration being given by your Government to a question which, as they are aware, has already occupied much attention, and which various public statements show, has during the past six years been warmly advocated by successive administrations, and by a large section of the representatives of the people.

Presented by Deputation.—H.P., 13/1/88.

## No. 6.

## Mr. R. J. Hardy to The Colonial Secretary.

Dear Sir,

Sydney, 10 February, 1888.

Some time ago I noticed that a deputation waited on you with reference to a bridge to the North Shore. Having given some attention to the subject, I may state that I have formulated a plan by which I can show that a bridge can be constructed from Fort Macquarie to the North Shore for less than £250,000 clear of the approaches—that is, if the span does not exceed 1,500 feet, and the prices of the proposed material (steel) does not exceed £12 per ton, f.o.b. in London. On seeing the prices I have named, and knowing the prices you had arranged to give, you will no doubt consider that the structure must be a very flimsy one to be constructed for the sum I have named, the structure would be a most substantial one which will require over 9,000 tons of steel to construct. The difference

difference in cost arises from the different mode of construction. The plan I propose to carry out this work is a bold one, but the plan I propose will admit the work to be carried out with absolute safety. The plan is an entirely new one and novel in character, and has not, to my knowledge, ever been adopted in a bridge or other construction. Now if you will inform me the amount of commission you will award me in the event of my mode of construction being adopted and carried out, I am prepared to detail to you the plan I propose to be adopted in carrying out this work. I may state that the bridge is constructed of eight girders 26·8 deep and  $\frac{1}{4}$  inch thick, and has three roadways, one for the railway and two for the ordinary road traffic, each road 20 feet wide; the bridge would be 70 feet wide outside; the footways are on the top of the bridge; these footways are utilised to strengthen the bridge. If my figures are correct the bridge has a surplus strength of over 700 tons beyond the limit of engineers limit of safety; but, of course, I cannot vouch for these figures as I am only a novice in these matters, your officers would soon test them and make the specifications to their requirements this being only a matter of detail.

I am, &c.,

R. J. HARDY.

No. 7.

Mr. A. R. Perry to The Colonial Secretary.

Sir,

28, John-street, Woollahra, Sydney, 7 March, 1889.

I had the honor some seven years ago, to submit to the then Government, plans for the erection of a high level bridge connecting Dawes' Point with the North Shore. The proposal was to carry the roadway on a single arch of 1,550 foot-span, composed of seven parallel steel ribs and two diagonal ribs. The height above high-water mark at crown to be 150 feet, and the width of the roadway sufficient for two lines of railway, carriage way, and foot pavements. The cost was estimated at under one million sterling, and the time of erection three years.

I should be happy to submit these plans again, or prepare fresh ones, should sufficient encouragement be offered, and would also undertake to carry out the work, and to complete it within the time and at the cost specified.

I have, &c.,

ALEX. R. PERRY, C.E.

No. 8.

Mr. S. Pollitzer to The Secretary for Public Works.

Plan of Bridge to North Shore.

Sir,

Sydney, 17 October, 1889.

By the morning papers I notice that you are going to examine the merits of the various schemes submitted for the erection of the North Shore bridge. This is the reason that I have the honor of forwarding my design, which I had submitted to the hon. Sir Henry Parkes two years ago, but, owing to his having come to no decision, I withdrew it quite recently.

The prominent features of my design are the following:—Being a suspension bridge the central span is 700 feet and the two side spans 350 feet each; the clear headway for ships to pass underneath it is 160 feet from H.W.S.T. for underline of girders; the structure is proposed from Dawes' to Milson's Points on the Sydney side the approaches would meet the surface at about Argyle Cut in Princes-street.

The bridge is calculated to carry on one platform a railway in the centre, adjoining on either side ordinary vehicular traffic, and adjoining to these footpaths for pedestrians. Except the land abutments the whole bridge is of steel and iron, and the more important details are of gun-metal, the estimates, carefully prepared, amount to £366,000 sterling.

Eventually, I am prepared to carry out this bridge with the assistance of a Company, in case your Government would be prepared to give a consideration in the shape of a guarantee of  $4\frac{1}{2}$  per cent. on the invested capital.

I have, &c.,

S. POLLITZER.

No. 9.

The Council Clerk, St. Leonards, to The Colonial Secretary.

Sir,

Borough of St. Leonards, Council Chambers, 5 March, 1890.

I have the honor, by direction of His Worship the Mayor, to inform you that at a meeting of this Council, held last evening, a resolution was unanimously carried affirming the desirability of proceeding with the erection of a high-level bridge to connect the northern end of Sydney with St. Leonards, of a sufficient height to allow the largest vessels to pass under it.

I have therefore to request that, in view of the importance of the undertaking to the City of Sydney, as well as to the populous and rapidly increasing district this side of the harbour, that you will cause the necessary steps to be taken to secure the fulfilment of the object desired.

I have, &c.,

W. BARNETT SMITH,  
Council Clerk.

1890.

## LEGISLATIVE ASSEMBLY.

## NEW SOUTH WALES.

## BRIDGES OVER MIHI AND DANGAR CREEKS.

(REPORTS, &amp;c., RESPECTING ERECTION OF.)

*Ordered by the Legislative Assembly to be printed, 22 October, 1890.*

## SCHEDULE.

NO.	PAGE.
1. H. Copeland, Esq., M.P., to the Commissioner for Roads and Bridges, urging the erection of a bridge over Mihi Creek; reports and minutes thereon. 31 January, 1890 .....	1
2. J. Inglis, Esq., M.P., to the Secretary for Public Works (Mr. Bruce Smith), forwarding an extract from the <i>Armistale Chronicle</i> , urging the erection of bridges over Dangar, Mihi, and Grocer's Creeks; report and minutes thereon. 5 March, 1890.....	2
3. Under Secretary for Public Works to J. Inglis, Esq., M.P., informing him that a report had been called for, as asked in his letter of 5th March (Telegram). 8 March, 1890 .....	3
4. Under Secretary for Public Works to the Under Secretary for Finance and Trade <i>re</i> provision from Advance Account for bridges over Dangar and Mihi Creeks. 25 March, 1890 .....	3
5. Under Secretary for Public Works to J. Inglis, Esq., M.P., informing him that Minister had approved of erection of bridges over Dangar and Mihi Creeks. 25 March, 1890 .....	3
6. Mr. W. C. M'Crossin to the Secretary for Public Works urging the erection of a bridge at Mihi Creek, and minutes thereon. 4 April, 1890 .....	3
7. Under Secretary for Public Works to H. Copeland, Esq., M.P., informing him of action taken. 3 May, 1890 ...	4
8. Under Secretary for Public Works to J. Inglis, Esq., M.P., informing him of action taken. 3 May, 1890 .....	4
9. Mr. S. A. Donnelly to the Commissioner for Roads and Bridges, forwarding section for a bridge over Mihi Creek. 3 June, 1890 .....	4
10. H. Copeland, Esq., M.P., to the Under Secretary for Public Works, forwarding an extract from the <i>Armistale Chronicle</i> , urging the erection of bridges over Mihi and Dangar's Creeks. 20 June, 1890.....	4
11. Under Secretary for Public Works to H. Copeland, Esq., M.P., informing him of action taken. 21 June, 1890 ..	5
12. Mr. S. A. Donnelly to the Commissioner for Roads and Bridges <i>re</i> means of providing funds for the extra cost involved by the erection of a truss bridge over Mihi Creek, and minutes thereon. 23 June, 1890 .....	5
13. Mr. S. A. Donnelly to the Engineer for Bridges <i>re</i> the site of the proposed bridge over Mihi Creek, and minutes thereon. 10 July, 1890 .....	5
14. Mr. S. A. Donnelly, forwarding section of the proposed bridge over Dangar's Creek, and minutes thereon. 10 July, 1890 .....	6
15. Engineer-in-Chief for Roads and Bridges instructing Mr. A. W. Stilwell (Assistant Engineer) to report <i>re</i> estimates for bridges over Mihi and Dangar's Creeks. 6 September, 1890 .....	7
16. Report of Mr. A. W. Stilwell to Engineer-in-Chief for Roads and Bridges <i>re</i> estimates for bridges over Mihi and Dangar's Creek. 13 September, 1890 .....	7
17. <i>Précis</i> of action <i>re</i> bridges over Mihi and Dangar's Creeks, and Minister's minute thereon. 25 September, 1890 ..	7
18. Under Secretary for Public Works to H. Copeland, Esq., M.P., conveying Minister's decision. 29 September, 1890 .....	8
19. Under Secretary for Public Works to J. Inglis, Esq., M.P., conveying Minister's decision. 29 September, 1890 ..	8
20. Memorandum of J. Inglis, Esq., M.P., urging reconsideration of decision, and minutes thereon. 1 October, 1890 ..	8
21. H. Copeland, Esq., M.P., to the Under Secretary for Public Works, complaining that his letters had not been answered. 4 October, 1890 .....	8
22. Under Secretary for Public Works to H. Copeland, Esq., M.P., in answer to his communication of 4th October. 20 October, 1890 .....	9

## No. 1.

## II. Copeland, Esq., M.P., to The Commissioner for Roads and Bridges.

Sir,

Legislative Assembly, 31 January, 1890.

I desire to point out to you that there is a great necessity for a bridge over the Mihi Creek, on the road Uralla to Melrose. At the latter place there is a great development of mining, causing a very large amount of traffic on the road. It is estimated there are 400 people there at present, and large numbers of houses are being erected, and much machinery is likely to be required. In addition to this I am informed that the people on seventeen selections and two sheep and cattle stations require to cross the creek, which, however, is frequently uncrossable. Only a few days the mail coach was delayed six hours waiting for the creek to become crossable, and when next winter comes on I am afraid very great inconvenience and delay will result to the people of Melrose and district unless a bridge is built in the meantime.

I may say that no great expenditure is needed, as probably £200 will be sufficient for all requirements.

I have, &amp;c.,

HENRY COPELAND.

Mr. Donnelly,—For report.—J.B., 31/1/88. Report herewith.—S.A.D., 3/2/90. The Commissioner.

Report upon the application of Mr. Copeland, M.P., for erection of bridge over Mihi Creek, upon road Uralla to Melrose.

THE direct road from Uralla to Melrose gold-field crosses Mihi Creek, nearly midway between those places. There is much traffic upon the road, and a population of 467 persons are located upon the field, besides there is much good land in the neighbourhood, capable of supporting a comparatively large population (agricultural), which, I may state, are being attracted to the vicinity of the local market which the gold-field is establishing. Uralla is the nearest outlet, as well as practically, if not in reality, being the nearest point of the railway.

I am of opinion £400 will be required to erect a suitable bridge here, a section has not been taken, but knowing the creek at the point in question flows over a bed somewhat that in its cross section it is evident that more than £200 will be required to bridge such a flood of water as would stop the mail coach at such a place. Still I am of opinion the larger sum (£400) would be well expended in erecting a bridge at such place, and would recommend such amount be granted, if possible, as Mr. Copeland suggests, so as to have the bridge ready by incoming winter. A section may be made, if approved.

S. A. DONNELLY,

The Commissioner for Roads.

Superintendent of Roads, 3/1/90.

*Subject* :—Urging erection of bridge over the Mihi Creek, road Uralla to Melrose.

THE local officer reports that the road from Uralla to Melrose gold-field crosses the Mihi Creek about midway. There is considerable traffic on the road and a population of nearly 500 is located on the field, and the adjacent country is capable of supporting a comparatively large agricultural population also. Uralla is the nearest outlet, as well as being the nearest point of the railway.

He recommends the erection of this bridge, which he estimates to cost £400.

Commissioner.

P.H.F.

Mr. Stilwell for report.—R.H., 11/2/90.

This creek offers a serious obstruction to traffic, and a bridge would, in flood times, serve not only the Uralla traffic, but that from Armidale to Melrose also. It should, I think, be provided for, and with that view I will have section made.—A.W.S., 27/3/90. Commissioner for Roads.

Submitted.—P.H.F., 1/4/90. Resubmit with section and estimate.—R.H., 2/4/90. Mr. McDonald,—J.B., 9/4/90. £400 approved from Advance Account, for bridge Mihi Creek, on papers 90—1800.—U.S., 10/4/90. Wire sent for section. Resubmit on receipt.—J.A.McD., 15/4/90. Chief draftsman.

## No. 2.

J. Inglis, Esq., M.P., to The Secretary for Public Works.

Dear Sir,

Uralla, 5 March, 1890.

Please read enclosed cutting from *Armidale Chronicle*, to-day's issue. Do send for a report on this Enmore road at once. There is now a very large population there and the creeks are simply awful. The want of bridges is retarding the development of the mines, and jeopardising every interest in the place. Already the revenue derived from the mines must have been very large, and the place is fast becoming quite a large town. I go there to speak on Friday, and I dread the journey, even with a light buggy. On public grounds alone, I ask your very speedy attention to these crying wants, and hope to have a favourable reply addressed to Armidale, as I will be there till Tuesday next. The most urgently required help is *bridge over Dangar's Creek*, *bridge over Mihi Creek at Mihi Station*, and *bridge over Dangar's Creek at Gostwyck Station*, also *bridge over Grocer's Creek*. Please consider this matter *urgent*, and favour with reply.

Yours truly,

JAS. INGLIS.

Inform Mr. Inglis that we have wired for a report. Mr. Hickson,—the Minister would like you to get a report on this subject at once. Please wire to-day.—J.B., 7/3/90. Wire sent for report, 8/3/90. Reply attached, 12/3/90.

[Enclosure.]

### THE ENMORE ROAD.

NOTWITHSTANDING the vast importance Enmore is now assuming as a mining centre, the roads are almost in an impassable state, and the creeks during the recent floods were quite impracticable. During the winter no vehicle will be able to reach the field; the roads have been so fearfully cut up that a very little rain turns them into a bog. It would take a great deal of money to make the roads themselves any way decent, but something should certainly be done to the creeks, even if the roads were left untouched. To make the road from Armidale to Enmore practicable in flood time there should be a bridge over Dangar's Creek and another over Mihi Creek, at the Mihi Station. To keep Uralla in communication with Enmore there should be a bridge over Dangar's Creek, at Gostwyck Station. Both Armidale and Uralla, in flood time, could use the same crossing over Mihi Creek, though this would make the road about 2 miles longer from Armidale. There could also be an inexpensive bridge put over Grocer's Creek, which both Armidale and Uralla travellers have to cross. The cost of these would not be much, and at least traffic on horseback would not be suspended. Some very narrow escapes were made last week in crossing Dangar's and Mihi Creeks; and at the end of the week, though Mihi Creek could be crossed at great risk, Dangar's Creek must have been 10 feet deep in the middle, and travellers from Enmore to Armidale had to go round by Salisbury, a distance of over 50 miles instead of 30. It is necessary that this matter should be looked to without delay. [Since writing the above poor Marthny has met his death in trying to cross the Beady, 2½ miles from Glen Innes. Why cannot the Government at least erect posts at the creeks liable to be swollen, showing whether there is danger or not in crossing?]

Telegram from Mr. Road Superintendent Donnelly to The Commissioner for Roads.

TELEGRAM, re Mr. Inglis proposed bridges, Enmore road, delayed. Interruption to wire. Bridge cost £500. Very urgent, Dangar's Creek. Also Mihi Creek. £400 already recommended on Mr. Copeland's application 31st January last. Dangar's Creek, Gostwyck, £500. Not very urgent; good ford. Grocer's Creek, £250; desirable; not very urgent. Total, £1,650. All desirable, if funds permit. Have already, 26th ultimo. Urged £163 for Melrose-street; not less; urgent work. All these proposed bridges on roads leading to that place.

S. A. DONNELLY,  
Road Superintendent.

*Subject* :—

## 3

*Subject*:—Urging necessity of erection of bridges on Enmore road, viz., over Dangar's Creek; over Mihi Creek, at Mihi Station; over Dangar's Creek, at Gostwyck Station; and over Grocer's Creek. The local officer reports by wire, that cost of bridge over Dangar's Creek would be £500, and is very urgently required.

That bridge over Mihi Creek is also urgently required. Cost, £400. Recommended on application of Mr. Copland, 31st January last.

That bridge over Dangar's Creek at Gostwyck Station would cost £500, but is not very urgently required, there being a good ford.

That bridge over Grocer's Creek, would cost £250, is desirable, but not very urgent.

The total cost would be £1,650. All the bridges are desirable, if funds permit. He also states that on the 26th February he recommended a grant as urgent of £163 for Melrose-street, a not less necessary work. All the proposed bridges are on roads leading to Melrose.

Two of these bridges, costing £400 and £500 are reported as very urgent. Two others, costing £500 and £250, desirable, but not very urgent. There are no funds available.—R.H., Under Sec., 15/3/90. Submitted.—J.B., 18/3/90. First two bridges can be carried out, and Treasury asked to pay from Advance Account.—W.M., 24/3/90. Inform then to Mr. Hickson.—J.B., 24/3/90.

## No. 3.

Telegram from The Under Secretary for Public Works to J. N. Inglis, Esq., M.P.

8 March, 1890.

Your letter received *re* state of Enmore road. Minister has called for immediate report upon the matter.

## No. 4.

The Under Secretary for Public Works to The Under Secretary for Finance and Trade.

Sir,

25 March, 1890.

I am directed to request that you will have the goodness to move the Honorable the Colonial Treasurer to cause to be charged against the Advance Account the sums of £500 and £400 for the erection of bridges over Dangar and Mihi Creeks respectively, on the Enmore road.

I have, &c.,  
J. BURLING,  
Under Secretary.

## No. 5.

The Under Secretary for Public Works to J. Inglis, Esq., M.P.

Sir,

25 March, 1890.

In reply to your letter of the 5th instant, urging the erection of certain bridges on the Enmore road, I am directed to inform you that the Secretary for Public Works has approved of the erection of bridges over Dangar and Mihi Creeks, on the road in question.

I have, &c.,  
J. BURLING,  
Under Secretary.

## No. 6.

Mr. W. C. M'Crossan to The Secretary for Public Works.

Sir,

Melrose, via Uralla, 4 April, 1890.

We have been instructed by the local Progress Committee to communicate with you *re* the necessity of a bridge at Mihi Creek, road Uralla to Melrose. We most respectfully request that you will grant this, as it is needless to say it is urgently required. During the late rains teams loaded with provisions were frequently delayed, and it has greatly interfered with mail communication.

Trusting you will give this matter your early and favourable consideration.

We have, &c.,

Chairman,  
W. C. M'CROSSAN,  
Secretary.  
(On behalf Melrose Progress Committee).

Roads, for report.—J.B., B.C., 14/4/90. Papers.—U.S., 17/4/90. Papers now herewith.—A.S., 25/4/90. Mr. M'Donald.—P.H.F. (*per* U.S.), 29/4/90. £400 approved from Advance Account. Might be informed that local officer has been instructed to send in sections when to hand. Drawings will at once be put in hand.—P.A. (*pro*. Under Secretary), 1/5/90. Inform.—J.B., 2/5/90. The question of funds for this and an other bridge has been raised on papers 90-1800. Resubmit when they are returned from P.U.S.—P.H.F. (*per* U.S.), 6/5/90. 90-1800 now returned.—U.S., 12/5/90.

No. 7.

## No. 7.

The Under Secretary for Public Works to H. Copeland, Esq., M.P.

Sir,

3 May, 1890.

Referring to a letter which has been received from the Melrose Progress Committee, urging the erection of a bridge over Mihi Creek on the road Uralla to Melrose, I am directed to inform you that the local roads' officer has been instructed to submit sections, and when these shall have been received, the necessary drawings will be at once put in hand.

I have, &c.,  
J. BARLING,  
Under Secretary.

## No. 8.

The Under Secretary for Public Works to J. Inglis, Esq., M.P.

Sir,

3 May, 1890.

Referring to a letter which has been received from the Melrose Progress Committee, urging the erection of a bridge over the Mihi Creek on the road Uralla to Melrose, I am directed to inform you that the local roads' officer has been instructed to submit sections, and when these shall have been received the necessary drawings will be at once put in hand.

I have, &c.,  
J. BARLING.

## No. 9.

Mr. Road-Superintendent Donnelly to The Commissioner and Engineer-in-Chief for Roads and Bridges.

Forwarding section for bridge over Mihi Creek, Uralla to Melrose Road.

3 June, 1890.

UNDER another cover I forward the above. The site is upon reserve No. 36, parish of Lawrence, county of Sandon. Rocks show themselves in various parts of the bottom, showing it unlikely that piles can be driven. As trial holes cannot be conveniently sunk at present, none have been attempted, it being thought time to do so when sketch\* of design is sent as hitherto. Not much drift timber comes down; the bed of creek has but a very moderate fall, about 1 in 100. The soil is granitic. There is no timber at the site; no old bridge.

S. A. DONNELLY,  
Superintendent of Roads.

Mr. Stilwell.

Section forwarded.—A.W.S., 12/6/90. Commissioner and Engineer-in-Chief for Roads and Bridges. Mr. Donnelly reports that rock is from 2½ feet to 3½ feet from surface right across the channel on line sectioned.—A.W.S., 21/7/90. Commissioner and Engineer-in-Chief for Roads and Bridges. Mr. M'Donald.—P.H.F., 24/7/90.

## No. 10.

H. Copeland, Esq., M.P., to The Under Secretary for Public Works.

Bridges at Enmore road (Armidale), Dangar's Creek, and Mihi Creek.

Dear Mr. Barling,—

20 June, 1890.

Will you kindly bring attached leader under the notice of the Minister, and ask him when he expects to expiate his officers, should any of these "narrow escapes" culminate in loss of life. I wrote you some months ago with reference to this matter, pointing out the importance of the place, and the urgent necessity of keeping communications open, but, although some five or six months have elapsed, I have had no intimation that anything was being done.

I may mention that Enmore and Melrose are one and the same. A bridge over Dangar's Creek is required for several squatters, as well as the large number of miners located at Melrose.

Yours, &c.,  
HENRY COPELAND.

Will Mr. Hickson please expedite.—J.B., 21/6/90. Very urgent. Mihi Creek—design sent for report (90-5,076); Dangar's Creek—section not received. Hurry this work up. Inform Under Secretary of action taken.—R.H., 28/6/90. Mr. M'Donald. Wire sent to expedite section of Dangar's Creek, Enmore road.—P.A., 1/7/90. Will Mr. Donnelly please say when report and section will be received.—P.H.F., 8/7/90. Section herewith and report.—S.A.D., 10/7/90.

## [Enclosure.]

EXTRACT from the *Armidale Chronicle*, 18th June, 1890.  
THE ENMORE ROAD.

THE Enmore road is in a terrible state, and the last 10 miles are almost impassable for vehicles. This is nothing, however, compared with the dangers and difficulties caused by the swollen creeks in flood time. Last week two gentlemen and a lady had to camp for seventeen hours on the Armidale side of Dangar's Creek during the pouring rain, and several other parties were camped on either side waiting for the waters to subside. When they did cross it was at some personal risk. On Saturday again the creeks were very high, and a party returning to Armidale had to wait for twelve hours in one of the Gostwyck huts, and then cross at Dangar's crossing, and make their way round by Uralla. One day last week, a man and his wife attempted to pass over Dangar's crossing in a spring cart, and were very nearly drowned. Had it not been for the courage and energy of some of the station men, who took them off in a boat, they would almost certainly have been drowned. The men released the man and his wife at great peril to themselves, and rescued the horse, and took the luggage out of the trap, being for several hours up to the neck in water. The trap had to be tied to a log till the water went down. All this is very unsatisfactory, considering what a large income the Crown derives from the Lumore field. As we have mentioned before, three bridges are absolutely necessary—one over Dangar's crossing, and another over Mihi Creek at the station to suit Uralla, and another over Dangar's Creek on the Armidale road. Then there would always be communication with Enmore, both from Armidale and Uralla, for Armidale could use the same crossing as Uralla over Mihi Creek. There is a great deal of traffic now on both roads, and it is wonderful that no lives have yet been lost; very narrow escapes there have certainly been.

No. 11.

## No. 11.

The Under Secretary for Public Works to H. Copeland, Esq., M.P.

Dear Mr. Copeland,

Department of Public Works, Sydney, 21 June, 1890.

With reference to your letter of yesterday respecting the three bridges required on the Enmore road, I find the following are the facts of the case:—

*Mihi Creek Bridge*:—The design of the bridge has been prepared, and will be sent to the local officer for revision on Monday,

*Dangar's Creek Bridge*:—Section not yet to hand, but the local officer has been wired to, asking him to forward it.

*Dangar's Creek Bridge at Gostwyck*:—It is reported this is not a very urgent work, as there is a good ford.

With regard to the first two bridges we shall do our best to get them put in hand at once. The Minister, knowing the importance of the matter, has already arranged for the necessary funds:

Yours, &c.,

J. BARLING.

## No. 12.

Mr. Road Superintendent Donnelly to The Commissioner for Roads and Bridges.

*Subject*:—Respecting the means of providing necessary funds to meet increase of cost between £400 for beam bridge, and that of truss bridge for Mihi Creek, at intersection of road Uralla to Enmore and Melrose.

Upon referring to the letter of Mr. Copeland, M.P., of 31st January, 1890, No. 90-1,909 attached, it will be seen that that gentleman asks that £200, to erect a bridge at the place referred to, and intimating that the flood of water had stopped the coach thereat. In my report, which will be seen was written from recollections of a former visit—the only one previously made. It is stated that the flood which could stop the coach at such a place could not be bridged under £400, but intimating no section had been made, but that such would be done if so instructed. Hence could I then tell with precision the cost of truss bridge, or even if a truss was required at all at the place until the depth to the bed rock was ascertained and the quantity and length of drift timber which the floods bring down were indicated.

As the ford has almost sufficed during the last six months of unprecedented rain, and as there are reasons to hope finer weather is at hand, and also as signs are not wanting to show the prosperity of Melrose Gold-field is not assured as yet, this proposed bridge might, I think, without seriously inconveniencing the public, stand over until 1891.

I may add I did not think a truss bridge would be required until after the depth to the rock was ascertained; a beam bridge was in view, and I do not think so bad an estimate—of £400 for same before the section was taken, when the official estimate, made afterwards, is but £450.

S. A. DONNELLY,

P.S.—This is upon one of the roads recently transferred to Mr. Scarborough, and just at the point—17 miles from Armidale—where one of my roads end. It is distant about 25 miles from Walcha.—S.A.D.

£400 is granted for this bridge. The cost of truss bridge and approaches would be (say) £650. The work is not regarded as urgent this year, but if not now proceeded with the Members for the district will make an outcry; so, if possible, £250 additional should be allotted, and the work proceeded with.—A.W.S., 16/8/90. Commissioner and Engineer-in-Chief for Roads and Bridges.

Telegram from The Engineer for Bridges to Mr. Assistant Engineer Stilwell, Tamworth.

Sydney.

PLEASE instruct Mr. Donnelly to at once take section and forward plan and report for Dangar's Creek, on Enmore road. Very urgent.

PERCY ALLAN,

(*Pro* Engineer for Bridges.)

I have wired Mr. Donnelly for this section; will he please send it in with report attached to this paper early as possible.—A.W.S., 2/7/90. Mr. Donnelly, B.C. The section was sent a few days ago (10th inst.), with report, but this paper was overlooked at the time.—S. A. DONNELLY, 16/7/90. Mr. Stilwell. A.W.S., 21/7/90. Put with papers.—J.B., 24/7. Commissioner and Engineer for Roads and Bridges. Mr. McDonald.—P.H.P., 18/8/90. Let me have estimate for 65 feet truss bridge and approaches, timber at 5s. per cubic foot.—P.A. (*pro* Engineer for Bridges), 1/9/90. Chief Draftsman.

Truss bridges and approaches will cost £850; it is certainly the most suitable design for this site, but only £400 is available from Treasurer's Advance Account submitted as to funds.—P.A. (*pro* Engineer for Bridges), 3/9/90. Commissioner and Engineer-in-Chief for Roads and Bridges.

## No. 13.

Memo. from The Engineer for Bridges and Field Officer's Report.

Department of Public Works, Roads and Bridges Branch, Sydney, 23 June, 1890.

Memo.

*Field Officer's Report.*

Will Mr. Donnelly please report on the suitability to site of attached outline design of proposed bridge and approaches for Mihi Creek road, Uralla to Melrose. Plot local sketch on tracing. State:—

When here on 4th July, water too high to ascertain depth of rock in creek at line of section; rock is showing a little lower down; an opinion piles cannot be driven in pier, but can in abutments; hence should prefer one span—a truss. Local sketch is on

(1.) If bridge will be square, or, if not, at what angle to the stream when in flood.

(1.) Square with axis of stream when in flood.

(2.) Nature of formation.

(2.) Loam on rock.

(3.)

(3.) The depths to which piles can be driven at positions shown, and, if a rock bottom, its nature and the most suitable mode of securing piers and abutments.

(4.) Should piles be coppered, or is turpentine timber obtainable in locality for piles.

(5.) The maximum lengths, character, and quality of timber obtainable; whether turpentine, iron bark, blue gum, red gum, or box, should be specified for piles, girders, corbels, capsills; iron bark, blue gum, red gum, or box, for sheathing; tallow-wood, red gum, or iron bark for planking; and give approximate cost per cubic foot for each class of timber erected in position.

(6.) The highest flood level, and if ascertained from reliable data; and, if backwater, at what height current ceases, also its maximum velocity.

(7.) If much drift timber comes down in flood, and its probable length.

(8.) If there is an old bridge at proposed site, and, if so, should material become the property of the Contractor, or be retained by Department.

(10.) If site for bridge and approaches is clear of alienated land; and if not, show same with boundaries, and report if owners require compensation, and how much.

(11.) Whether bridge and approaches should be let separately; or, if not, what material is available for banks and backing.

(12.) Will it be necessary to provide a temporary crossing for traffic during the erection of bridge.

(13.) When calling for tenders, at what towns it would be advisable to exhibit plans.

(14.) The amount available for this work is £400, and the approximate cost of bridge and approaches will be £450. How do you propose to provide for the balance?

Fix the position of permanent bench-mark on plan and section, with its reduced level.

Return papers and plans without delay to Head Office.

PERCY ALLAN,

(*pro* Engineer for Bridges).

Mr. Donnelly, Armidale.

(3.) Piles in abutments might be driven 15 feet.

(4.) Not necessary to copper; no water insects.

(5.) Red gum, box, stringybark, blue gum, good lengths, 18 in. dia to square 12 in. x 12 in. may be got up to 40 feet, within 10 or 15 miles. Stringybark chiefly say—piles, 5s. per lineal foot planking, and hewn timber, 3s. 6d. to 4s., cubic foot.

(6.) Highest flood been is shown on section.

(7.) Not a great deal of drift timber various lengths up to 40 feet.

(8.) No old bridge.

(10.) The site is on a reserve as shown.

(11.) Let together.

(12.) No; but the contractor might be directed to keep present ford passable.

(13.) Armidale and Uralla (nearest), and perhaps Maitland besides U.O.

(14.) A special grant is all I can suggest. Road vote is insufficient for road work, and nothing from it can be spared.

S. A. DONNELLY.

10/7/90.

Mr. M'Donald.—A.W.S., 11/7/90. Commissioner and Engineer-in-Chief for Roads and Bridges.

Funds are insufficient for a truss bridge: definite information must be obtained as to depth of rock at site of pier and abutments.—P.A. (*pro* Engineer for Bridges), 14/7/90. Mr. Donnelly. The bottom has been tried all over, and for about 36 feet each side of section line, and rock found in all places at from 2 feet 6 inches to 3 feet 6 inches throughout bed of creek.—S. A. DONNELLY, 19/7/90.

Mr. Donnelly recommended £400, and now asks for a truss bridge. How does he propose to pay the difference in cost. Without doubt a truss bridge is the right thing here, but should have been recommended in the first instance when sufficient funds could have been provided. Can the work stand till next year for a further vote?—J.A.M'D., 11/8/90. Mr. Donnelly.

Report herewith.—S. A. DONNELLY, 14/8/90.

#### No. 14.

#### Memo. by Mr. Road Superintendent Donnelly.

Appendix B.

Forwarding section over Dangar's Creek upon road, Armidale to Mihi Creek and Walcha, and Armidale to Melrose, with previous paper, 90-5,118.

I REGRET that pressure of other important duties sending the above sooner. The bed of creek is rocky, the fall is about 1 in 200; about 3 miles below site of section, the waters of the creek flow over Dangar's Falls, between 600 and 700 feet deep, the creek flows into the Macleay River. The flood marks show a width of flood surface, nearly 450 feet, and a depth of 21 feet in deepest part. A great deal of timber does not come down. Abutment piles, north side of large bridge, might be driven, but other parts must be fastened, &c., to rock. The place is about 12 miles from Armidale. Settlement and population seem to be increasing in this direction.

I should have stated the site of section is near the old crossing, when the water is a little higher than shown on section, the creek is uncrossable except by swimming.

S. A. DONNELLY.

Mr. Stilwell.

10 July, 1890.

Mr. M'Donald.—Section sent under separate cover.—A.W.S., 11/7/90. Commissioner and Engineer-in-Chief for Roads and Bridges. See with sketch design.—P.A. (*pro* Engineer for Bridges), 14/7/90. Chief Draftsman.

Bridge and approaches will cost £2,400. Authority has been obtained for expenditure of £500 from Treasurer's Advance Account. Submit as to funds.—P.A. (*pro* Engineer for Bridges), 3/9/90. Commissioner and Engineer-in-Chief for Roads and Bridges.

No. 15.

No. 15.

Minute Paper.

Subject :—Bridges over Mihi and Dangar's Creek.

Department of Public Works, Roads and Bridges Branch,

Sydney, 6 September, 1890.

On receipt of a telegram from the local officers that these bridges were urgently required, and would cost respectively £400 and £500, the Minister approved of the work being carried out, and paid from Treasurer's Advance Account. It now appears that the bridges will cost £850 and £2,400.

I should like Mr. Stilwell to look carefully into this matter, and report before it is submitted to the Minister. It appears to me there must have been great carelessness, or utter incompetency on the part of the officer, who submitted the estimates in the first instance, and Mr. Stilwell will at once see the false position it puts me into, in obtaining approval for two works estimated by me to cost £900, whereas the net amount should have been £3,250 nearly four times the original estimate.

ROB. HICKSON.

Mr. Assistant-Engineer Stilwell. Report attached.—A.W.S., 13/9/90. Commissioner and Engineer-in-Chief for Roads and Bridges.

No. 16.

Minute Paper.

Subject :—Bridges over Mihi and Dangar's Creeks as to defective estimates for.

Tamworth, 13 September, 1890.

MR. DONNELLY furnished estimates of cost and made recommendations for these bridges before I took charge of the division. I have just seen him as to the errors in estimates. His explanation is :—in both instances he reported from memory only, without visiting or ever having measured the channels. With respect to Mihi Creek he points out that he estimated for a beam bridge, and that, for this there is a difference of £50 only between his and Mr. McDonald's estimate—the estimate afterwards made by Mr. McDonald is for a truss bridge; and this is at £850. But this truss bridge is in accordance with Mr. Donnelly's recommendation (90-5,076), after he had measured and inspected the site.

As to Dangar's Creek Mr. Donnelly admits he was much surprised, on having channel measured, to find the provision required to be so much greater than he had thought; but he cannot charge himself with carelessness in making the recommendation—his view is that at a time when the country was in a flooded state, and many urgent demands being made, he did his best, not wishing to delay the recommendation.

I think Mr. Donnelly has evinced a want of discretion and caution in jumping to conclusions as to the estimates in these cases. It is just at a time such as this that extra discretion is demanded of an officer—that he should withhold himself from the hysterical outcry, and with a firmness and circumspection due to his great knowledge and experience, "make haste slowly," that action may be effectual as well as prompt. Beyond this I cannot charge Mr. Donnelly with either carelessness or incompetence—the errors have arisen from his tendency to office, rather than field work, as to which I have before had occasion to report with reference to his contractors and day men.

Both the sites in question are within very moderate distances of Armidale. Dangar's Creek where the greater discrepancy occurs, only 12 miles.

As to Dangar's Creek Bridge Mr. Donnelly does not think the larger outlay of £2,400 warranted by the circumstances. The mines in this direction are decreasing in importance—traffic and population diminishing—the crossing of the creek good, and floods to suspend traffic of rare occurrence. I concur with him in advising that the question of bridging the creek here be held in abeyance for the present.

As to Mihi Creek, which appears from the applications and reports to offer a greater obstacle to traffic, and where the cost of bridging is much less than at Dangar Creek. I would suggest that both the amounts approved of, viz. : £400 and £500 be applied to constructing the bridge—if approval to this course can be obtained, and the work proceeded with.

A.W.S.

Commissioner and Engineer-in-Chief for Roads and Bridges.

No. 17.

Minute Paper.

Subject :—Proposed Bridges over Mihi and Dangar's Creeks.

Department of Public Works, Roads and Bridges Branch,

Sydney, 23 September, 1890.

In March last, in reply to an application from Mr. J. Inglis, M.P., the local officer reported by telegraph that the above bridges were very urgently required, and would cost about £400 and £500 respectively. The Minister approved of their construction, and Treasury was asked to pay from Advance Account.

Sections of creeks were then taken, and drawings, &c., prepared, when the Engineer for Bridges estimated cost of suitable structures at £850 and £2,400 respectively.

The Assistant Engineer now reports that he does not think the larger outlay of £2,400 for Dangar's Creek bridge warranted, and he concurs with the local officer in advising that the question of bridging this creek be held in abeyance for the present.

As to Mihi Creek, which appears from the applications and reports to offer a greater obstacle to traffic, and where the cost of bridging is much less than at Dangar's Creek, he suggests that both the amounts approved of, viz., £400 for Mihi Creek, and £500 for Dangar's Creek, be applied to its construction, if approval to this course can be obtained, and the work proceeded with.

With

With regard to the discrepancy in the estimates of cost as furnished by local officer, and as calculated in Head Office, it appears that for Mihi Creek Bridge the local officer's estimate of £400 was for a beam bridge (which in Head Office was estimated at £450), but after section had been received, a truss bridge was considered more suitable, and for the latter design the cost was estimated at £850.

As to Dangar's Creek Bridge (£500 recommended and approved), the original estimate was furnished by local officer without having measured the channel, and he admits that he was very much surprised, on making such measurement, to find the provision required was so much greater than he had thought. The recommendations were made when the country was in a flooded state, and he did not wish to delay them.

Submitted.—P.H.F. (*per* U.S.), 24/9/90. Submitted for Instruction.—J.B., 25/9/90. Inform Members as to the increased estimate, and state that the amounts required cannot be granted at present.—B.S., 25/9/90. Write.—J.B., 26/9/90. Mr. M'Donald to see.—P.H.F., 1/10/90.

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No. 18.

The Under Secretary for Public Works to H. Copeland, Esq., M.P.

Sir,

29 September, 1890.

Referring to my letter of the 25th March last, addressed to Mr. J. Inglis, M.P., in which it was stated that the Minister had approved of the erection of bridges over Dangar's Creek and Mihi Creek, on the Enmore road, I am directed to inform you that the Minister's approval was then based on a report submitted to him, in which the estimated cost was set down at £500 for a bridge over Dangar's Creek, and £400 for a bridge over Mihi Creek. Upon a more detailed examination of the sites being made, however, it has been found that suitable structures cannot be erected for less than £800 for Mihi Creek and £2,400 for Dangar's Creek. In these circumstances the Secretary for Public Works regrets that the question of their erection must stand over for the present.

I have, &c.,  
J. BARLING,  
Under Secretary.

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No. 19.

The Under Secretary for Public Works to J. Inglis, Esq., M.P.

(No. 90-7,314, R. & B.)

Sir,

29 September, 1890.

Referring to my letter of the 25th of March last, in which it was stated that the Minister had approved of the erection of bridges over Dangar's Creek and Mihi Creek, on the Enmore road, I am directed to inform you that the Minister's approval was then based on a report submitted to him, in which the estimated cost was set down at £500 for a bridge over Dangar's Creek, and £400 for a bridge over Mihi Creek. Upon a more detailed examination of the sites being made, however, it has been found that suitable structures cannot be erected for less than £800 for Mihi Creek, and £2,400 for Dangar's Creek. In these circumstances, the Secretary for Public Works regrets that the question of their erection must stand over for the present.

I have, &c.,  
J. BARLING,  
Under Secretary.

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No. 20.

Memo. by J. Inglis, Esq., M.P.

Memo. for Under Secretary, Public Works.

Dear Sir,

1 October, 1890.

In the light of the long conversation had with you and Mr. Hickson at our interview to-day, when I was accompanied by Capt. A. H. Richardson, Uralla, and in view of the constantly-increasing traffic to and from the important mining centre at Enmore, and the imminent risk to life owing to the absence of proper crossings, I would earnestly urge that this decision be reconsidered. I do not think a costly high-level bridge is at all needed on either creek; a low-level bridge would meet all requirements. Even a strong causeway, with stout protecting posts and wire might suffice for Dangar's Creek, and a substantial low-level bridge for Mihi Creek. I trust you will not lose sight of this, but come to a speedy and favourable decision.

Yours, &c.,  
JAS. INGLIS.

Mr. Hickson.—J.B., B.C., 1/10/90. Mr. M'Donald for estimates as explained verbally.—R.H., 1/10/90. Wire Donnelly for information as to class of stone obtainable for masonry, and within what distance of each site.—J.A.M'D., 1/10/90. Chief Draftsman.

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No. 21.

H. Copeland, Esq., M.P., to The Under Secretary for Public Works.

Sir,

Legislative Assembly, 4 October, 1890.

I am in receipt of your letter No. 90-7,314, R. & B., dated September 29th, from which it appears that you addressed a letter on 25th March last to my colleague, Mr. J. Inglis, informing him that the Minister had approved of the erection of bridges over Dangar's Creek and the Mihi Creek on Enmore road, and without referring to other matters contained in your letter I desire to know how it is that

that I received no similar intimation on 25th March last, nor during the time which has since elapsed—some six months, seeing that the correspondence on this subject was opened by me in the first instance on 31st January last, and on the 20th June last I again urged this matter on your attention. Yet, notwithstanding these facts, my correspondence is ignored, and you base your present correspondence in a letter addressed by you to Mr. Inglis on 25th March, which was in reply to one of his bearing same date so that while my colleague can obtain a reply on same date, my letters of January and June are deliberately treated with contempt, or at least are ignored.

As this is the third occasion within a few weeks on which I have had to draw your attention to similar treatment, I can only come to the conclusion that there are some mysterious influences at work in your department, and take this opportunity of formally drawing your attention to the matter, feeling well assured that neither yourself or the Minister would countenance conduct of this character which, from the frequency of its occurrence I can only conclude to be of deliberate intention.

I am, &c.,  
HENRY COPELAND.

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No. 22.

The Under Secretary for Public Works to H. Copeland, Esq., M.P.

Sir, Department of Public Works, Sydney, 20 October, 1890.

I am in receipt of your letter of the 4th instant, in which you complain that your communications respecting the erection of bridges over Dangar and Mihi Creeks, on the Enmore road, have been ignored. I regret very much that you should have had any cause of complaint in regard to this matter, but the papers show, that as far as your letter of 20th June is concerned, it was replied to by me on the following day. I have since learned from yourself that this letter did not reach you, but it is duly copied in our letter-book, and the messenger's delivery book shows that it went out of the office; where the failure has been, therefore, I am at a loss to know. I must at once admit that the letter of 29th September, in which the name of Mr. Inglis only was referred to, was an entire mistake. It was, however, signed for me, as, of necessity, many official letters have to be. I well knew that you had taken a prominent interest in the matter, and I regret exceedingly that by an oversight this fact was not acknowledged in the letter. I can assure you that you do the Minister and myself no more than justice when you state that you are sure we should discountenance any neglect of the kind complained of by you, and I trust, therefore, you will accept my assurance that the mistake was purely accidental, to prevent the recurrence of which I have given special instructions that more care shall be exercised in future.

In conclusion, I may add that the papers, which, at your request, are to be laid upon the Table of the House, will show clearly the action you took in the matter.

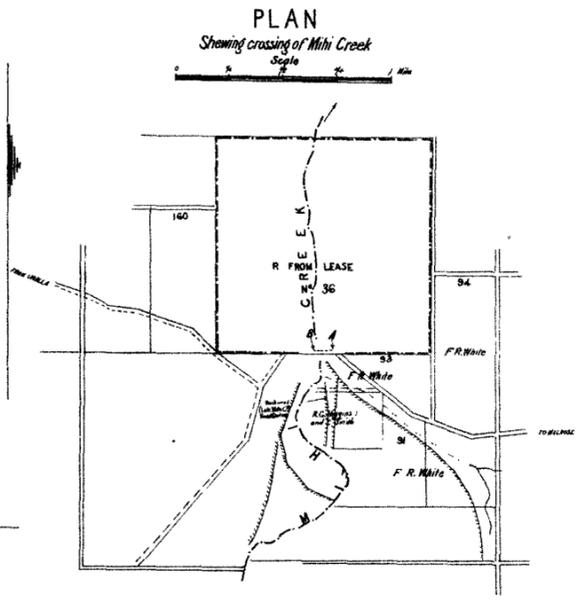
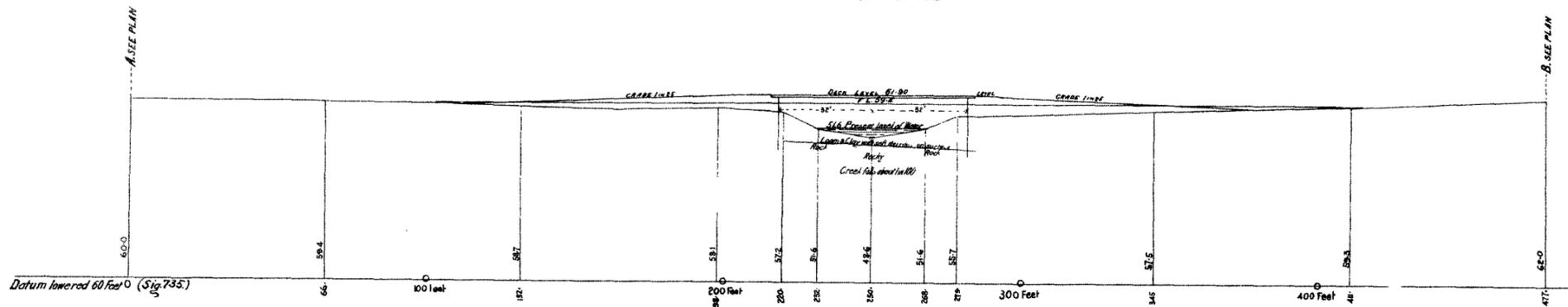
I have, &c.,  
J. BURLING,  
Under Secretary.

[Two plans.]



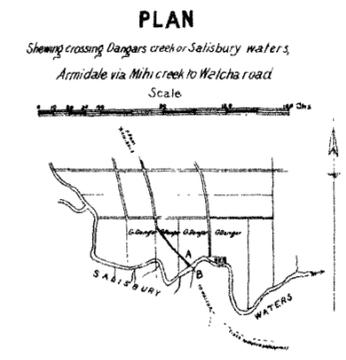
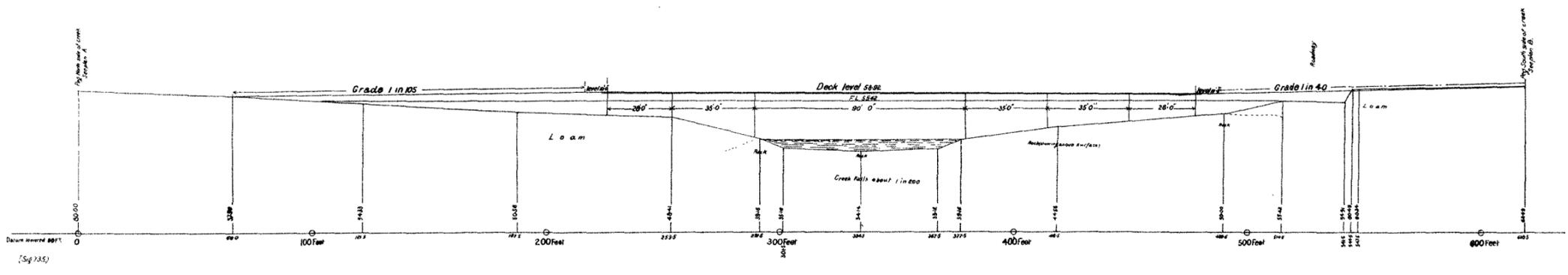
**SECTION**  
*Across Mihi Creek*  
 For bridge on road Uralla to Melrose

Scale  
 PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,  
 SYDNEY, NEW SOUTH WALES.



*Bridge over Dangars Creek*  
 Road Armidale via Mihi Creek to Walcha.

Scale  
 PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,  
 SYDNEY, NEW SOUTH WALES.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

BRIDGE OVER THE MURRUMBIDGEE RIVER, AT  
FRESHFORD.

(REPORT RESPECTING PROPOSED.)

*Ordered by the Legislative Assembly to be printed, 30 September, 1890.*

P. Scarr, Esq., to The Under Secretary for Public Works.

Sir,

Department of Public Works, Sydney, 19 September, 1890.

In accordance with your instructions, I proceeded to Queanbeyan, for the purpose of inquiring as to the necessity for a bridge over the Murrumbidgee in the vicinity of Freshford, and now have the honor to report.

I have carefully perused the reports made from time to time by the officers of the Government, who have long resided in the district, and in the course of their duties gained an intimate knowledge of the country in question.

I have also had interviews with such of the officers as are now in the district, and with a number of residents who are acquainted with it.

I also visited the bridge site proposed by the petitioners, and other portions of the river and the adjacent country.

As a result of my inquiries, the facts of the case present themselves to me as follows:—

- 1st. That the stretch of country in question—forming the greater part of the county of Cowley, and bounded on the south and east by the Murrumbidgee River, on the west by the Cooradigbee River, and on the north by a line running west from the junction of the Molonglo and Murrumbidgee Rivers—consists of a mass of high broken mountain ranges, intersected by rapid streams, and embraces little or no land fit for agriculture, unless it be a few patches of extremely limited area along the banks of some of the creeks, and that it is entirely incapable of supporting anything more than a very small population, who can only engage in sheep-farming.
- 2nd. That west of the Cooradigbee, upon the high lands, or “snow country,” beginning at Cooleman Plain, is some good plain land, which is for many months of the year covered with snow, and can only be used during the summer months.
- 3rd. That the cultivation of this land is for several reasons out of the question. Even if crops could be produced in such an inhospitable region, and a first-class road were provided, the distance from market would be an effectual bar against its occupation for agricultural purposes.
- 4th. That in the vicinity of Yaouk, in the extreme southern portion of the area mentioned, there is some good open grazing country; but from its comparative nearness to the railway at Cooma and Bredbo those places are the proper outlet from that point.
- 5th. That already a good road exists from Cooma to Kiandra, capable of carrying the traffic for a place much more important than Kiandra, which has a population within a radius of 5 miles of only 138 persons. Further, that a special grant of £12,000 is now being expended in making a cart-road from Tumut to Kiandra; in addition to which funds are being expended upon the following roads, all of which afford access more or less to the “Snow Lands” :—
  - (1.) Queanbeyan *via* Lanyon Ford (Tharwa) to Naas, 21 miles, £210.
  - (2.) Canberra to Uriarra, 13 miles, £64.
  - (3.) Queanbeyan to Uriarra, 22 miles, £216.
  - (4.) Uriarra to Brindabella, £300 in 1889, and £130 in 1890.
  - (5.) Billyingra (Bredbo) to Adaminaby, 30 miles, £294.
  - (6.) Cooma to Bolairo, 30 miles, £294.
  - (7.) Warro *via* Boambolo to Mullion, 15 miles, £147.

So that, considering the traffic to the snow lands is only stock and the attendant vehicles, it does not appear necessary further provision should be made.

- 6th. That the anticipated addition to the population of the district, as the result of throwing open the land for selection, has not been fulfilled.

An

An estimate carefully compiled by Mr. Surveyor Wood in April last gives the population residing west of the river, and who would be likely to use the bridge, as 104; the sheep, 43,974; cattle, 4,569; horses, 672.

Now, I find from a return supplied by the Lands Office, Cooma, that of forty-eight applications for land, comprising 28,061 acres in thirteen parishes, thirty-four for 19,181 acres are known to be those of persons previously holding land there. These selections are made either for the purpose of securing the runs or as extensions of previous holdings.

This goes to show that there has not been any large increase of population, but that the land is now largely held by previous holders, with the difference that it is under new conditions, and that the limit of profitable occupation was probably reached under the old system of leasing.

These facts should largely dispose of the assertion that under the new Land Act population would largely increase in the locality in question.

#### BRIDGE SITES.

The site proposed by the petitioners is that at Freshford.

In connection with it, it is proposed by the petitioners that a road should be constructed, known as Campbell's or Kelleher's line, leading from Freshford, *via* Baroomba, Ororal Valley, and the Cotter River, to Cooleman Plain.

To carry out these proposals the cost would be as follows:—

Bridge at Freshford ... ..	£6,000	0	0
Road, Freshford to Cooleman (exclusive of bridges and culverts, for which no estimate has been made) ... ..	7,075	0	0
	<u>£13,075</u>	<u>0</u>	<u>0</u>

Of cost of resumption of road through Cunningham's estate no complete estimate has been given, but it will be considerable.

It appears to me that to erect the bridge and construct the road to Cooleman, with resumptions, &c., an outlay of £15,000 to £16,000 will be necessary, and, keeping in view the probability of still further expenditure for improvement and maintaining in the early future, the Department would, by adopting these proposals, be entering upon an outlay of £20,000 to £30,000.

The other site proposed is that at Tharwa (or Lanyon) Ford.

There is a good road to this point from Queanbeyan, and this good road extends to Naas, 5 miles further. The road has been scheduled and in the hands of trustees for several years.

The cost of a bridge at Tharwa would not be greater than at Freshford, and no resumptions would be needed. The position is also the most central.

It has been suggested that a road should be opened from Naas, along Gudgenby Creek and Yaouk, to Nungar Plain, near Kiandra.

To carry out this proposal the cost would be:—

Bridge at Tharwa ... ..	£6,000	0	0
Opening ground (as estimated by Mr. Boot, Road Supt.) ... ..	3,500	0	0
	<u>£9,500</u>	<u>0</u>	<u>0</u>

to merely open the road; and, allowing for further improvement and maintenance, the cost would probably be before long £15,000 to £20,000.

Mr. Boot, who framed the road estimates, speaks in unqualified condemnation of Campbell's track, and states it would be a most expensive one to maintain when made.

As regards distance, from the report of Mr. Wood, who appears to have gone carefully into the question, there would, after allowing for the detours necessary to obtain grades on Campbell's line, be little difference in the lengths of the two roads, say 70 miles in each case.

The conclusion I arrive at is that:—

- 1st. The population, present and prospective, is insufficient to justify the erection of the bridge at either site, but that, if it was to be erected, Tharwa is the most central and suitable in the public interest, and the least expensive as to contingent cost.
- 2nd. That there is nothing to warrant the large expenditure necessary to open either of the lines of road referred to, but that, of the two, that *via* Tharwa, Naas, and Gudgenby Creek is the least expensive, and would best suit the public.

In view of these conclusions, the opening of the road through Messrs. Cunningham's estate will not be required.

I have, &c.,  
PERCY SCARR.

Name.	Area.	Parish.		Remarks.
	Aeres.			
Wm. Laughlin, 2 C.Ps. and C.L.	600	Tiddinbilla	Old.	
S. J. O'Connor, 1 C.P. and C.L.	200	"	"	
P. Hardy, senr., 1 C.P.	90	Congwarra	"	
P. Hardy, junr., 1 C.P. and C.L.	1,250	"	"	
Chas. Hardy, 1 C.P.	40	"	"	
C. J. Kirchner, 1 C.P.	150	"	"	
A. J. and J. Cunningham, 1 C.P.	260	"	"	
John Noone, 2 C.Ps. and C.Ls.	460	"	"	
A. J. and J. Cunningham, 1 C.P. and C.L.	966½	"	"	
A. J. and J. Cunningham, 1 C.L.	621	"	"	
A. Brice, 1 C.P. and C.L.	800	"	"	
A. J. and J. Cunningham, 1 C.P. and C.L.	320	"	"	
Wm. Maloney, 1 C.P. and C.L.	400	"	Apparently new.	
M. O'Keefe, 1 C.P. and C.L.	1,280	Tharway	"	
C. M'Keahine, 1 C.P. and C.L.	500	"	Old.	
M. Maloney, 1 C.P. and C.L.	800	"	Apparently new.	Conflicts with M. O'Keefe.
L. F. De Salis, 1 C.P. and C.L.	240	"	Old.	
P. O'Leahy, 1 C.P. and C.L.	500	"	"	Identical.
D. White, 1 C.P. and C.L.	800	"	"	
J. Sheedy, 1 C.P. and C.L.	580	"	Old.	Conflict.
H. G. M. F. De Salis, 1 C.P. and C.L.	480	"	"	
G. F. De Salis, 1 C.P.	70	"	"	
L. F. De Salis, 1 C.P. and 1 C.L.	160	"	"	
C. M'Keahine, 1 C.P. and C.L.	534	"	"	
E. M'Keahine, 1 C.P.	40	"	"	
Wm. Ellington, 1 C.P. and C.L.	320	"	"	
G. Hatcliffe, 1 C.P. and C.L.	400	Beeroomba	"	
C. M'Keahine, 2 C.Ps. and 1 C.L.	261	"	Old.	
A. Cochran, 2 C.Ps. and 2 C.Ls.	810	Yaouk	"	
N. Cochran, 1 C.P. and 1 C.L.	1,220	"	"	
L. Cochran, 1 C.P. and 1 C.L.	649	"	"	
D. Cochran, 2 C.Ps. and 2 C.Ls.	1,440	"	"	
W. F. Sinclair, 1 C.P. and C.L.	1,250	Greenfield & Gudgenby.	"	
Harriette Mackintosh, 1 C.P. and C.L.	1,250	"	"	
M. Broderick, 1 C.P. and C.L.	600	Cuppacumbalong and Yarrara.	"	
T. M. Foley, 1 C.P. and C.L.	600	Cuppacumbalong	"	
Thos. Long, 1 C.P. and C.L.	600	"	Old.	
Thos. Long, 1 C.P. and C.L.	800	"	"	
P. Kelly, 1 C.P. and C.L.	1,280	"	New	Conflict.
H. G. M. F. De Salis, C.L.	640	"	Old	
L. F. De Salis, 1 C.P. and C.L.	520	"	"	
J. Gray, 1 C.P. and C.L.	160	"	"	
G. F. De Salis, 1 C.P. and C.L.	320	"	"	
Do 1 C.P. and C.L.	480	" and Naass	"	
— Hutchinson, 1 C.P. and C.L.	1,280	Jarara.	"	
C. A. Peden, 1 C.P. and C.L.	240	Bunbalong	Old.	
Commercial Bank, 2 C.Ps. and 2 C.Ls.	597	"	"	



1890.

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LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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COWRA BRIDGE BILL.

(MESSAGE No. 21.)

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*Ordered by the Legislative Assembly to be printed, 2 July, 1890.*

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*By Deputation from the Governor,*  
ALFRED STEPHEN,  
*Lieutenant-Governor.*

*Message No. 21.*

In accordance with the provisions contained in the 54th section of the Constitution Act, the Governor recommends for the consideration of the Legislative Assembly the expediency of making provision to meet the requisite expenses in connection with a Bill to sanction the erection of a bridge over the Lachlan River, at Cowra.

*Government House,*  
*Sydney, 2nd July, 1890.*

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1890.

## NEW SOUTH WALES.

## LANDS FOR PUBLIC PURPOSES ACQUISITION ACT.

(RESUMPTION AT RYDALMERE FOR AN APPROACH TO BRIDGE OVER BISHOP'S CREEK.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16, sec. 6.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
44 VICTORIA No. 16.

NEW SOUTH WALES, } By His Excellency The Right Honourable  
to wit, } CHARLES ROBERT, BARON CARRINGTON,  
a Member of Her Majesty's Most  
(L.S.) Honourable Privy Council, Knight  
CARRINGTON, } Grand Cross of the Most Distinguished  
Governor. } Order of Saint Michael and Saint  
George, Governor and Commander-in-  
Chief of the Colony of New South  
Wales and its Dependencies.

WHEREAS I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, have duly sanctioned the carrying out of certain works for and in connection with the construction of a Bridge over Bishop's Creek, Rydalmere, in the said Colony, for and towards the completion of which said works public funds are available; and whereas the land hereinafter described is required for approaches to the said works: Now I, the Governor of the said Colony, with the advice of the Executive Council of the said Colony, in pursuance of the powers in this behalf given to or vested in me by the "Lands for Public Purposes Acquisition Act," do, by this notification, published in the Gazette, and in a newspaper, that is to say, in the "Cumberland Mercury," circulated in the Police District wherein the said land is situated, declare that the land hereinafter described has been resumed for the public purposes hereinafter mentioned, that is to say, for and in connection with the approaches to the above bridge, to the intent that, upon the publication of this notification in the Gazette, the legal estate in the said land shall forthwith be vested in the Minister for Public Works and his successors, on behalf of Her Majesty, for the purpose of the said last-mentioned Act, for an

estate of inheritance in fee simple in possession, freed and discharged from all trusts, obligations, estates, interest, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to the intent further that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Minister as a trustee, with the powers stated in the said last-mentioned Act. And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land containing 21 perches more or less, being a part of and commencing at the north-west corner of portion 4 of section D of the Vineyard Estate, parish of Field of Mars, county of Cumberland, Colony of New South Wales, on the east side of Wharf-street, 1 chain wide, and on the southern boundary of a reserve from sale; and bounded thence on the north by part of the northern boundary of that portion aforesaid, being a line bearing east 72 feet; thence on the south-east by a line bearing south 24 degrees 14 minutes west 175 feet 6 inches to Wharf-street; thence on the west by that street, being also part of the western boundary of portion 4, bearing north 160 feet, to the point of commencement; and said to be in the possession of F. Randall.

In witness whereof I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this twenty-seventh day of December, in the year of our Lord one thousand eight hundred and eighty-nine, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,  
W. McMILLAN.

GOD SAVE THE QUEEN!



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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THE HINTON PUNT.

(PETITION FROM CERTAIN PERSONS, PRAYING FOR THE ABOLISHMENT OF TOLLS ON)

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*Ordered by the Legislative Assembly to be printed, 30 July, 1890.*

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To the Honorable the Legislative Assembly of New South Wales.

The Petition of the undersigned, being persons who have occasion to make use of the Hinton Punt,—

HUMBLY SHOWETH:—

That the imposition of tolls on the said punt is felt to be unfair, burdensome, and impolitic.

Unfair—inasmuch as costly bridges, maintained at considerable annual outlay, are free.

Burdensome—inasmuch as so many persons are driven to avail themselves of the risk and uncertainties of water-carriage in preference to the speedier and safer transit by rail; and traffic is diverted from its natural channel of the shortest and easiest route, *via* Hinton, to the longer route, because of the free bridges, to the injury of Hinton and Morpeth; and bears heavily on the small farmer when bringing his weekly stock of eggs and butter to the market.

Impolitic—inasmuch as the charge tends to deprive the railway of the produce of the district, and to take from the inhabitants on the Hinton side those benefits which Government has been at the cost to provide in the way of technical classes, and also the great advantages of public lectures, agricultural shows, political gatherings, and the various agencies, which are no inconsiderable factors in the advancement of the community, supplied by the proximity of Maitland and Morpeth.

Inasmuch, therefore, as the tolls are felt to be a grievance, and hinder the development of the community out of all proportion to the revenue derived by Government from this source; and, moreover, as the claims of this district, in comparison with less important ones, have received scant attention in the past,—

Your Petitioners hereby pray that you will abolish the tolls on the Hinton punt forthwith.

And your Petitioners, as in duty bound, will ever pray.

[Here follow 640 signatures.]

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

TRAFFIC ACROSS SPIT FERRY, MIDDLE HARBOUR.  
(RETURN SHOWING.)

*Ordered by the Legislative Assembly to be printed, 17 July, 1890.*

[Laid upon the Table in reply to Question No. 4, on the 9th July, 1890.]

Questions.

- (4.) TRAFFIC ACROSS SPIT FERRY, MIDDLE HARBOUR:—MR DALTON *asked* THE SECRETARY FOR PUBLIC WORKS,—
- (1.) Has he any objection to lay upon the Table of this House, a Return showing in detail the number of passengers, horses, vehicles, and cattle crossing the Spit Ferry, Middle Harbour, from the 30th June to 31st December, 1889; also, the amount of revenue received from same during that period?
- (2.) The like information from 1st January to 30th June, 1890, inclusive?
- (3.) If he has no objection to furnishing the Return, will he state upon what date the same will be available?

Answers.

MIDDLE HARBOUR FERRY.

RETURN of traffic from 1st July to 31st December, 1889:—

Foot passengers	...	...	...	...	...	...	...	...	1,267
Horses	...	...	...	...	...	...	...	...	3,878
Vehicles	...	...	...	...	...	...	...	...	2,697
Cattle	...	...	...	...	...	...	...	...	43

Revenue received from above, £153 18s. 4d.

RETURN of traffic from 1st January to 30th June, 1890:—

Foot passengers	...	...	...	...	...	...	...	...	1,427
Horses	...	...	...	...	...	...	...	...	4,288
Vehicles	...	...	...	...	...	...	...	...	2,875

Revenue received from above, £136 12s. 11d.

Tolls not being levied on passengers in vehicles, a return cannot be furnished of their numbers during the periods stated above.

Six monthly tickets for horses, and two monthly tickets for vehicles have been issued for the six months ending 30th June, 1890, the revenue for which is included in the amount given above.



1890.

## NEW SOUTH WALES.

NEW SOUTH WALES GOVERNMENT RAILWAYS AND  
TRAMWAYS.

(ANNUAL REPORT OF RAILWAY COMMISSIONERS, YEAR ENDING 30TH JUNE, 1890.)

Presented to Parliament pursuant to Act 51 Vic. No. 35.

Offices of the Railway Commissioners of New South Wales,  
Sydney, 27th August, 1890.

TO THE HONORABLE THE MINISTER OF RAILWAYS,—

Sir,

In accordance with the provisions of the 45th clause of the Railways Act of 1888, 51 Vic. No. 35, we have the honor to present, for the information of Parliament, our Annual Report upon the working of the Railways and Tramways for the year ending June 30th, 1890.

## GENERAL REMARKS.

Since the date of our last Annual Report, we have inspected the whole of the lines, and authorized many works required in the interests of the country, and for the development of the Railways.

The general result of the working of the Railways and Tramways during the year shows that the total traffic amounted to £2,902,048, and the net profit to £1,012,140. The following table will show the progress and result of the Railway and Tramway working for a period of seven years before our taking office, and since that date:—

	MILEAGE OPEN.				TOTAL EARNINGS.			
	1882.	1888.	1889.	1890.	1882.	1888.	1889.	1890.
Railways .....	1,276	2,114	2,171	2,182	£ 1,701,016	£ 2,295,124	£ 2,538,477	£ 2,633,086
Tramways .....	22	38½	38½	39½	126,202	236,519	243,563	268,962
	1,298	2,152½	2,209½	2,221½	£1,827,218	£2,531,643	£2,782,040	£2,902,048
	CAPITAL.				PROFIT ON WORKING.			
	1882.	1888.	1889.	1890.	1882.	1888.	1889.	1890.
Railways .....	£ 15,843,616	£ 27,722,748	£ 29,839,167	£ 30,555,123	£ 763,661	£ 764,573	£ 903,875	£ 967,251
Tramways .....	452,818	930,561	905,595	933,614	23,066	17,323	21,728	44,889
£	16,296,434	28,659,309	30,744,762	31,488,737	£786,727	£781,896	£925,603	£1,012,140
		16,296,434			Increase over 1888 year in which pre- sent Commissioners took office.		£143,707	£230,244
		£ 12,362,875					£373,951	

Showing a net gain to the Treasury from Railways and Tramways during the two years we have been in office of £373,951, whilst in the seven years preceding our taking office, although the traffic had increased by £704,425 and the capital by over £12,000,000, the net return to the Treasury showed a decrease.

440—A

RAILWAYS.

[1620 copies—Approximate Cost of Printing (labour and material), £239 11s. 5d.]

## RAILWAYS.

On the 30th of June, 1889, 2,171½ miles were open, and on the 1st January, 1890, the line from Hornsby to St. Leonards, a length of 10½ miles, was brought into use, making a total milcage on the 30th of June, 1890, of 2,182 miles.

The cost of the lines opened for traffic has been £30,555,123.

To meet this expenditure, £27,734,581 has been raised by the issue of debentures of the nominal value of £28,983,967, the balance having been provided out of the General Funds of the Colony.

Debentures of the value of £1,109,075 have been finally paid off, leaving £27,874,892 outstanding on the 30th of June, 1890.

The revenue derived from working the lines during the year was £2,633,086, and the expenses amounted to £1,665,835, or 63·26 per cent. of the gross revenue, a decrease of 3·43 per cent. since we took office, leaving a net revenue of £967,251 towards paying interest upon capital, or a return of 3·47 per cent. on the total debenture capital outstanding, and 3·28 per cent. per annum on the total amount outstanding against the capital cost of the railways.

The details of the revenue and working expenditure will be found in the Appendix, Nos. 5 to 7.

The increase in revenue amounted to £94,609. Of this increase, the coaching traffic contributed £24,362, the merchandise and live stock traffic £69,014, and miscellaneous £1,233.

The revenue for the year ending 30th June, 1889, was materially augmented by the traffic to the Melbourne Exhibition, whereas this year there has not been any special attraction of the kind. The continuous and unprecedented rains also interfered with general traffic, and, by keeping the rivers open throughout the year, diverted a considerable quantity of merchandise which would otherwise have been conveyed by railway.

Working expenses increased by £31,233 (33·01 per cent. of the increased traffic) leaving an increased net result of £63,376.

The totals of, and increases in, the various classes of traffic will be seen below :

	Total.	Increase.
Passengers (number) ... ..	10,787,307	502,327
Season Tickets issued (number) ... ..	196,248	18,307
Goods, minerals, and live stock (tons) ...	3,788,950	303,111

The train miles run were 8,008,826, being an increase of 367,057 miles over the preceding year.

The earnings per train mile amounted to 78·90d., and the expenditure per train mile was 49·91d., leaving a net earning of 28·99d., as against 28·38d. last year, and 27·43d. in 1888, being an increased profit since 1888 of 1·56d. per train mile.

It is gratifying to report that in spite of the exceptional difficulties we have had to contend with during the year, owing to the excessive rains, and also the additional expenditure incurred in improving the rolling stock and permanent way, we have been enabled to increase the net return to the Treasury from the railways, as compared with the year preceding our taking office by £202,678.

The

The phenomenal rainfall during the past year has had a most disastrous effect upon the lines, which were already in such a defective condition, as, in consequence of the almost entire absence of drainage in many places, and the want of proper ballast, the sleepers were practically floating in mud. The exceptional state of the weather also seriously retarded the work of reballasting, as also relaying, &c., the contractors having been unable to deliver the sleepers at the rate required, and the line was in such a condition in many localities as to render it unwise to interfere with it.

The rainfall for the fourteen months ending 30th June has for the past fifty years averaged 59·58 inches; but the record for the period closing 30th June last amounts to 108·48 inches. Mr. Russell, the Government Astronomer, states that, apart from the mere quantity, a remarkable feature about the recent rain was its persistence, the ground never having a chance to dry after one deluge of rain before another was pouring upon it.

It has been necessary for a long time past to employ a largely increased staff upon the permanent way, in order to keep the lines in running order, and it was only by the exercise of the greatest vigilance on the part of the officers and men, and running the trains at reduced speed, that the traffic was conducted so satisfactorily as has been the case. For many months the average number of additional men employed on the permanent-way amounted to about 800, as against a normal staff of about 3,100.

Several exceedingly heavy landslips took place at various places, entailing heavy expenditure, and the great flood at Bourke seriously damaged the railway lines for many miles.

The extra expenditure incurred up to the end of June in connection with the floods and slips amounts to over £40,000, and this exceptional expenditure is still continuing.

A land-slip at Bell, in the Blue Mountains, caused the traffic of the Main Western Line to be obstructed for five days whilst a deviation was being made. The flood in the Darling River in April and May last was the most disastrous ever experienced. The line was inundated and seriously damaged for 13 miles; and, from the 17th April until the 19th May the communication with Bourke was maintained by the Department by a service of boats between the point at which the line became impassable for trains and the town, and by this means over 2,000 persons were conveyed and supplies kept up.

On three occasions since May, 1889, the traffic of the Great Northern Line was suspended in consequence of the floods in the Hunter River at Maitland. We have, therefore, decided to raise the railway embankment above flood level for a distance of 3,740 yards, so as to avoid a repetition of this interruption.

During the year the cost of relaying 44 miles 15 chains of line was debited against working expenses, as compared with 35 miles 10 chains last year, and 20 miles 52 chains in the previous year.

There have unfortunately been several serious accidents to passenger trains during the year; but the amount of money paid as compensation for personal injury to passengers during the time we have been in office has been at a considerably less rate per annum and per passenger carried than was the case for the four  
years

years preceding our taking office. We feel sure that the steps being taken by us in improving the rolling-stock and permanent-way, and extending the use of safety appliances, will materially add to the security of the lines.

The following return will show the progress made in extending the Interlocking of Points and Signals and the Absolute Block system of working.

RETURN showing number of miles of Line on which the traffic is worked under the **Absolute Block System**; also, number and percentage of places which have or have not **Points and Signals interlocked**.

Date, to end of—	Number of miles of line opened for traffic.			Number of miles of line on which the traffic is worked under Absolute Block System.			Number and Percentage of Places which have or have not Points and Signals interlocked.				
	Double.	Single.	Total.	Double.	Single.	Total.	Number of Places.			Percentage.	
							Inter-locked.	Not inter-locked.	Total.	Inter-locked.	Not inter-locked.
October, 1888 ... ..	71½	2,042½	2,114	28	Nil.	28	104	318	422	24·64	75·36
October, 1889 ... ..	75	2,096	2,171	51½	80½	132	126	327	453	27·81	72·19
July, 1890 ... ..	79	2,103	2,182	72½	189½	262	173	291	464	37·29	62·71

Six trains have also been fitted with electric communication between passengers and guards, and in a short time the whole of the through trains will be equipped in this way.

The Westinghouse and Vacuum Break Companies are each fitting up a train of fifty goods waggons for the purpose of conducting competitive break trials, so as to enable us to decide upon the form of automatic continuous break to adopt for the goods stock.

#### MERCHANDISE RATES.

On the 1st of January last a reduction of 10 per cent. was made in the whole of the rates for agricultural produce, to operate all the year round, and from the 1st of February to 31st of August, when the pressure upon the rolling stock is not so great as at other times, a further reduction of 10 per cent. was brought into operation, making a reduction of 20 per cent. during the period most advantageous to the farmers. The rates for this class of traffic are now the lowest in Australia.

The rates for the carriage of low-class ores and coke were materially reduced during the year in order to encourage the mining industry.

A general revision of the goods rates has taken place, and came into operation as from the 1st instant, the main features being the simplification and enlargement of the classification so as to cover every known article likely to be conveyed over the railways, and a modification of the rates in various ways, including the total abolition of the 4th Class. The articles so classed were conveyed at about 9d. per ton per mile, whereas now the highest rate will be 7d. per ton per mile, excepting for a few exceptional articles.

We have every reason to believe that the concessions in rates will not only be a great benefit to the country, but will also speedily lead to a considerable increase of traffic on the railways.

### OPENING OF NEW LINES AND THEIR EFFECT UPON THE TRAFFIC.

Since the date of our last report the only additional line opened for traffic has been that from St. Leonards to Hornsby, but in consequence of the position of the terminus it has been an absolute loss to the country, the working from the 1st January to the 30th June showing a total earning of £886 only, while the cost of the line for working and interest amounts to £6,849. Little improvement can be expected until the line is brought to the waters of Port Jackson, and when this has been done an opportunity will be afforded of creating a good suburban traffic, so that in a few years in all probability the expenditure on the whole scheme will cease to be a burden upon the existing lines.

### ACCOMMODATION FOR THE TRAFFIC AND CONDITION OF LINES AND ROLLING STOCK.

On all the lines alterations and additions to the accommodation have been authorized for the purpose of improving the facilities for the public and encouraging traffic, but, in consequence of so much work being in hand, and the exceptional weather we have experienced, many of the works have not made that progress which we could have wished.

The duplication of the line from Hurstville to Oatley, and Sutherland to Loftus Junction, was opened on the 4th April last.

The duplicating of the lines from Granville to Picton, Adamstown to Teralba, Oatley to George's River, George's River to Waterfall, and Strathfield to Ryde, has been proceeded with, and the engineers expect to be able to open several of the sections before the end of the year.

The letting of the contracts for quadrupling the Suburban Line has been delayed in consequence of it having been found necessary to resurvey the whole of the line. Fair progress has been made with the two additional lines between Redfern Station and the Illawarra Junction at Eveleigh, and it is hoped that this work will be completed before the end of the year. Tenders are now being invited for quadrupling the line from Illawarra Junction, Eveleigh, to Petersham, and we hope shortly to be able to call for tenders for quadrupling the line from Petersham to Homebush.

Several quarry properties have been acquired for the purpose of reballasting the lines, and, now that more settled weather is approaching, it is hoped that rapid progress will be made in relaying, resleepering, and draining the lines, and we expect that before the close of 1891 the lines will be in first-class order.

The rolling stock has received very special attention during the year, and a sum of over £60,000 has been spent upon repairs and renewals out of working expenses in excess of the sum spent in the year preceding our taking office.

In spite of the liberal expenditure in repairing the locomotives, it has been with the greatest difficulty that the traffic has been kept going, only thirteen additional locomotives having been delivered during the past year, but we hope that within the next few months some of the engines which have been under order since August last will be delivered, and so afford the much-needed relief.

The

The proposal to establish Locomotive Works in the Colony, under the management of an eminent locomotive engineer and builder, with ample capital at his command, will, we trust, not only be the means of enabling us to properly equip our lines with engines built under the personal inspection of our own officers, but will also create an entirely new industry for the Colony, and give employment to a large number of skilled workmen.

The new rolling stock which has been brought into work between the 1st July last year and the 30th June this year is shown on table (page 16), in addition to which there have been delivered since the 1st July this year:—Six lavatory first-class carriages; ten second-class express (46 ft.) carriages; three first and three second American cars, for suburban working, and there are under order the following:—

110 carriages ... ..	Makers—Various Colonial firms.
456 goods waggons and vans...	„ „ „ „
500 coal hopper waggons ... ..	„ „ „ „
25 locomotives ... ..	Makers—Messrs. Dubs & Co., Glasgow.
27 „ ... ..	„ „ Beyer, Peacock, & Co., Manchester.

There is almost an entire absence of shelter-sheds for the carriage stock on the Railways, and now that the carriages are being so materially improved it is absolutely necessary in so trying a climate that shelter should be provided, so as to preserve the property. Active steps are being taken to supply this want.

The sharp curves in the line across the Blue Mountains have a prejudicial effect upon the rolling stock and the comfort of travelling, and we are modifying many of them where the work can be carried out at a reasonable cost.

The severe grades over the main lines materially increase the working expenses, and of necessity the rates are much higher than would be the case if the grades were easier. We therefore propose to ask the Government to move Parliament to place a sum of money at our disposal in order that, where practicable, grades which materially affect the loading of trains may be reduced, and so contribute, with other things, to enable us to work the lines with greater economy, and thus lead to reduction in rates for goods traffic.

#### UNIVERSAL GAUGE FOR AUSTRALIA.

We regret that the question of an universal gauge for Australia has not made much progress since we referred to the subject in our last Annual Report; but we would take the opportunity of strongly urging that active steps should be taken to bring about this necessary change; the great disadvantage of the break of gauge is at the present moment being more felt than at any previous period, in consequence of the suspension of the shipping trade, owing to the Maritime strike, and the consequent necessity for greater interchange of goods and coal by railway.

#### STAFF.

The condition of the staff has been materially improved in various ways, and as the labour question is so seriously before the public at the present time, we attach as an Appendix (page 57) a list of the concessions which have been granted to the staff since we assumed office, together with a new classification showing the rates of pay of the various grades of employees, which was brought into force since our last Annual Report was made. The value of the advances of pay and concessions granted to the staff since we took office amounts to more than £70,000 per annum.

It

It has only been possible to act in this liberal manner by carrying out economies in various ways, and it will therefore be seen how much the interests of the staff are wrapped up in the efficient and economical administration of the railways.

An institute for the staff, containing lecture hall capable of accommodating 550 persons, class-room, reading-room, library, &c., is being erected at Redfern, and we hope it will be ready for opening on the 1st January next. Tenders have been accepted for the supply of 3,000 volumes of selected books for the library. It is hoped that this institute will be an element of much good to the staff.

The Government has promised to introduce into Parliament a scheme worked out by us for establishing Provident and Pension Funds for the whole of the weekly staff, and we trust Parliament will give us the needful authority to contribute to the funds out of the railway revenue. The allowances to the staff are based on a very liberal scale, and the contributions required from the men are very moderate.

The question of establishing a Convalescent Home for the staff is also under consideration, and, to assist the movement, the Government has generously granted 19 acres of land in the Field of Mars, near Beecroft.

The appendices to the report will give complete information as to the general condition of the railway traffic and expenses. The diagrams also will enable the whole of the transactions of the department to be readily grasped.

#### RECAPITULATION.

	1888.	1889.	1890.
Total spent in construction and equipment...	£27,722,748	29,839,167	30,555,123
Total Debentures finally paid off ...	£1,017,875	1,047,975	1,109,075
Total cost of construction and equipment, less Debentures paid off ...	£26,704,873	28,791,192	29,446,048
Total cost per mile open for traffic ...	£13,114	13,714	14,003
Total mileage open for traffic ...	2,114	2,171	2,182
Average miles opened for the year ...	2,044	2,128	2,177
Gross revenue ...	£2,295,124	2,538,477	2,633,086
Working expenditure...	£1,530,551	1,634,602	1,665,835
Profit on working ...	£764,573	903,875	967,251
Percentage of working expenses to revenue ...	66.69	64.35	63.26
Earnings per average mile open ...	£1,122	1,192	1,209
Expenditure per average mile open ...	£748	768	765
Gross earnings per train mile ...	82.34d.	79.72d.	78.90d.
Expenses per train mile ...	54.91d.	51.34d.	49.91d.
Net profit per mile ...	27.43d.	28.38d.	28.99d.
Number of passenger journeys ...	15,174,115	16,086,223	17,071,945
Goods tonnage...	3,831,671	3,378,305	3,680,718
Live-stock tonnage ...	68,101	107,534	108,232
Train mileage ...	6,689,313	7,641,769	8,008,826
Locomotives, Number of ...	428	429	439
Passenger Stock, Number of...	1,039	1,085	1,064
Goods Stock, Number of ...	8,833	9,060	9,304

TRAMWAYS.

## TRAMWAYS.

ON the 30th of June, 1889,  $38\frac{1}{2}$  miles were open, and on the 14th of August, 1889, the section from Marrickville to Dulwich Hill, a length of 1 mile, was opened, making a total mileage, on the 30th June, 1890, of  $39\frac{1}{2}$  miles.

The cost of the lines opened for traffic has been £933,614.

A sum of £975,340 has been raised by the issue of debentures to the amount of £1,000,000 for Tramway purposes.

The result of the year's working of the Tramways is satisfactory, as the lines have, for the first time for some years past, ceased to be a burden upon the country, and have also contributed a profit to the Treasury. At the same time, whilst this has been done, the property has been considerably increased in value during the twelve months, no less than 31 tram-cars and 1 water-tank waggon having been renewed out of the revenue, making a total of 41 tram-cars and 1 water-tank renewed out of revenue within eighteen months; this is nearly one-third of the total rolling stock we found in existence when we took office. The condition of the remainder of the stock has been considerably improved, and the service to the public increased.

A new piece of line is about to be constructed from Castlereagh-street along Cleveland-street, to a junction with the Randwick line. This connecting line will enable a large amount of traffic from the Redfern Railway Station and the districts lying to the west thereof, going to and from the Association Cricket Ground, the Randwick Racecourse, and Coogee, to be accommodated.

A scheme of cable trams running from the Circular Quay to the Railway Station and Pyrmont, and from the foot of King-street, at the wharf, to Woollahra *via* William-street, is at the present time under the consideration of the Public Works Committee, and we trust the proposal will be carried out, as we feel sure that not only would the lines be a great convenience to the public but that they would also be extremely profitable.

The work in connection with the fitting up of a section of the tram-line with the Thomson-Houston system of electric traction will be ready to be tested very shortly, and we trust that the trial may demonstrate the advisability of the system being experimented with on a larger scale on the existing lines.

Fifty new tram-cars are under construction, and also 12 motors, which are being built in the Colony.

### CITY AND SUBURBAN LINES.

*(Length,  $30\frac{1}{2}$  miles.)*

The gross revenue from working the lines during the year was £249,508, and the expenses amounted to £207,517, or 83·17 per cent. of the Revenue, as against 91·25 per cent. last year, leaving a net result of £41,991 towards paying interest upon the capital.

The cost of the city and suburban section was £790,555, and the net return gives 5·31 per cent. upon the capital invested, as against 2·56 per cent. in the preceding year, and 2·27 in 1888.

The

The working gives the following results :—

	1888.	1889.	1890.
Gross revenue ... ..	£221,060	225,833	249,508
Working expenses ... ..	204,227	206,092	207,517
Net profit ... ..	16,833	19,741	41,991
Passengers fares collected...	51,563,197	52,810,026	57,463,650
Miles run by cars ... ..	1,246,543	1,388,386	1,474,646
Earnings per car mile ... ..	42·56d.	40·49d.	40·60d.
Expenses per car mile ... ..	39·32d.	36·95d.	33·77
Net profit per car mile ... ..	3·24d.	3·54d.	6·83

During the year 31 new cars and 1 water-tank wagon have been paid for out of revenue at a cost of £11,392.

#### NORTH SHORE CABLE TRAMWAYS (*Length*, 1½ miles).

The revenue amounted to £9,483—expenses, £8,339; net profit, £1,144.

The total cost of the line and its equipment was £73,812, and upon this sum the net profits give 1·55 per cent., a decrease of 0·59 per cent. upon the previous year, the working expenses having been unduly increased by the cost of renewing the cable on two occasions and in rearranging the guides and running gear, which were found to be very defective, and so caused the cables to be damaged.

The car miles run were 66,187, being an increase of 399.

There was an increase of 314,007 in the number of fares collected, the total being 2,269,721.

#### NEWCASTLE TO PLATTSBURG (*Length*, 7½ miles).

The construction and equipment cost £69,247, and the net return gives 2·53 per cent. on the capital invested, an increase of 1·87 per cent. upon the previous year.

The gross revenue derived from working was £9,972, and the working expenses, £8,217, leaving £1,755 to pay the interest upon the capital cost of the line.

The improvement in the financial result of the working of this line is very satisfactory.

The car miles run were 105,133, an increase of 5,668.

The earnings per car mile were 22·76d., expenditure, 18·76d., and net profit, 4·00d.

#### CONDITION OF EXISTING LINES.

Improvement has been effected in the condition of the lines during the year, and 2 miles 18 chains of relaying has been done. The exceptional rainfall added materially to the difficulty of keeping the lines in order as well as to the cost.

#### ACCOMMODATION FOR THE TRAFFIC.

The considerable number of new cars added to the equipment has enabled the service to be conducted in a much more satisfactory manner, and when the additional cars, now under order, are supplied, we hope that the exceptional holiday traffic will also be fully provided for.

The pressure upon the space in Bridge-street yard is very great; we are, however, unable to take any action regarding the question until the cable-tram schemes are finally dealt with.

Better waiting-room accommodation at various points has been provided in the Newcastle district, and several additional and improved rooms are authorized in connection with the Sydney lines.

Improved lighting has been provided in all the cars.

#### RECAPITULATION.

## RECAPITULATION.

The following summary will show the principal items of interest in the Tramway transactions for the year ending the 30th of June, 1890; and, for the purposes of comparison, the figures for the years 1888 and 1889 are shown:—

	1888.	1889.	1890.
Total Debentures issued and outstanding ...	£1,000,000	£1,000,000	£1,000,000
Amount added to Capital Account for the year	67,929	32,351	24,019
Total spent in Construction and Equipment...	877,244	909,595	933,614
Total cost per mile open for traffic ... ..	22,786	23,626	23,636
Total mileage open ... ..	38½	38½	39½
Gross Revenue ... ..	£236,519	£243,563	£268,962
Working Expenditure ... ..	219,196	221,835	224,073
Profit on working ... ..	17,323	21,728	44,889

## CITY AND SUBURBAN LINES.

Total cost of Construction and Equipment ...	£742,555	£771,255	£790,555
Gross Revenue ... ..	221,060	225,833	240,508
Working Expenditure ... ..	204,227	206,092	207,517
Profit on working ... ..	16,833	19,741	41,991
Percentage, Working cost to Revenue ...	92·38	91·25	83·17
Percentage of Profit to Capital invested ...	2·27	2·56	5·31
Total mileage open ... ..	29½	29½	30½

## NORTH SHORE CABLE TRAMWAY.

Total cost of Construction and Equipment ...	£71,519	£72,617	£73,812
Gross Revenue ... ..	7,248	8,178	9,483
Working Expenditure ... ..	6,833	6,626	8,339
Profit on Working ... ..	415	1,552	1,144
Percentage, Working Cost to Revenue ...	94·26	81·02	87·93
Percentage of Profit to Capital invested ...	0·58	2·14	1·55
Total mileage open ... ..	1½	1½	1½

## NEWCASTLE TO PLATTSBURG.

Total cost of Construction and Equipment ...	£63,170	£65,723	£69,247
Gross Revenue ... ..	8,211	9,552	9,972
Working Expenditure ... ..	8,136	9,117	8,217
Profit on Working ... ..	75	435	1,755
Percentage, Working Cost to Revenue ...	99·08	95·44	82·40
Percentage of Profit to Capital invested ...	0·12	0·66	2·53
Total mileage open ... ..	7½	7½	7½

We have the honor to be,

Sir,

Your most obedient servants,

E. M. G. EDDY, Chief Commissioner.  
 W. M. FEHON,  
 CHARLES OLIVER, } Commissioners.

## CONTENTS OF APPENDIX.

### RAILWAYS.

NO.	PAGE.
1. Report of Engineer for Existing Lines	13
2. Report of Locomotive Engineer	15
3. Statement showing rolling stock renewed out of revenue	15
4. Return of working stock, &c.	16
5. Revenue Account	17
6. Working expenses abstracts	17
7. Comparative analysis of traffic—Railways	18
8. Railway loan and debenture account	19
9. Statement of earnings, working expenses, &c.	20
10. Wages paid to Maintenance, Locomotive, and Traffic Branches	21
11. Capital expenditure—Lines open	21
12. Cost of additions, &c.	21
13. Number of suburban passengers, &c.	21
14. Return of coal and shale carried	22
15. Return of coal exported from Newcastle	23
16. Statement of wool traffic	24
17. Number of employees	24
18. Revenue and expenditure of each station	25
19. Return of imports—Railway material	30
20. Number and nature of injuries to life and limb	35
21 & 22. Detailed mileage of each engine	36 & 39
23. Date of opening the various sections of Railway, and length in miles	40
24. Return of appointments and removals	41 & 42

### TRAMWAYS.

25. Report of Locomotive Superintendent	48
26. Report of Tramway Engineer	49
27. Revenue Account	50
28. Working expenses abstracts—City and Suburban Lines	50
29. Working expenses abstracts—North Shore Cable	51
30. Working expenses abstracts—Plattsburg Line	51
31. City and Suburban rolling stock	52
32. North Shore rolling stock	52
33. Plattsburg rolling stock	52
34. Capital expenditure—Lines open	52
35. Summary of the working of City and Suburban	53
36. Number of employees	53
37. Wages paid	54
38. Number and nature of accidents to life and limb	54
39. Return of imports—Tramway material	55
40. Return of appointments and removals	55

### GENERAL.

List of Concessions granted to the Staff	57
Classification Advances—Railways	58
Classification Advances—Tramways	64

Diagrams descriptive of Railway transactions, Nos. 1 to 11.

Maps showing Railway systems and Lines.



## APPENDIX.

## APPENDIX 1.

## Report of Engineer for Existing Lines.

Railway Department, Office of Engineer for Existing Lines, Sydney, 22 July, 1890.

Annual Report for year ending 30 June, 1890.

Gentlemen,

I have the honor to report that the condition of the permanent-way and works has been maintained as efficiently as possible during the year.

There have been, however, considerable difficulties to contend with, owing to the excessive rainfall, and in consequence there has been increased expenditure, caused by floods and slips, some of which have been of a very serious nature.

I may mention that the places which have suffered most have been the Western Line, at and near Bourke, and between Katoomba and Bell. The Northern Line between East and West Maitland, and in the vicinity of Murrurundi and Ben Lomond, and also between Strathfield and Cowan Creek, and from Gosford to Adamstown. The Southern Line, between Granville Junction and Campbelltown, and between Picton and Goulburn, and the Illawarra Line, near Clifton.

At Ben Lomond and Bell it was found necessary to deviate the line. The Mudgee Line has given considerable trouble owing to slips, and unless several deviations are made further expense and delays will take place.

Relaying and refencing have also been unavoidably retarded owing to the bush roads being impassable for the conveyance of sleepers and fencing material.

There has, however, been 44 miles 15 chains relaid, and 18 miles 26 chains refenced.

Draining and reballasting have also been retarded through bad weather.

The Suburban line has been redrained and reballasted thoroughly from Redfern to Ashfield on the Up line, and from Redfern to Summer Hill on the Down line, and as the most difficult portion has been completed more rapid progress will be made in future.

Bombo quarries are being worked to the best advantage, but considerable delays have resulted, owing to bad weather.

Quarries for ballasting purposes are being opened out at Bowral, on the Southern line, and advantage is being taken of any suitable rock found in the cuttings further south. Rock is also being worked at 111 miles 60 chains, Western line, and quarries at 126½, 163½, and 203½ miles, Northern line, are in hand.

The duplication works have made fair progress, but have been delayed in consequence of the severe weather.

The double line, Hurstville to Oatley, and between Sutherland and Loftus Junction, was completed in time for the Easter traffic.

The quadruplication between Sydney and Homebush has been commenced, the section between Redfern and Illawarra Junction having been let by contract, and the work is being rapidly pushed forward. The section from Illawarra Junction to Petersham will be advertised shortly, as also the curve between the Northern and Southern line at Homebush, and a rearrangement of that station. These works have been delayed owing to the line having to be resurveyed.

*Bourke Floods.*—Considerable expenditure has taken place in filling timber waterway openings, which were so damaged as to prevent ordinary repairs being executed, as also the portions of embankment which were washed away. As the flood water has not sufficiently subsided the repair of existing bridges has only been dealt with in a temporary manner, but arrangements are being made to provide additional openings, as also to repair the structures which have given way.

The station buildings and bridges have been carefully looked after, and at many stations additional accommodation, both in sidings and buildings, has been provided.

During the year the extension from Hornsby to St. Leonards, a length of 10 miles 37 chains, was opened for traffic. This portion of the line has also given a considerable amount of trouble owing to subsidence of banks.

RETURN

## RETURN showing number of Men employed on maintenance of Permanent-Way.

	30th June, 1889.	30th June, 1890.
	Number per Mile.	Number per Mile.
Sydney to Granville Junction ... ..	1·30	1·15
Granville Junction to River Murray ... ..	·91	·83
Granville Junction to Bourke ... ..	·71	·79
Strathfield Junction to Hamilton Junction ... ..	·78	·78
Newcastle to Wallangarra ... ..	·68	·81
Illawarra Line ... ..	·86	·80
Cooma Line ... ..	·53	·50
Murrumburrah—Blayney Line ... ..	·81	·56
South-western Line ... ..	·66	·50
Jerilderie Branch ... ..	·42	·43
Gundagai Branch ... ..	·63	·48
Richmond Branch ... ..	·74	·74
Mudgee Branch ... ..	·52	·55
Molong Branch ... ..	·54	·53
North-western Line ... ..	·69	·50
St. Leonards' Branch ... ..	Not opened.	·75
Camden Tramway ... ..	·54	·54
Sans Souci Tramway ... ..	·41	·41
Plattsburg Tramway ... ..	Included in section Newcastle to Wallangarra.	·68

NOTE.—This figure included Redfern yard gang.

The following work was performed during the year:—

Sidings laid in and extended ... ..	13 miles 37·58 chains.
Sidings relaid with steel rails ... ..	22·82 chains.
Sidings relaid with rerolled iron rails ... ..	66·33 chains.
Sleepers used in new sidings ... ..	24,496.
Sleepers used in main lines ... ..	79,208.
Ballast used on maintenance of main lines ... ..	65,975 cubic yards.
Length of fences wired ... ..	18 miles 30 chains.
Culverts and flood-openings constructed ... ..	7; extra waterway, 73½ feet.
Culverts and flood-openings extended ... ..	40.

## RETURN showing length of line relaid and paid for during each year, 1881 to 1890.

Year ending 30th June.	Relaying done.		Relaying paid for.	
	Miles.	Chains.	Miles.	Chains.
1881 ... ..	12	43	12	43
1882 ... ..	9	68	9	68
1883 ... ..	8	6	8	6
1884 ... ..	20	57	20	57
1885 ... ..	32	25	32	25
1886 ... ..	11	30	11	30
1887 ... ..	26	9	18	26
1888 ... ..	22	71	20	52
1889 ... ..	25	8	35	10
1890 ... ..	44	15	44	15
Totals ... ..	213	12	213	12

J. ANGUS,  
Acting Engineer for Existing Lines.

## APPENDIX 2.

## Locomotive Engineer's Report.

New South Wales Government Railways,  
Locomotive Engineer's Office,

Eveleigh, Sydney, 9 August, 1890.

Dear Sir,

I hand you herewith my report to the Railway Commissioners for the year's working. Had I not been pressed for time before going away to England, I should have liked to have gone a little further into detail, but the main points are touched upon as given below.

Yours faithfully,

W. THOW,

Locomotive Engineer.

The Secretary.

[Enclosure.]

[Enclosure.]

## Locomotive Engineer's Report.

## Railways.

PROGRESS has been made in improving the Rolling Stock during the year, the boilers of locomotives especially have received attention, but none of the new boilers ordered came to hand sufficiently early to be used before the year closed.

Two hundred and twenty-seven locomotive boilers in all were repaired during the year, 173 of them at Eveleigh, and 54 at Newcastle. Nine stationary or pumping boilers, and 12 boilers of tram motors, were also dealt with. Of the above 103 locomotive boilers were internally examined, retubed, and received heavy repairs.

One hundred and seventy-seven locomotives at Eveleigh, and 43 at Newcastle, or 220 in all, passed through the repairing shops during the year. Of these 168 received heavy repairs and thorough overhaul. The remaining 52 received general repairs of a lighter character. Two steam cranes also were thoroughly overhauled at Eveleigh.

Seven hundred and fifty-seven carriages or coaching vehicles at Eveleigh, and 283 at Newcastle, or 1,041 vehicles in all, were overhauled. Many of those dealt with at Eveleigh received heavy repairs.

Four thousand one hundred and sixty-seven merchandise vehicles passed through the principal workshops during the year, and received more than mere running repairs. The ordinary attentions to Rolling Stock are, of course, not included in the above.

Many of the locomotives, especially those running the Melbourne Express Trains, have executed exceptionally heavy mileages, far beyond their economic duty, which shows the necessity for additions to the stock.

The consumption of fuel, 62.16 lb. per train mile, or 45.72 per engine mile, after allowing for our heavy grades, is too heavy. It is chiefly caused by the inadequate heating surfaces in most of the boilers, necessitating small blast orifices and quick draught in order to generate steam for the cylinders.

The workshop machinery, hydraulic plant, and pumping appliances belonging to the Department have been maintained in efficient working order.

## APPENDIX 3.

## ROLLING STOCK ON NEW SOUTH WALES GOVERNMENT RAILWAYS.

TOTAL stock, also vehicles renewed or replaced, exclusive of Capital Account.

Year ending.	Total Stock.			* Renewals out of Revenue and Special Vote.		
	Locomotives.	Passenger Vehicles.	Goods Stock.	Locomotives.	Passenger Vehicles.	Goods Stock.
31 December, 1855.....	4	37	55	Nil.	Nil.	Nil.
31 " 1856.....	8	61	91	"	"	"
31 " 1857.....	11	61	106	"	"	"
31 " 1858.....	12	76	128	"	"	"
31 " 1859.....	13	76	136	"	"	"
31 " 1860.....	13	76	151	"	"	"
31 " 1861.....	16	152	257	"	"	"
31 " 1862.....	16	176	319	"	"	"
31 " 1863.....	19	176	319	"	"	"
31 " 1864.....	25	177	345	"	"	"
31 " 1865.....	36	180	411	"	"	"
31 " 1866.....	40	180	429	"	"	"
31 " 1867.....	47	185	467	"	"	"
31 " 1868.....	47	198	613	"	"	"
31 " 1869.....	47	204	720	"	"	"
31 " 1870.....	57	232	909	"	"	"
31 " 1871.....	66	259	1,121	"	"	"
31 " 1872.....	67	290	1,312	"	1	28
31 " 1873.....	69	316	1,405	"	2	6
31 " 1874.....	81	336	1,513	"	2	11
31 " 1875.....	100	344	1,610	"	2	16
31 " 1876.....	101	344	2,217	1	1	8
31 " 1877.....	138	352	2,806	4	Nil.	4
31 " 1878.....	154	378	3,413	Nil.	"	14
31 " 1879.....	177	444	3,866	2	1	34
31 " 1880.....	215	490	4,443	Nil.	1	33
31 " 1881.....	233	530	4,840	"	Nil.	17
31 " 1882.....	268	564	5,445	"	"	Nil.
31 " 1883.....	296	695	6,386	"	"	10
31 " 1884.....	338	776	6,938	6	6	115
31 " 1885.....	392	854	7,972	Nil.	Nil.	20
31 " 1886.....	408	942	8,364	3	2	31
31 " 1887.....	428	1,009	8,798	Nil.	1	78
30 June, 1888.....	429	1,030	8,833	"	8	71
30 " 1889.....	429	1,085	9,060	"	12	125
30 " 1890.....	439	1,064	9,304	3	32†	209

\* The figures in these columns show only vehicles that have been built to replace others worn out or destroyed, and vehicles rebuilt in the workshops of the Department. † Capacity in excess of 46 4-wheeled vehicles replaced.

**APPENDIX 4.**  
**NEW SOUTH WALES GOVERNMENT RAILWAYS.**  
**RETURN of Working Stock, year ending 30th June, 1890.**

	Tank.		Passenger.					Goods.			Total, Locomotives.
	Suburban.	Small.	Bogie, 4 wheels coupled.	Bogie Express, 4 wheels coupled.	Express, single driving wheels.	Mogul bogie, 6 wheels coupled.	For mixed traffic.	Mogul bogie, 6 wheels coupled.	Consolidation, 8 wheels coupled.	Ordinary, 6 wheels coupled.	
Stock on 30th June, 1889 .....	32	19	92	47	3	10	25	80	11	110	429
Renewals on account of stock worn out to 30th June, 1890 .....	...	...	...	...	...	...	...	...	...	3	3
<b>Total stock</b> .....	<b>32</b>	<b>19</b>	<b>92</b>	<b>47</b>	<b>3</b>	<b>10</b>	<b>25</b>	<b>80</b>	<b>11</b>	<b>110</b>	<b>429</b>
Added at expense of capital, to 30th June, 1890 .....	...	...	...	...	...	10	...	...	...	...	10
<b>Total stock on the 30th June, 1890</b> .....	<b>32</b>	<b>19</b>	<b>92</b>	<b>47</b>	<b>3</b>	<b>20</b>	<b>25</b>	<b>80</b>	<b>11</b>	<b>110</b>	<b>439</b>
Portion of the above stock under or waiting repairs on the 30th June, 1890 .....	7	4	20	10	...	3	8	13	5	32	102

	First Class.										Composite.				Second Class.				General.				Total, Passenger Stock.	Grand Total.														
	Dining carriages.	State carriages.	Sleeping cars, 4 wheels.	American on bogies.	Cleminson's on bogies.	Redfern on bogies.	Ordinary on bogies.	8 wheels.	6 wheels.	4 wheels.	Saloons.	Laboratory, 16 feet long.	American on bogies.	Ashbury on bogies.	Ordinary on bogies.	Redfern on bogies.	8 wheels.	6 wheels.	4 wheels.	American on bogies.	Cleminson's on bogies.	Redfern on bogies.			6 wheels.	4 wheels.	Invalid's carriage.	40 ft. second class breaks.	Brake vans.	Team-cars on bogies.	Mail-van, 4 wheels.	Prison-vans.	Hearses.	Horse-boxes.	Carriage trucks.	Workmen's vans.	Workmen's sleeping vans.	Total, General.
Stock shown on Register, 30th June, 1889 .....	1	2	16	3	37	3	40	7	6	15	36	9	26	8	6	32	2	12	43	39	47	3	7	202	...	180	6	788	24	7	12	152	71	31	...	297	1,085	
Renewals on account of stock worn out to 30th June, 1890 .....	...	...	...	9	...	...	...	...	...	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	2	...	32	...	...	...	...	...	...	...	32	32
<b>Total stock on Register 30th June, 1890</b> .....	<b>1</b>	<b>2</b>	<b>16</b>	<b>3</b>	<b>46</b>	<b>3</b>	<b>40</b>	<b>7</b>	<b>6</b>	<b>15</b>	<b>*</b>	<b>9</b>	<b>26</b>	<b>8</b>	<b>6</b>	<b>32</b>	<b>2</b>	<b>12</b>	<b>43</b>	<b>39</b>	<b>47</b>	<b>3</b>	<b>7</b>	<b>192</b>	...	<b>6</b>	<b>174</b>	<b>6</b>	<b>786</b>	<b>24</b>	<b>7</b>	<b>12</b>	<b>152</b>	<b>71</b>	<b>31</b>	...	<b>297</b>	<b>1,063</b>
Added at expense of capital to 30th June, 1890 .....	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	1
<b>Total stock on 30th June, 1890</b> .....	<b>1</b>	<b>2</b>	<b>17</b>	<b>3</b>	<b>46</b>	<b>3</b>	<b>40</b>	<b>7</b>	<b>6</b>	<b>15</b>	...	<b>9</b>	<b>26</b>	<b>8</b>	<b>6</b>	<b>32</b>	<b>2</b>	<b>12</b>	<b>43</b>	<b>48</b>	<b>47</b>	<b>3</b>	<b>7</b>	<b>192</b>	...	<b>6</b>	<b>174</b>	<b>6</b>	<b>767</b>	<b>24</b>	<b>7</b>	<b>12</b>	<b>152</b>	<b>71</b>	<b>31</b>	...	<b>297</b>	<b>1,064</b>
Stock waiting repairs, 30th June, 1890 .....	...	4	1	10	2	6	1	2	5	...	1	...	2	3	...	2	1	4	6	8	7	...	19	...	24	2	110	2	...	20	5	...	...	...	27	137		
Duplicate stock .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	5	5	...	6	6	

	A. waggons.	B. waggons.	D. waggons.	E. waggons.	F. waggons.	G. waggons.	L. waggons.	K. waggons.	Cattle waggons.	C. vans.	Sleep-vans.	Powder-vans.	Meat-vans.	H. dump-cars.	Refrigerating car.	Combination car.	Brake-vans.	Total Goods Stock.	Locomotive coal waggons.	Water trucks.	Ballast waggons.	Accident-vans.	Travelling gas van.	Travelling gas truck.	Total, General.	Grand Total, Stock.
	Stock on 30th June, 1889 .....	239	222	534	366	11	354	93	24	460	404	463	46	48	201	1	15	160	8,448	249	54	300	7	1	1	612
Renewals on account of stock worn out to 30th June, 1890 .....	...	1	176	...	...	...	...	...	5	5	17	...	...	...	...	...	4	208	...	...	1	...	...	...	1	209
<b>Total stock</b> .....	<b>239</b>	<b>222</b>	<b>534</b>	<b>366</b>	<b>11</b>	<b>354</b>	<b>93</b>	<b>24</b>	<b>460</b>	<b>404</b>	<b>463</b>	<b>46</b>	<b>48</b>	<b>201</b>	<b>1</b>	<b>15</b>	<b>160</b>	<b>8,448</b>	<b>249</b>	<b>54</b>	<b>300</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>612</b>	<b>9,060</b>
Added at expense of capital to 30th June, 1890 .....	...	...	28	...	...	...	...	...	57	45	112	...	...	...	1	2	...	245	...	...	...	...	...	...	...	245
<b>Total stock on the 30th June, 1890</b> .....	<b>+</b>	<b>+</b>	<b>+</b>	<b>366</b>	<b>11</b>	<b>354</b>	<b>93</b>	<b>24</b>	<b>517</b>	<b>449</b>	<b>575</b>	<b>46</b>	<b>48</b>	<b>201</b>	<b>2</b>	<b>17</b>	<b>156</b>	<b>8,891</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>1</b>	<b>1</b>	<b>413</b>	<b>9,304</b>
Portion of the above stock under or waiting repairs on the 30th June, 1890 .....	36	46	278	22	...	32	4	...	45	34	47	3	6	54	1	1	26	635	...	...	26	...	...	...	26	661

\* 36 first class 4 wheels, and 10 second class 4 wheels—total carrying capacity, 1,048—replaced by 9 first and 9 second Americans on bogies, and 6 laboratory—total carrying capacity, 1,272.  
 † The difference between this and last year's figures is owing to conversions to other classes to improve the stock and suit the traffic.  
 ‡ Includes one Goods Brake converted to Workmen's Van, excluded from Goods Stock total.

**Locomotive, Passenger, and Goods Stock.**

Engines .....	1890.	1889.
Passenger stock .....	439	429
Goods do .....	1,064	1,085
	<b>9,304</b>	<b>9,060</b>
<b>Grand total</b> .....	<b>10,807</b>	<b>10,574</b>



APPENDIX 7.

COMPARATIVE Analysis of Traffic Working and Expenses for the years ending 30 June, 1888, 1889, and 1890.

Particulars.	Year ending 30 June, 1888.				Year ending 30 June, 1889.				Year ending 30 June, 1890.				
	Average miles open for traffic		Miles.		Average miles open for traffic		Miles.		Average miles open for traffic		Miles.		
	2,044		3,074,678		2,125		3,395,670		2,177		3,581,125		
	Passenger		3,614,635		Passenger		4,246,009		Passenger		4,427,701		
	Goods		6,639,313		Goods		7,641,769		Goods		8,008,826		
	Total mileage				Total mileage				Total mileage				
	Numbers or Tonnage.	Revenue.	Per mile open.	Per train mile.	Numbers or Tonnage.	Revenue.	Per mile open.	Per train mile.	Numbers or Tonnage.	Revenue.	Per mile open.	Per train mile.	
<b>TRAFFIC.</b>	Numbers.	£ s. d.	£	d.	Numbers	£ s. d.	£	d.	Numbers.	£ s. d.	£	d.	
Passengers—First and second class	9,572,785	728,644 9 7	354	0	10,284,080	811,838 7 11	381	5	10,787,307	817,400 15 9	375	5	
Do Season tickets	169,850	59,690 18 4	29	2	177,941	65,591 8 4	36	8	196,248	72,463 0 7	33	3	
Horses, carriages, and dogs		20,196 4 3	9	9		10,913 0 5	9	4		19,468 10 9	8	9	
Cloak-room and parcels		59,811 11 8	29	0		63,538 14 0	29	9		74,992 1 5	34	1	
Mails		45,727 4 11	22	4		55,304 1 6	25	9		55,370 0 0	25	4	
Miscellaneous, coaching items		1,512 2 2	0	7		1,086 9 3	0	5		2,612 6 4	1	2	
<b>Total coaching</b>		910,082 10 11	445	2	71	1,017,214 13 5	478	0	71	1,041,608 14 10	478	4	69
	Tons.				Tons.				Tons.				
Live stock	62,101	104,847 9 6	80	6	107,534	219,962 6 8	103	4	103,332	225,678 4 11	103	7	
Minerals	2,105,146	145,456 11 1	71	1	2,176,546	175,423 1 3	82	4	2,350,435	162,753 2 0	74	8	
Wool	74,148	217,670 13 4	100	4	81,932	249,957 2 5	117	4	83,489	259,515 6 6	117	8	
General merchandise	1,152,377	823,746 15 10	405	8	1,119,777	850,350 2 9	390	6	1,241,794	920,272 2 4	422	7	
Miscellaneous, goods items		5,087 12 1	2	8		4,610 9 6	2	2		4,137 4 9	1	9	
<b>Total goods</b>	3,299,772	1,302,500 6 10	600	7	3,483,839	1,500,342 2 2	705	0	3,768,950	1,539,356 0 6	720	9	
Sundries, special and miscellaneous		22,232 3 8	10	9		20,890 0 11	9	8		22,123 0 1	10	2	
<b>Total revenue</b>		2,295,124 1 5	1123	3	32	2,538,476 19 6	1192	8	79	2,633,085 15 5	1209	5	78
<b>WORKING EXPENSES.</b>													
Maintenance of way works and stations		422,000 12 8	209	9	15	441,527 17 11	207	5	13	442,014 3 0	203	0	13
Locomotive power		463,451 18 10	223	2	16	523,991 10 3	246	2	16	532,230 5 8	244	5	15
Carriages and waggons		127,835 16 11	62	5	4	148,264 7 7	60	7	4	158,625 2 11	72	9	4
Traffic expenses		420,023 4 0	205	5	15	436,566 13 4	204	7	13	455,050 15 10	209	7	13
Compensation		27,039 19 4	13	3	0	7,365 2 1	3	7	0	10,885 7 3	5	0	0
General expenses		60,144 1 0	29	4	2	77,355 19 3	36	3	2	67,029 18 2	30	8	2
<b>Total expenditure</b>		1,390,550 12 9	748	3	54	1,634,601 15 5	763	1	51	1,665,834 12 10	765	2	49
<b>Net profit</b>		764,573 8 8	374	0	27	903,875 4 1	424	7	28	967,251 2 7	444	2	28
<b>Increase in net profit over year ending 30th June, 1888.</b>						139,301 15 5				202,677 13 11			
	Expenditure percentage to gross revenue, 66.69%.				Expenditure percentage to gross revenue, 64.39%.				Expenditure percentage to gross revenue, 63.26%.				

Percentage of Expenditure in each Division.

Divisions of Expenditure.	Year ending 30 June, 1888.	Year ending 30 June, 1889.	Year ending 30 June, 1890.
Maintenance of Way, Works, and Stations	23.03	27.01	26.63
Locomotive Power	30.18	32.05	31.95
Carriage and Waggon	8.35	9.07	9.54
Traffic Expenses	27.44	26.65	27.81
Compensation	1.77	0.49	0.65
General Expenses	3.83	4.73	4.02
	100.00	100.00	100.00



APPENDIX 9.

RETURN of the Number of Passengers, Tonnage of Goods, Earnings and Working Expenses Total and per Train Mile, Percentage of Working Expenses to Gross Earnings, Net Earnings, Capital Invested on Lines open, and Interest on Capital each year, from 1855 to 1890, inclusive.

Year.	Length of Line.	Number of Passengers.	Tonnage of Goods.	Train Mileage.	Earnings from Coaching Traffic.	Earnings from Goods Traffic.	Total Earnings.	Working Expenses.	Earnings per Train Mile.	Working Expenses per Train Mile.	Percentage of Working Expenses to Gross Earnings.	Net Earnings.	Capital expended on Lines open.	Interest on Capital.
	Miles.	No.	Tons.	No.	£	£	£	£	d.	d.	%	£	£	%
1855	14	98,846	140	14,107	9,093	156	9,249	5,959	157.34	101.37	64.43	3,290	515,347	.638
1856	23	350,724	2,469	68,371	29,526	2,757	32,283	21,788	113.32	76.48	67.49	10,495	683,217	1.536
1857	40	829,019	20,847	107,822	34,970	8,417	43,387	31,338	96.58	69.75	72.23	12,050	1,023,838	1.176
1858	55	376,492	33,385	141,495	45,858	16,451	62,309	43,928	105.69	74.51	70.50	18,381	1,281,867	1.492
1859	55	425,877	43,020	147,618	46,502	15,258	61,760	47,598	100.41	77.38	77.07	14,162	1,278,416	1.107
1860	70	551,044	55,394	174,249	45,428	16,841	62,269	50,427	83.37	67.52	80.98	11,841	1,422,672	.832
1861	73	595,591	101,130	214,881	49,637	25,367	75,004	61,187	83.77	68.34	81.58	13,817	1,536,032	.899
1862	97	642,481	205,139	274,565	62,095	41,775	103,871	68,725	90.79	60.07	66.16	35,146	1,907,807	1.842
1863	124	627,164	218,535	315,177	71,297	52,614	123,911	96,867	94.38	73.76	78.16	27,073	2,466,950	1.097
1864	143	693,174	379,661	415,422	81,487	66,167	147,653	103,715	85.35	59.92	70.24	43,938	2,631,790	1.660
1865	143	751,587	416,707	483,446	92,984	73,048	166,032	108,926	82.42	54.07	65.60	57,106	2,746,373	2.079
1866	143	668,330	500,937	490,475	85,636	82,899	168,535	106,230	82.49	51.99	63.64	52,395	2,786,094	2.236
1867	204	616,375	517,022	600,751	87,564	101,508	189,072	117,324	82.02	46.87	62.08	71,748	3,282,320	2.185
1868	247	714,563	596,514	768,529	99,408	124,951	224,359	144,201	70.06	45.03	64.29	80,158	4,060,930	1.973
1869	318	759,635	714,113	893,552	109,427	155,548	264,975	176,362	71.17	47.37	66.57	88,613	4,681,329	1.892
1870	339	776,707	766,523	901,139	117,854	189,288	307,142	206,003	81.81	54.86	67.08	101,139	5,566,092	1.817
1871	358	759,062	741,986	931,333	129,406	225,826	355,322	197,065	91.57	50.79	55.46	158,257	5,887,258	2.688
1872	398	753,910	825,360	1,036,255	161,862	260,127	424,989	207,918	98.43	48.15	48.92	217,071	6,388,727	3.307
1873	403	875,602	923,788	1,109,879	178,216	306,020	484,236	238,035	104.71	51.47	49.16	246,201	6,739,918	3.653
1874	403	1,085,501	1,070,938	1,249,233	189,595	347,980	536,575	257,703	103.09	49.51	48.03	278,872	6,844,546	4.074
1875	473	1,288,225	1,171,354	1,472,204	205,941	408,707	614,648	296,174	100.20	48.28	48.18	318,474	7,245,379	4.396
1876	509	1,727,730	1,244,131	1,688,964	233,870	459,355	693,225	339,406	98.50	48.22	48.96	353,819	7,990,601	4.428
1877	598	2,957,144	1,430,041	2,106,802	271,598	541,332	815,920	418,985	92.95	47.73	51.35	396,935	8,883,177	4.468
1878	638	3,705,733	1,625,886	2,655,176	306,308	596,681	902,989	536,988	81.62	48.54	59.47	366,001	9,784,645	3.741
1879	734	4,317,864	1,720,815	2,932,463	319,950	632,416	952,366	604,721	77.94	49.49	63.49	347,645	10,406,495	3.341
1880	849	5,440,138	1,712,971	3,239,462	390,149	770,868	1,161,017	647,719	86.02	47.99	55.79	513,298	11,778,819	4.358
1881	995	6,907,312	2,033,850	3,923,929	488,675	955,551	1,444,226	733,334	83.33	45.16	51.12	705,892	13,301,597	5.307
1882	1,268	8,984,313	2,619,427	4,851,157	587,825	1,111,038	1,698,863	934,635	84.05	46.21	55.02	764,225	15,843,616	5.135
1883	1,320	10,272,037	2,864,566	5,937,261	661,751	1,269,713	1,931,464	1,177,788	78.07	47.61	60.97	753,676	16,905,014	4.484
1884	1,618	11,253,109	3,124,425	6,403,041	745,665	1,340,572	2,086,237	1,301,259	78.19	48.77	62.37	784,978	20,080,138	4.201
1885	1,732	13,506,346	3,273,004	6,638,399	830,904	1,343,464	2,174,368	1,458,153	78.61	52.72	67.06	716,215	21,831,276	3.370
1886	1,889	14,881,604	3,218,532	6,479,265	843,233	1,310,817	2,160,070	1,492,992	80.01	55.30	69.12	667,078	24,071,454	2.901
1887	2,036	14,451,303	3,339,233	6,472,107	850,499	1,357,796	2,208,294	1,457,760	81.98	54.05	66.01	750,534	26,532,122	2.965
1887-88	2,114	15,174,115	3,399,772	6,689,313	918,975	1,376,149	2,295,124	1,530,551	82.34	54.91	66.69	761,573	27,722,748	2.852
1888-89	2,171	16,086,223	3,455,839	7,611,769	1,025,601	1,512,876	2,538,477	1,634,602	79.72	51.34	64.39	903,875	29,839,167	3.144
1889-90	2,182	17,071,945	3,788,950	8,008,826	1,059,791	1,573,295	2,633,086	1,665,835	78.90	49.91	63.26	967,251	30,555,123	3.176

The accounts were made up to the 31st December in each year up to 1887, since that time up to the 30th June in each year.

## APPENDIX 10.

RETURN of the Total Amount paid for Wages on the different Branches of the Railways during the years ending 30th June, 1888, 1889, and 1890.

Branches.	1888.	1889.	1890.
RAILWAYS :—	£	£	£
Maintenance Branch .....	394,891	405,509	462,576
Locomotive „ .....	431,220	466,802	465,254
Traffic „ .....	235,269	244,742	271,966
TOTAL.....	£ 1,061,380	1,116,703	1,199,796

NOTE.—Includes all wages paid by the Department, whether on Maintenance or New Works.

## APPENDIX 11.

STATEMENT showing the cost of Construction and cost per Mile open on different sections of the Railway Lines, on the 30th June, 1890.

Lines opened for Traffic.	Length in Miles.	Total Cost.	Cost per Mile.
		£	£
Darling Harbour Branch.....	1	294,066	294,066
Sydney to Granville .....	13	1,183,841	91,065
Haslem's Creek Branch .....	$\frac{1}{2}$	6,459	12,918
Granville to Wodonga .....	374 $\frac{1}{2}$	4,294,351	11,467
Juncie to Ilay .....	167	942,212	5,642
Narrandera to Jerilderie .....	65	407,324	6,266
Granville to Bourke .....	490	5,151,889	10,514
Wallerawang to Mudgee .....	85	949,971	11,176
Blacktown to Richmond .....	16	172,182	10,761
Goulburn to Cooma .....	127 $\frac{1}{2}$	1,399,655	10,978
Cootamundra to Gundagai .....	34	229,373	6,761
Orange to Molong .....	22	269,258	12,239
Murrumburrall to Blayney .....	106	1,058,636	9,987
Sydney to Kiama .....	70	1,802,634	25,755
Homebush to Waratah .....	93 $\frac{1}{2}$	2,302,411	24,625
Newcastle to Wallangara .....	391	4,801,978	12,281
Werris Creek to Narrabri .....	97	556,703	5,739
Bullock Island Branch.....	1 $\frac{1}{2}$	74,988	49,992
Morpeth Branch .....	4	60,586	15,146
Hornsby and St. Leonards .....	11	203,389	18,490
Campbelltown to Camden } Tram lines .....	7 $\frac{1}{2}$	38,434	5,124
Kogarah to San Souci } .....	5	11,956	2,391
Average cost of construction .....	2,182	26,212,996	12,013
Rolling stock .....		£3,460,860	
Machinery .....		245,928	
Workshops .....		627,828	
Furniture .....		7,511	
		4,342,127	
Average and total cost, all charges.....	2,182	30,555,123	14,003

## APPENDIX 12.

STATEMENT showing cost of Additions and Improvements to Stations, Buildings, Siding Accommodation, &c., and Rolling Stock, the cost of which was charged to Capital Account, during the year ending 30th June, 1890.

Particulars.	Amount.	Total.
	£	£
Additions to stations and buildings .....	78,598	
Equipment of stations, &c., cranes and weighing appliances .....	2,593	
Overbridges and subways .....	4,680	
Improvements to water supply .....	4,600	
Extending sidings and making additional sidings, loops, &c. ....	35,784	
Additions to signals and interlocking.....	38,040	
Additional flood-openings and waterways .....	2,251	
Cost of land resumed .....	36,390	
	202,936	
Additional rolling stock .....	£87,414	
Additional machinery.....	2,166	
	89,580	
		292,516

## APPENDIX 13.

RETURN of the Milage of Suburban Passengers on all Lines of Railway during the years ending 30th June, 1888, 1889, and 1890.

Description.	1888.	1889.	1890.
Number of Passengers .....	No. 7,413,868	8,086,908	8,504,942
„ Workmen's Journeys .....	1,738,294	1,796,520	1,990,368
„ Season Ticket Holders' Journeys .....	3,227,760	3,460,320	3,936,180
Total, Passenger Journeys .....	12,379,912	13,343,748	14,521,490
Number of miles travelled .....	Miles 70,172,793	77,823,971	83,216,224
Average milage per passenger .....	5.67	5.79	5.73
Amount received from passengers.....	£ 186,393	205,393	233,465
Average receipts per mile per passenger .....	0.64	0.64	0.67

NOTE.—Suburban Lines include only distances within 20 miles of Sydney and Newcastle, Liverpool and Morpeth included

## APPENDIX 14.

COMPARATIVE Abstract of the Tonnage and Amount received for the Carriage of Coal and Shale from the various Collieries during the years ending 30th June, 1889 and 1890.

Companies. Northern Line	1889.		1890.		Increase, 1890.		Decrease, 1890.	
	Tons.	Freight.	Tons.	Freight.	Tons.	Freight.	Tons.	Freight.
A.A. Company .....		£		£		£		£
Blackwall .....	19,477	815	41,703	1,740	22,226	925	.....	.....
Burwood .....	1,281	491	1,480	691	149	2 0	.....	.....
Burwood, West .....	149,909	6,246	166,590	6,951	16,681	705	.....	.....
Bloomfield .....	8,527	363	21,816	907	13,289	544	.....	.....
Black Jack .....	48	6	6	3	.....	.....	42	3
Co-operative .....	1	4	6	2	.....	.....	.....	2
Dulwich .....	158,826	6,837	140,657	6,174	.....	.....	18,169	663
Ferndale .....	543	293	253	126	.....	.....	290	167
Greta, East .....	24,982	624	46,306	1,162	21,324	538	.....	.....
Greta .....	323	25	.....	.....	.....	.....	323	25
Goose .....	122,751	12,259	125,043	11,472	2,292	.....	.....	787
Hillside .....	66	3	19	11	125	8	.....	.....
Lambton .....	2,857	130	246	10	.....	.....	2,611	120
Lambton, South New .....	214,923	8,952	177,879	7,411	.....	.....	37,044	1,541
Lambton, New .....	2,577	107	19,059	761	16,482	654	.....	.....
Lambton, East .....	53,240	2,159	13,840	577	.....	.....	39,100	1,582
Minmi .....	10,252	429	1 363	102	.....	.....	8,889	927
Maryvale .....	141,679	7,067	145,833	7,285	4,174	218	.....	.....
Purified .....	11,745	294	.....	.....	.....	.....	11,745	294
Rix's Creek .....	3,244	133	4,424	269	1,180	136	.....	.....
Rathluba .....	2,896	718	1,941	551	.....	.....	955	167
Springfield .....	518	49	.....	.....	.....	.....	518	49
Sneddon's (Walsend) .....	22	9	.....	.....	.....	.....	22	9
Linwood .....	9,168	398	14,133	589	4,965	191	.....	.....
Wall-end Tunnel .....	10,498	265	15,086	369	4,588	104	.....	.....
Wallsend, Young .....	389,314	16,273	402,202	16,819	12,888	546	.....	.....
Newcastle .....	.....	.....	2,762	151	2,762	151	.....	.....
Waratah .....	161,721	6,761	236,553	9,878	74,832	3,117	.....	.....
Wickham and Bullock Island .....	18,429	767	28,634	1,201	10 205	434	.....	.....
Anvil Creek .....	103,031	2,578	157,073	3,942	53,992	1,364	.....	.....
Holmville .....	4,740	443	3,919	376	.....	.....	827	67
Great Northern .....	10,617	806	4,009	283	.....	.....	6,528	523
Coal Siding .....	90,094	5,311	35,850	2,125	.....	.....	54,244	3,216
Thornton .....	435	125	49	12	.....	.....	386	113
Thornleigh .....	1,924	80	.....	.....	.....	.....	1,924	80
Hetton .....	.....	.....	76	25	76	25	.....	.....
Rosehill .....	35,607	890	86,009	2,153	50,402	1,263	.....	.....
Gladstone .....	.....	.....	908	42	908	42	.....	.....
West Wallsend .....	190	67	98	32	.....	.....	92	35
Centenary .....	18,815	1,231	11,470	1,217	.....	.....	7,346	14
South Wallsend .....	.....	.....	232	69	232	69	.....	.....
Cardiff .....	328	19	15,648	684	15,320	665	.....	.....
Thorley .....	21	2	.....	.....	.....	.....	21	2
Keya .....	34	6	.....	.....	.....	.....	34	6
Northumberland .....	264	11	.....	.....	.....	.....	264	11
Hestelov's .....	.....	.....	520	33	520	33	.....	.....
South Greta .....	682	28	.....	.....	.....	.....	682	28
Monkwearmouth .....	23	9	40	3	40	3	.....	.....
<b>Total, Northern Collieries .....</b>	<b>1,786,683</b>	<b>84,113</b>	<b>1,930,208</b>	<b>86,653</b>	<b>335,880</b>	<b>12,371</b>	<b>192,355</b>	<b>9,831</b>
Joadja .....	1,653	552	1,550	402	.....	.....	103	150
Austermere .....	2,107	483	1,603	401	.....	.....	504	83
North's .....	20,505	6,094	15,288	4,158	.....	.....	5,219	1,935
Main Camp .....	11,929	3,276	2,610	811	.....	.....	9,319	2,465
Lithgow Valley .....	135,969	55,949	110,154	49,447	.....	.....	25,815	6,502
Carlos' Gap .....	439	146	25	2	.....	.....	414	144
Cox's Siding .....	4,893	3,606	704	110	.....	.....	3,689	3,496
Helensburgh .....	.....	.....	29,539	4,230	29,539	4,230	.....	.....
Bellambi .....	.....	.....	27,712	4,796	27,712	4,796	.....	.....
<b>Total, South and West .....</b>	<b>176,995</b>	<b>70,106</b>	<b>189,183</b>	<b>64,357</b>	<b>57,251</b>	<b>9,026</b>	<b>45,063</b>	<b>14,775</b>
<b>Total, Coal .....</b>	<b>1,963,678</b>	<b>154,219</b>	<b>2,119,391</b>	<b>151,010</b>	<b>393,131</b>	<b>21,397</b>	<b>237,418</b>	<b>24,606</b>
Joadja .....	18,293	6,110	17,133	5,568	.....	.....	1,160	542
Hartley Vale .....	5,071	2,325	14,927	5,160	9,856	2,835	.....	.....
Doughboy Hollow .....	203	97	78	26	.....	.....	125	71
<b>Total, Shale .....</b>	<b>23,567</b>	<b>8,532</b>	<b>32,138</b>	<b>10,754</b>	<b>9,856</b>	<b>2,835</b>	<b>1,285</b>	<b>613</b>
<b>Grand Total, Coal and Shale .....</b>	<b>1,987,245</b>	<b>162,751</b>	<b>2,151,529</b>	<b>161,764</b>	<b>402,987</b>	<b>24,232</b>	<b>238,703</b>	<b>25,219</b>

## APPENDIX 15.

RETURN of the quantity of COAL exported from Newcastle to Intercolonial and Foreign Ports for the years ending 30th June, 1889 and 1890, showing the increase and decrease in each.

Countries.	1888-9.	1889-90.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.
Victoria .....	686,434	844,832	158,448	.....
New Zealand .....	132,551	160,761	28,210	.....
South Australia .....	106,384	174,289	67,905	.....
Tasmania .....	39,809	64,954	25,145	.....
Western Australia .....	14,275	16,215	1,940	.....
Fiji .....	9,098	7,397	.....	1,701
Queensland .....	5,540	4,362	.....	1,178
<b>Total, Intercolonial.....</b>	<b>994,091</b>	<b>1,272,860</b>	<b>281,648</b>	<b>2,879</b>
<b>Foreign—</b>				
Sumatra .....	4,560	1,855	.....	2,705
Peru .....	15,303	24,329	9,026	.....
New Caledonia .....	9,390	10,138	748	.....
India .....	70,280	19,622	.....	50,658
United States .....	255,516	227,970	.....	27,546
Hong Kong .....	44,951	65,437	20,486	.....
China .....	.....	931	931	.....
Mauritius .....	11,422	9,464	.....	1,958
Philippine Islands.....	50,704	22,612	.....	28,092
Chili .....	165,146	138,690	.....	26,456
Sandwich Islands .....	21,832	30,915	9,083	.....
Java .....	54,318	34,609	.....	19,709
South America .....	20,693	1,163	.....	19,530
Bankok .....	725	.....	.....	725
Guam .....	2,528	800	.....	1,728
Mexico .....	8,564	4,186	.....	4,378
New Guinea .....	485	.....	.....	485
South Sea Islands .....	6,392	.....	.....	6,392
Curragal .....	.....	.....	.....	.....
Cape of Good Hope .....	.....	.....	.....	.....
Solomon Islands .....	480	918	468	.....
Singapore (included with India on previous returns).....	39,147	28,973	.....	1,174
Other countries.....	10,835	1,030	.....	9,805
<b>Total, Foreign.....</b>	<b>784,271</b>	<b>623,672</b>	<b>40,743</b>	<b>201,341</b>
<b>Grand Total .....</b>	<b>1,778,362</b>	<b>1,896,532</b>	<b>322,890</b>	<b>204,220</b>

## PORT OF NEWCASTLE.

## FOREIGN and Intercolonial Shipping out of Newcastle.

1888-9.		1889-90.		Decrease.	Increase.
No. of Vessels.	Tonnage.	No. of Vessels.	Tonnage.	No. of Vessels.	Tonnage.
1,330	1,217,976	1,323	1,247,670	7	29,694

## NUMBER of Tons and Value of Coal exported—Foreign and Intercolonial.

1888-9		1889-90.		Increase.	
Tons.	Value.	Tons.	Value.	Tons.	Value.
1,778,363	£ 954,092	1,896,532	£ 990,138	118,170	£ 36,046

## APPENDIX 16.

RETURN of the number of Bales of Wool forwarded from the undermentioned Stations on the New South Wales Government Railways, during the years ending 30th June, 1889 and 1890.

Stations	Number of Bales		Stations.	Number of Bales.		Stations.	Number of Bales.	
	1889.	1890.		1889.	1890.		1889.	1890.
Sydney.....	2,156	1,856	Carrathool .....	4,609	5,140	Capertee .....	530	554
Darling Harbour.....	6,611	3,332	Hay .....	9,944	3,456	Rylstone .....	1,681	1,560
Liverpool.....	8,239	4,844	Colombo .....	1,891	2,005	Mudgee .....	10,523	9,914
Minto .....	5	13	Jerilderie.....	4,915	4,053	Broadmeadow .....	.....	1
Campbelltown.....	63	11	Camden .....	34	50	Newcastle .....	767	668
Menangle .....	.....	11	Kiama .....	.....	6	Hamilton.....	95	54
Douglas Park .....	.....	10	Blacktown .....	1,013	1,530	Waratah .....	.....	1
Picton .....	.....	33	Mount Victoria .....	277	309	East Maitland.....	42	30
Mittagong .....	28	49	Hartley Vale .....	10	5	Morpeth .....	2	113
Moss Vale .....	264	196	Bowenfels .....	62	105	West Maitland .....	271	3,348
Wingello.....	1	.....	Wallerawang .....	69	64	Farley .....	.....	2
Marulan .....	764	807	Rydal .....	88	63	Lochinvar .....	8	2
Towrang .....	592	727	Tarana .....	878	870	Branxton .....	138	185
Goulburn.....	6,271	7,331	Locksley .....	36	45	Whittingham .....	96	83
Breadalbane.....	309	321	Brewonglo .....	354	238	Singleton .....	152	161
Gunning .....	1,844	2,229	Raglan .....	.....	28	Glennie's Creek .....	27	22
Jerrawa .....	93	72	Kelso .....	1,082	747	Ravensthorpe .....	379	461
Yass .....	3,218	3,967	Bathurst .....	1,140	1,767	Musclebrook .....	4,299	6,017
Bowling .....	1,802	2,417	Perth .....	1,321	1,137	Aberdeen .....	278	345
Binalong .....	3,773	4,155	George's Plains .....	.....	38	Scone .....	3,389	3,760
Rocky Ponds.....	366	933	Wimbledon .....	203	237	Wingon .....	467	482
Harden .....	1,761	1,638	Newbridge .....	817	821	Blandford .....	1,299	1,817
Murrumburrah .....	345	332	Blayney .....	155	515	Murrumbidgee .....	149	224
Nubba .....	132	154	Millthorpe .....	1,229	773	Doughboy Hollow .....	542	674
Wallendbeen.....	1,653	1,741	Spring Hill .....	124	144	Willow Tree .....	2,890	3,220
Cootamundra .....	4,380	4,536	Orange .....	1,059	1,404	Quirindi .....	6,528	7,052
Bethungra .....	775	875	Mullion Creek.....	.....	105	Werris' Creek .....	500	620
Illabo .....	972	1,142	Kerr's Creek .....	29	38	Currabubula .....	1,111	1,570
Junee Junction.....	1,266	1,131	Warne .....	523	542	West Tamworth.....	13,472	13,295
Marefield .....	388	747	Store Creek .....	.....	35	Tamworth .....	479	470
Bomen .....	16	19	Stuart Town .....	160	173	Moomba .....	691	724
Wagga .....	7,868	9,476	Mumbil .....	901	837	McDonald River .....	698	458
Sandy Creek .....	829	658	Springs .....	189	265	Walcha Road .....	4,000	4,933
The Rock .....	4,139	4,425	Wellington .....	1,681	1,714	Kentucky .....	1,511	1,340
Yerong Creek .....	3,023	2,818	Mary Vale .....	90	88	Uralla .....	4,662	6,107
Calcaru .....	993	3,542	Geurie .....	188	198	Armidale .....	2,390	3,032
Geogery .....	82	1,177	Murrumbidgee.....	785	752	Dumaresque .....	550	807
Yambla .....	.....	3	Dubbo .....	15,773	18,526	Black Mountain .....	230	336
Tarago .....	536	1,446	Narramoo .....	4,925	5,876	Guyra .....	1,268	1,235
Bungendore.....	1,534	2,719	Trangie .....	9,181	7,885	Ben Lomond .....	277	301
Queanteyan.....	3,033	5,030	Nevertire .....	16,527	16,813	Glencoe .....	9	167
Michelago .....	5,184	519	Mullengudgery .....	583	502	Glen Innes .....	3,044	6,258
Cooma .....	.....	8,474	Nyngun .....	22,673	15,995	Dundee .....	498	1,030
Coolac .....	1,285	1,733	Girilambone .....	3,643	5,309	Deepwater .....	506	820
Gundagai .....	3,403	3,504	Coolabah .....	3,557	5,158	Bolivia .....	10	17
King's Vale .....	.....	33	Byrock .....	7,740	7,965	Tenterfield .....	233	192
Young .....	14,265	14,191	Bourke .....	46,861	55,799	Wallangarra .....	21	273
Koorawatha .....	371	437	Riverstone .....	102	161	Breeza .....	1,190	1,622
Cowra .....	13,720	21,430	Mulgrave .....	843	1,221	Curlewis .....	538	679
Old Junee .....	2,744	3,999	Windsor .....	.....	16	Gunnsdale .....	6,777	7,142
Coolaman .....	4,397	4,244	Clarendon .....	2	.....	Boggabri .....	2,315	2,496
Grong Grong .....	798	1,803	Carcoar .....	44	6	Baan Baa .....	47	71
Narrandera .....	13,236	11,138	Mandurama .....	732	1,115	Narrabri .....	48,012	52,317
Yanko .....	1,375	1,310	Lyndhurst .....	779	736			
Whitton .....	10,874	8,654	Woodstock .....	721	678			
Darlington .....	2,360	2,405	Borenore .....	8,056	9,620			
Bringadoo .....	1,291	2,788	Molong .....	6,232	6,895			
						Total .....	459,944	503,055

## APPENDIX 17.

STATEMENT of the number of Persons employed on the Railways on the 31st October, 1888, 30th June, 1889 and 1890.

Branches.	31st October, 1888.	30th June, 1889.	30th June, 1890.
Commissioners' and Secretary's Office .....	54	32	29
Chief Accountant's Branch .....	46	44	43
Traffic Audit Branch .....	60	60	60
Stores Branch—Salaried Staff.....	37	39	19
Wages Staff .....	60	26	28
Permanent-way Branch—Salaried Staff.....	159	140	133
Wages Staff .....	3,274	3,271	4,235
Locomotive Branch—Salaried Staff .....	141	123	150
Wages Staff .....	3,204	3,151	3,600
Traffic Branch—Salaried Staff.....	842	821	853
Wages Staff .....	2,389	2,287	2,441
Interlocking Branch—Salaried Branch .....	8	9	15
Wages Staff.....	72	95	218
Other Branches .....	.....	.....	3
Total, Salaried Staff .....	1,347	1,273	1,305
Total, Wages Staff.....	8,999	8,830	10,522
GRAND TOTAL .....	10,346	10,103	11,827



APPENDIX 18—continued.

Stations.	No. of hands employed, including Station-masters.	Total Salaries and Wages Expenditure.		No. of Tickets collected.	Revenue from Tickets and Coaching Traffic.	GOODS.		COAL.		HAY, STRAW, AND CHAFF.		WOOL.		Revenue collected at each Station from Goods Traffic.	Total Earnings, exclusive of Special Earnings.		Increase.	Decrease.	Stations.
		1890.				Out. Tons.	In. Tons.	Out. Tons.	In. Tons.	Out. Trucks.	In. Trucks.	Out. Bales.	In. Bales.		1890.	1889.			
		£ s. d.	1890.																
Harden	14	1,500 5 5	6,350	2,333 10 10	1,173	1,076	30	70	1,033	6	332	1,817 11 3	4,051 2 1	5,492 8 0	1,104 10 1	841 5 11	Harden.		
Murrumburrah	3	341 8 9	5,373	1,076 10 7	7,195	7,921	366	8	6	332	5,036 0 10	6,712 17 5	5,408 7 4	1,104 10 1	.....	Murrumburrah.			
Nubba	3	141 17 4	383	110 12 11	1,287	104	.....	.....	.....	154	111 2 3	227 15 2	193 19 1	38 10 1	.....	Nubba.			
Wallendbeen	7	509 15 0	1,723	757 16 3	3,279	429	13	4	3	1,741	720 8 0	1,478 4 3	1,463 10 3	19 14 0	.....	Wallendbeen.			
Cootamundra	18	1,325 10 0	11,634	7,284 0 1	10,434	7,155	32	2	13	4,566	12,277 0 6	19,561 0 7	17,607 13 5	1,953 13 2	.....	Cootamundra.			
Bethunga	7	427 7 4	1,554	443 11 9	2,630	424	.....	.....	.....	675	418 0 11	801 18 8	767 8 7	34 10 1	.....	Bethunga.			
Ilhabo	3	310 10 2	1,253	433 15 11	2,000	257	.....	.....	.....	1,142	436 10 9	570 6 8	600 8 3	260 18 5	.....	Ilhabo.			
Junee Junction	40	3,680 18 2	10,309	7,506 18 11	3,161	20,248	605	25	45	1,131	6,249 17 9	13,755 16 8	12,153 4 7	1,602 12 1	.....	Junee Junction.			
Herefield	4	274 9 6	747	159 12 10	1,905	.....	.....	.....	.....	747	00 3 11	219 16 9	129 2 1	90 14 8	.....	Herefield.			
Bowen	4	272 13 11	571	302 3 9	725	52	.....	.....	.....	19	149 15 11	451 19 8	404 5 0	12 5 4	.....	Bowen.			
Wagga	18	1,563 0 8	12,383	10,725 10 2	10,291	9,474	1,092	183	53	0,476	25,181 1 9	35,907 0 11	43,806 19 0	7,930 18 1	.....	Wagga.			
Sandy Creek	3	292 7 0	930	169 0 7	1,418	245	.....	.....	.....	217	112 0 0	231 0 7	232 10 11	48 0 8	.....	Sandy Creek.			
The Rock	4	338 14 11	2,726	1,001 11 11	1,898	599	3	.....	.....	4,423	518 17 10	1,518 9 9	1,399 13 3	121 10 6	.....	The Rock.			
Yerong Creek	4	417 11 5	3,402	1,468 17 9	1,707	997	.....	.....	.....	5	687 11 4	2,156 9 1	2,019 14 0	136 15 1	.....	Yerong Creek.			
Culcairn	5	437 18 10	4,400	1,630 2 3	1,502	1,125	23	16	1	3,542	886 17 6	2,516 19 0	2,544 3 8	.....	.....	Culcairn.			
Geogery	12	617 10 7	1,809	570 8 8	2,104	707	5	30	10	1,177	563 7 8	1,133 10 4	1,008 4 4	65 12 0	.....	Geogery.			
Yamba	1	100 0 0	910	275 12 10	654	272	.....	.....	.....	3	123 4 0	398 16 10	420 7 11	21 11 1	.....	Yamba.			
Albury	23	3,017 19 11	13,561	15,742 13 0	5,753	7,852	508	47	27	10,905	36,648 10 3	62,391 8 3	54,850 9 5	2,408 6 2	.....	Albury.			
Tarago	0	499 2 4	4,572	3,222 8 11	3,386	2,320	.....	.....	.....	47	1,446	2,050 5 8	5,201 0 8	.....	.....	Tarago.			
Bungendore	5	366 17 2	4,274	2,268 15 11	1,193	4,704	6	82	.....	8	2,719	6,953 17 4	9,234 13 3	0,296 2 8	.....	Bungendore.			
Queanbeyan	12	459 3 0	2,322	2,283 1 0	1,437	1,501	521	90	1	5,080	3,006 17 4	6,189 18 7	6,107 4 8	82 13 11	.....	Queanbeyan.			
Micholago	5	214 16 4	1,342	738 1 10	299	411	.....	.....	.....	42	499 2 2	1,297 4 0	11,411 410 9	10,174 15 9	.....	Micholago.			
Cooma	5	544 10 7	4,035	5,880 17 0	2,470	2,376	18	69	.....	8,474	7,959 10 1	13,846 7 1	1,271 5 0	12,675 2 1	.....	Cooma.			
Coolac	11	300 9 1	2,053	657 8 10	2,023	662	.....	.....	.....	7	1,783	1,374 6 11	693 8 7	377 17 4	.....	Coolac.			
Gundagai	5	515 6 0	4,147	4,829 10 4	5,087	3,502	.....	.....	.....	13	3,504	12,184 2 7	17,014 1 3	18,307 17 11	1,293 16 0	.....	Gundagai.		
Dumondrilla	4	330 14 11	584	58 11 1	815	615	.....	.....	.....	64	33	51 1 2	25 16 3	78 10 0	.....	Dumondrilla.			
Young	14	1,049 18 2	15,037	7,210 11 6	9,863	7,172	630	12	8	14,191	126	15,803 16 3	22,514 7 9	393 11 9	.....	Young.			
Koorawatha	3	209 11 8	124	424 2 5	112	.....	.....	.....	.....	437	278 2 6	702 4 11	350 11 5	361 13 6	.....	Koorawatha.			
Old Junee	4	322 9 4	853	263 2 3	7,144	751	3	41	2	3,999	2,860 11 1	3,128 13 4	1,790 3 9	1,383 9 7	.....	Old Junee.			
Coolman	6	303 12 10	2,583	1,400 7 7	7,739	1,218	.....	.....	.....	6	4,244	3,447 15 3	4,914 2 10	8,285 13 2	1,028 9 8	.....	Coolman.		
Devlin's Siding	1	18 17 0	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	.....	.....	Devlin's Siding.		
Grong Grong	2	135 12 8	1,611	562 10 0	1,005	364	.....	.....	.....	.....	1,803	244 14 3	807 13 3	1,049 10 4	242 3 1	.....	Grong Grong.		
Narrandera	9	1,009 1 7	7,757	6,289 17 0	6,099	7,037	45	.....	.....	.....	11,133	12,646 19 3	16,850 6 9	2,083 10 0	.....	Narrandera.			
Yanko	1	131 14 0	337	155 3 1	932	233	.....	.....	.....	.....	2	1,310	677 13 9	166 10 2	.....	Yanko.			
Whitton	3	354 14 4	2,034	1,592 19 1	1,805	2,090	4	.....	.....	.....	3	3,084	4,419 17 10	5,765 17 3	246 19 7	.....	Whitton.		
Darlington	1	148 13 4	703	469 8 7	538	274	.....	.....	.....	.....	2,465	485 16 9	1,077 1 6	122 2 2	.....	Darlington.			
Bringagee	1	135 16 8	679	395 14 8	198	698	.....	.....	.....	.....	10	2,788	644 8 3	701 4 2	338 18 4	.....	Bringagee.		
Carrathool	3	250 18 6	2,741	2,100 13 7	1,482	2,633	.....	.....	.....	.....	5,140	7,573 4 1	9,073 17 5	9,060 9 7	613 3 1	.....	Carrathool.		
Hay	7	635 1 11	4,800	6,366 14 1	1,033	6,054	.....	.....	.....	.....	525	14,211 18 9	20,003 12 10	23,111 16 9	2,503 3 10	.....	Hay.		
Moornah	11	316 8 4	2,230	1,093 13 4	1,388	592	.....	.....	.....	.....	1	407 0 4	1,366 0 3	199 18 5	.....	Moornah.			
Jerrilderie	3	238 3 6	1,408	1,695 11 5	2,997	2,395	.....	.....	.....	.....	36	5,776 6 1	7,471 17 6	5,555 4 8	1,910 12 9	.....	Jerrilderie.		
Erskinville	6	638 0 0	109,304	2,183 19 3	.....	.....	.....	.....	.....	.....	411 0 4	2,504 19 7	1,938 14 8	650 4 11	.....	Erskinville.			
St. Peters	8	988 1 9	128,010	2,608 13 10	.....	.....	.....	.....	.....	.....	5 10 1	2,014 8 11	2,425 3 0	185 15 11	.....	St. Peters.			
Marrickville	11	1,292 8 4	124,293	3,485 5 9	1,701	3,920	318	.....	.....	.....	4	4,318 13 1	8,304 3 10	6,856 7 0	1,448 16 9	.....	Marrickville.		
Tempe	7	602 16 0	60,854	2,370 19 10	.....	.....	.....	.....	.....	.....	1 13 7	2,378 13 5	2,116 0 4	262 7 1	.....	Tempe.			
Arncliffe	5	640 9 4	63,475	2,833 16 8	205	824	19	.....	.....	.....	188 0 9	3,022 6 5	2,353 10 5	693 7 0	.....	Arncliffe.			
Rockdale	9	873 16 9	128,422	5,014 11 0	360	5,482	.....	.....	.....	.....	1,021 3 5	6,635 14 11	0,151 9 5	454 5 6	.....	Rockdale.			
Kogarah	9	961 10 3	84,833	4,302 16 10	603	3,899	12	.....	.....	.....	480 14 1	4,703 10 11	4,653 10 8	140 0 3	.....	Kogarah.			
Carlton	4	413 17 0	29,146	1,610 19 10	.....	.....	.....	.....	.....	.....	0 3 0	1,617 2 10	1,863 13 7	253 9 3	.....	Carlton.			
Hurstville	18	1,166 18 11	62,082	3,561 17 2	14,063	6,828	11	.....	.....	.....	1,097 5 3	5,280 2 5	0,564 8 1	1,305 5 8	.....	Hurstville.			
Oatley	3	95 11 8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Oatley.		
Penshurst	1	181 16 0	6,120	354 1 3	.....	.....	.....	.....	.....	.....	.....	0 1 0	354 2 8	335 10 8	.....	Penshurst.			
Como	2	182 10 7	3,847	170 16 8	1,296	1,022	.....	.....	.....	.....	.....	10 3 11	190 0 7	156 13 8	.....	Como.			
Sutherland	5	450 9 3	12,213	902 19 1	5,140	1,133	.....	.....	.....	.....	.....	226 16 8	1,129 15 9	1,134 0 3	4 4 6	.....	Sutherland.		
Loftus Junction	3	353 5 8	2,360	131 13 10	236	1,110	.....	.....	.....	.....	.....	18 14 4	150 10 2	67 13 4	82 11 10	.....	Loftus Junction.		
Heathcote	2	111 15 10	1,312	154 10 9	1,272	421	.....	.....	.....	.....	.....	55 6 1	209 16 10	209 16 10	.....	Heathcote.			
Waterfall	3	300 0 10	2,033	183 11 7	947	339	.....	.....	.....	.....	.....	169 4 6	302 16 1	1,303 4 0	1,090 7 11	.....	Waterfall.		
Helensburg	2	285 11 1	6,666	973 8 9	26,271	2,300	29,540	.....	.....	.....	.....	678 3 7	1,049 12 4	700 6 0	.....	Helensburg.			
Oxford	3	260 14 9	2,543	324 4 4	1,935	687	.....	.....	.....	.....	.....	101 15 1	425 19 5	573 2 7	147 3 2	.....	Oxford.		

NOTE.—This Statement only shows the stations' earnings proper, exclusive of earnings from special services, which cannot be allotted to any particular station upon the lines.

APPENDIX 18—continued.

Stations.	No. of hanks employed including station-masters.	Total Salaries and Wages Expenditure		No. of Tickets issued.		Revenue from Tickets and Coaching Traffic.		GOODS.		COAL.		HAY, STRAW, AND CHAFF.		WOOL.		Revenue collected at each Station from Goods Traffic.		Total Earnings, exclusive of Special Earnings.		Increase.	Decrease.	Stations.
		1890.	1889.	1890.	1889.	Out. Tons.	In. Tons.	Out. Tons.	In. Tons.	Out. Trucks.	In. Trucks.	Out. Bales.	In. Bales.	1890.	1889.	1890.	1889.					
Clifton	3	£ 171 17 5	4,401	£ 627 1 5	1	82	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Clifton.
South Clifton	5	358 12 4	2,579	270 12 3	199	599	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	South Clifton.
Austimmer	1	128 13 0	6,351	430 17 1	154	130	1,606	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Austimmer.
Robinsville	3	161 17 1	3,430	300 11 8	16	181	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Robinsville.
Bulli	5	402 1 4	17,531	2,375 12 6	4,198	6,416	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Bulli.
Bellambi	4	852 0 7	5,093	455 6 8	84	714	27,712	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Bellambi.
Cortinal	3	104 12 2	1,551	104 2 5	14	271	3,069	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Cortinal.
Wollongong	10	1,230 17 4	23,050	5,180 18 7½	1,411	5,003	3,929	441	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Wollongong.
Mount Keira	1	7 6 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mount Keira.
Unandera	3	339 19 9	5,221	646 8 8	300	934	7,694	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Unandera.
Dapto	4	232 17 6	8,822	599 5 2	2,461	531	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Dapto.
Albion Park	3	215 18 0	3,339	803 7 8	553	814	144	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Albion Park.
Shellharbour	1	176 0 0	2,231	471 14 10	252	218	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Shellharbour.
Mount Kembla	1	0 11 1	10,097	4,388 14 7	12,233	1,976	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mount Kembla.
Kiama	3	321 9 6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Kiama.
Camden	3	490 9 9	9,105	2,178 12 7	621	3,710	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Camden.
Ryde	5	470 6 3	15,335	1,357 9 6	1,220	5,033	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Ryde.
Concord	2	33 0 8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Concord.
Eastwood	2	176 2 4	11,744	364 15 11	1,343	1,078	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Eastwood.
Carlingford	1	123 12 0	3,020	220 3 1	1,217	358	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Carlingford.
Thornleigh	1	135 0 0	6,150	599 1 0	4,530	1,763	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Thornleigh.
Hornsby	4	564 16 11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Hornsby.
Cowan	2	226 9 3	8,785	914 0 10	553	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Cowan.
Pymble	2	70 0 0	3,766	259 13 10	527	1,012	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Pymble.
Gordon	2	47 8 3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Gordon.
Chatswood	2	79 4 0	2,542	153 7 10	27	957	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Chatswood.
St. Leonards	2	79 1 0	4,250	301 19 11	272	1,243	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	St. Leonards.
Hawkesbury	5	858 19 10	4,184	913 10 1	175	2,072	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Hawkesbury.
Harris Park	2	291 15 4	25,703	1,020 17 6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Harris Park.
Parramatta	24	3,087 4 5	205,417	17,951 18 4	9,556	20,073	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Parramatta.
Wentworthville	3	317 15 2	2,313	127 19 8	1,381	339	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Wentworthville.
Seven Hills	3	415 16 6	8,836	707 14 7	2,932	1,016	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Seven Hills.
Blacktown	7	509 8 9	8,534	1,106 11 1	9,794	2,191	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Blacktown.
Rooty Hill	4	472 12 10	8,337	1,314 3 0	13,199	3,044	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Rooty Hill.
Mount Drutt	1	125 5 0	3,491	373 16 2	6,310	823	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mount Drutt.
St. Mary's	6	705 18 9	8,334	1,470 16 2	30,270	6,330	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	St. Mary's.
Kingswood	4	380 6 3	1,698	211 12 2	17,892	366	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Kingswood.
Penrith	37	4,033 3 8	17,824	4,043 18 1	5,161	7,529	1,108	804	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Penrith.
Emu Plains	6	597 19 6	3,307	483 9 3	60,718	720	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Emu Plains.
Glenbrook	8	707 3 10	982	127 7 9	403	116	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Glenbrook.
Springwood	4	431 7 4	3,073	730 3 1	144	1,460	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Springwood.
Linden	3	361 0 1	361	62 7 2	5	244	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Linden.
Lawson	3	309 14 10	3,232	553 10 1	25	1,420	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Lawson.
Wentworth Falls	4	373 3 7	3,209	660 13 3	90	1,957	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Wentworth Falls.
Katoomba	8	989 17 1	10,661	2,499 18 4	10,155	2,710	14,803	618	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Katoomba.
Blackheath	4	429 14 1	5,606	1,091 2 0	336	2,226	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Blackheath.
Mount Victoria	10	1,235 8 6	7,135	2,249 6 0	226	1,410	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mount Victoria.
Hartley Vale	1	185 0 0	1,185	328 1 11	16,719	1,236	2,610	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Hartley Vale.
Bell	4	425 0 4	500	254 17 0	83	191	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Bell.
Clarence Siding	3	319 2 2	491	70 10 0	1,068	568	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Clarence Siding.
Zig Zag	4	497 10 0	218	36 15 8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Zig Zag.
Eskbank	24	2,453 19 7	6,123	2,224 14 2½	8,701	20,133	111,304	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Eskbank.
Lithgow	5	508 10 9	1,799	1,541 10 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Lithgow.
Rowanfels	5	508 10 9	1,799	724 17 4	705	835	11,920	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Rowanfels.
Wallerawang	15	1,721 15 5	7,792	2,437 9 0	776	3,750	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Wallerawang.
Rydal	8	810 5 0	3,203	831 18 4	3,997	10,511	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Rydal.
Tarana	4	436 7 3	2,573	1,185 5 11	1,032	1,095	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Tarana.
Locksley	3	250 12 11	705	179 2 8	344	49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Locksley.
Brewongle	6	580 7 9	2,435	627 6 8	1,162	657	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Brewongle.
Raglan	4	392 14 8	1,209	190 0 4	2,025	1,518	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Raglan.

NOTE.—This Statement only shows the stations' earnings proper, exclusive of earnings from special services, which cannot be allotted to any particular station upon the lines.

APPENDIX 18—continued.

Stations.	No. of hands employed including Station-masters.	Total Salaries and Wages Expenditure.		No. of Tickets Issued.	Revenue from Tickets and Coaching Traffic.	GOODS.		COAL.		HAY, STRAW, AND CHAFF.		WOOL.		Revenue collected at each Station from Goods Traffic.	Total Earnings, exclusive of Special Earnings.		Increase.	Decrease.	Stations.
		1890.	1890.			1890.	1890.	Out. Tons.	In. Tons.	Out. Tons.	In. Tons.	Out. Trucks.	In. Trucks.		Out. Bales.	In. Bales.			
Kelso	5	£ 048 3 1	1,213	£ 802 18 11	2,807	1,085	.....	272	491	.....	747	.....	£ 3,692 0 0	£ 4,404 18 11	£ 5,246 5 10	£ 851 0 11		Kelso.	
Bathurst	41	4,693 11 6	24,644	13,927 8 0	11,700	30,336	.....	11,168	327	7	1,767	254	21,660 18 0	38,497 0 0	40,316 18 8	1,819 11 5		Bathurst.	
Perth	4	304 7 9	8,730	408 15 8	2,271	534	.....	150	419	.....	1,187	.....	1,472 1 0	1,940 17 5	1,914 0 11	28 10 0		Perth.	
George's Plains	5	484 15 11	2,972	477 9 7	1,007	287	.....	12	134	1	33	.....	110 19 9	588 9 4	606 13 3	7 3 11		George's Plains.	
Wimbledon	4	430 0 11	1,158	226 2 4	1,876	76	.....	.....	.....	.....	237	.....	30 18 9	292 1 1	292 11 5	30 10 4		Wimbledon.	
Newbridge	7	658 1 10	5,628	1,834 3 3	4,024	2,246	.....	26	277	.....	821	.....	2,201 16 5	4,035 19 8	4,998 14 7	870 14 11		Newbridge.	
Blayney	15	1,350 8 1	9,640	3,708 16 9	4,078	2,037	.....	1,267	453	.....	515	.....	3,050 4 5	7,360 1 2	7,106 16 2	292 5 0		Blayney.	
Multhorpe	9	641 4 1	3,838	1,067 17 1	4,800	572	.....	480	787	.....	733	.....	2,557 7 0	8,425 4 1	2,970 3 1	655 1 0		Multhorpe.	
Spring Hill	10	565 16 5	2,993	650 12 0	2,210	208	.....	344	802	.....	144	.....	605 9 11	1,192 2 8	920 15 1	241 7 7		Spring Hill.	
Orange	82	3,414 15 10	20,682	12,030 6 5	13,042	18,198	.....	3,359	663	90	1,401	.....	26,846 7 8	38,875 14 1	39,583 19 7	710 5 6		Orange.	
Mullion Creek	5	846 19 1	1,001	215 6 1	1,481	145	.....	.....	2	.....	105	.....	60 11 5	275 17 6	323 13 10	47 16 4		Mullion Creek.	
Kerr's Creek	3	273 0 0	1,213	143 3 4	172	217	.....	.....	.....	.....	38	.....	53 1 0	201 10 1	313 17 1	117 7 0		Kerr's Creek.	
Warno	3	314 7 1	1,424	440 12 9	400	407	.....	.....	.....	.....	642	.....	652 10 10	1,033 9 7	780 15 1	302 14 6		Warno.	
Store Creek	4	303 8 5	290	49 13 9	53	13	.....	.....	.....	.....	35	.....	7 4 10	76 18 7	79 19 3	3 0 8		Store Creek.	
Stuart Town	5	496 11 1	2,403	918 9 0	79	695	.....	25	.....	2	173	.....	1,056 18 5	1,974 7 5	2,600 17 11	626 10 6		Stuart Town.	
Mumbil	3	396 3 2	1,303	251 2 0	000	260	.....	.....	.....	.....	837	.....	314 5 7	665 8 1	632 9 3	82 13 10		Mumbil.	
Springs	3	297 1 8	885	221 18 10	421	42	.....	.....	.....	.....	235	.....	85 0 7	336 19 5	610 18 11	342 10 0		Springs.	
Wellington	16	1,926 3 3	5,187	4,041 19 3	4,204	3,014	.....	95	98	.....	1,714	.....	7,016 1 4	11,033 0 7	10,612 4 7	445 16 0		Wellington.	
Mary Vale	6	376 16 8	795	183 14 0	814	148	.....	.....	35	.....	88	.....	180 4 4	313 18 4	310 15 11	8 5 5		Mary Vale.	
Geurie	3	292 9 6	969	325 9 0	1,397	98	.....	224	.....	.....	198	.....	203 19 5	590 9 2	631 15 8	61 6 6		Geurie.	
Murrumbidgee	6	337 2 9	1,034	272 10 0	1,279	177	.....	.....	4	.....	762	.....	239 6 2	512 5 11	451 15 9	60 10 2		Murrumbidgee.	
Dubbo	24	2,873 16 0	10,405	11,515 17 0	6,504	8,301	.....	1	820	43	5	18,526	31,021 8 11	42,587 9 10	41,849 9 10	687 16 0		Dubbo.	
Narramine	6	474 18 1	2,634	1,806 5 1	2,250	899	.....	3	6	28	.....	5,876	1,755 14 0	3,961 10 1	3,141 5 10	79 0 9		Narramine.	
Trangie	5	421 15 10	2,250	1,801 16 11	4,211	1,105	.....	.....	.....	.....	6	.....	3,017 14 6	4,870 11 5	4,031 13 0	847 18 5		Trangie.	
Nevertire	6	668 19 5	3,822	4,039 3 4	3,148	2,601	.....	11	.....	42	10,813	.....	0,039 15 7	13,075 18 11	13,427 3 11	548 15 0		Nevertire.	
Mullengudgery	3	293 15 10	882	238 13 1	91	103	.....	.....	.....	.....	602	.....	175 10 0	414 3 1	344 18 8	79 4 5		Mullengudgery.	
Nyngan	18	1,134 6 3	4,626	6,754 7 9	4,533	4,741	.....	53	.....	63	15,995	381	10,688 4 10	23,442 12 1	33,221 14 6	9,782 2 5		Nyngan.	
Girilambone	3	304 2 5	766	324 0 2	934	326	.....	.....	.....	.....	5,800	.....	1,050 12 11	1,374 13 1	1,919 7 8	44 14 7		Girilambone.	
Coolabah	2	247 4 8	934	397 19 5	1,711	1,176	.....	5	.....	9	6,158	.....	3,875 7 0	4,773 6 5	3,004 0 10	1,769 5 7		Coolabah.	
Byrock	5	473 3 2	2,450	3,518 13 1	2,456	1,934	.....	12	1	9	7,965	.....	7,116 12 3	10,635 5 4	0,039 3 6	1,546 4 10		Byrock.	
Bourke*	18	2,467 19 0	4,421	10,982 7 8	3,838	15,294	.....	440	140	140	55,790	813	56,348 15 3	67,300 2 11	73,979 19 7	8,678 10 3		Bourke.	
Riverstone	4	352 9 5	7,969	1,297 7 10	29,057	2,406	.....	682	.....	.....	161	1,477	6,830 1 7	7,037 0 6	5,931 1 3	1,056 9 2		Riverstone.	
Mulgrave	1	136 2 2	2,459	433 19 7	3,062	799	.....	138	.....	.....	170	.....	377 18 0	811 18 4	806 10 1	2 8 3		Mulgrave.	
Windsor	4	527 14 8	13,446	2,842 4 8	4,087	4,478	.....	19	.....	.....	314	40	2,152 2 0	4,907 7 2	4,905 1 3	15 5 11		Windsor.	
Clarendon	1	145 0 0	1,773	468 10 11	404	224	.....	.....	.....	.....	20	.....	115 13 1	4,907 0 0	337 17 2	93 11 10		Clarendon.	
Richmond	5	436 18 11	9,689	2,902 4 8	5,208	2,748	.....	63	164	10	.....	.....	1,201 9 6	4,184 13 9	4,048 1 2	145 12 7		Richmond.	
Carcoar	5	450 6 5	3,859	1,325 16 10	1,305	931	.....	101	11	.....	6	.....	1,742 2 11	3,127 19 9	3,008 17 11	119 1 10		Carcoar.	
Mandurama	2	164 13 0	1,108	339 12 8	606	507	.....	2	.....	.....	1,115	.....	1,009 6 9	1,342 19 5	1,226 13 10	122 5 7		Mandurama.	
Lyndhurst	3	243 2 4	3,383	447 0 7	1,097	448	.....	6	160	.....	786	.....	649 1 10	1,096 2 5	993 2 11	97 19 6		Lyndhurst.	
Woodstock	3	285 15 4	2,558	925 7 5	1,933	961	.....	.....	.....	.....	673	.....	1,436 8 8	2,851 10 1	2,301 9 8	60 6 5		Woodstock.	
Cowra	23	1,194 4 5	4,998	4,410 10 8	8,918	6,348	.....	48	6	7	21,180	.....	17,952 17 8	22,372 8 4	20,951 12 8	1,420 15 8		Cowra.	
Borenore	5	634 0 8	2,216	625 15 9	3,161	3,194	.....	142	.....	.....	6,629	.....	8,244 2 5	8,890 18 2	9,144 10 11	274 12 9		Borenore.	
Molong	5	517 0 4	4,445	2,931 0 9	5,722	4,440	.....	216	19	9	6,895	.....	13,795 6 0	10,724 7 3	13,417 7 9	3,900 10 6		Molong.	
Piper's Plat	3	337 4 2	1,812	408 16 8	2,482	2,224	.....	4,412	.....	.....	2,033	.....	1,887 11 11	2,294 8 7	1,871 9 0	422 10 7		Piper's Plat.	
Capertee	6	323 12 6	1,302	565 13 10	4,038	738	.....	.....	.....	.....	554	.....	459 9 3	1,025 3 1	1,002 1 1	23 2 0		Capertee.	
Brogan's Creek	1	83 0 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		Brogan's Creek.
Iford	3	97 6 0	2,239	1,691 10 0	604	948	.....	773	.....	.....	2,063	.....	2,012 19 0	3,004 9 0	4,165 10 3	561 10 3		Iford.	
Itylsone	6	177 16 4	5,250	5,874 5 6	6,097	6,709	.....	28	1,145	.....	9,914	.....	17,233 2 3	23,107 7 8	22,847 15 7	259 12 1		Itylsone.	
Lue	2	1,180 8 10	7,262	2,030 6 2	1,083	2,766	.....	35	.....	.....	.....	.....	1,113 0 0	3,143 6 2	2,189 7 4	938 18 10		Lue.	
Mudgee	7	1,222 14 2	2,086	355 5 6	3,362	622	.....	.....	.....	.....	.....	.....	612 3 6	667 9 0	830 12 0	30 17 0		Mudgee.	
Gosford*	15	334 8 7	3,623	888 1 0	7,416	1,400	.....	19	.....	.....	.....	.....	891 12 4	1,779 13 4	1,573 19 6	295 18 10		Gosford*.	
Ourimbah	4	362 14 11	2,480	500 1 5	2,905	511	.....	4	.....	.....	.....	.....	160 14 1	660 15 6	769 16 4	100 0 10		Ourimbah.	
Wyong	3	.....	Closed.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		Wyong.
Morrissett	3	.....	Closed.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		Morrissett.
Mullett Creek	2	215 10 11	3,589	410 16 5	6,308	820	.....	.....	.....	.....	.....	.....	2 14 2	2 14 2	2,057 2 9	2,034 8 7		Mullett Creek.	
Awaba	3	339 2 0	12,500	1,027 9 10	903	1,368	.....	.....	.....	.....	.....	.....	94 10 4	505 6 9	36 5 11	469 0 10		Awaba.	
Terahba	3	238 17 7	10,579	1,174 12 4	1,811	3,443	.....	.....	.....	.....	.....	.....	844 5 11	1,441 15 9	1,955 10 3	514 3 6		Terahba.	
Cockle Creek	3	282 11 0	7,700	422 19 6	511	1,018	.....	.....	.....	.....	.....	.....	703 10 6	1,378 2 10	1,160 18 9	717 4 1		Cockle Creek.	
Adamstown	3	460 1 4	6,029	530 4 10	8	44	.....	.....	.....	.....	.....	.....	113 18 4	736 12 10	736 12 10	.....		Adamstown.	
Broadmeadow	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109 17 2	696 2 0	1,151 1 10	454 10 10		Broadmeadow.	

NOTE

APPENDIX 1S—continued.

Stations.	No. of hands employed including Station-masters.	Total Salaries and Wages Expenditure.		No. of Tickets issued.	Revenue from Tickets and Coaching Traffic.	GOODS.		COAL.		HAY, STRAW, AND CHAFF.		WOOL.		Revenue collected at each Station from Goods Traffic.	Total Earnings, exclusive of special earnings.		Increase.	Decrease.	Stations.						
		1890.				1890.		Out.	In.	Out.	In.	Out.	In.		Out.	In.				1890.	1890.	1890.	1890.		
		£	s. d.			£	s. d.	Tons.	Tons.	Tons.	Tons.	Trucks.	Trucks.		Bales.	Bales.				£	s. d.	£	s. d.	£	s. d.
Newcastle	150	19,304	14 6	103,030	25,243	13 0	53,239	32,352	99	1,061,516	430	1,303	668	63,860	123,113	3 3	154,357	2 0	148,620	13 3	5,736	3 9	Newcastle.		
Honeysuckle Point	16	2,159	11 11	49,102	3,939	13 7	4,573	8,211	8	238	3	65	...	...	2,440	18 8	6,371	17 3	4,882	13 8	10 10 6	Honeysuckle Point.			
Bullock Island	41	4,319	15 4	...	26	8 6	2,157	8,270	2,265	862,700	1	17	...	414	109	6 6	195	10 0	208	11 2	11 1 2	Bullock Island.			
Hamilton	18	2,191	10 4	67,964	3,827	13 11 1/2	1,470	6,002	44	309	2	112	...	54	1,225	6 8	5,053	0 7 1/2	5,430	1 0	377	0 10 1/2	Hamilton.		
Hamilton W. B.	3	570	16 8	...	15,740	...	1,018,082	...	309	...	2	112	...	34	...	...	...	...	...	...	...	...	Hamilton W. B.		
Waratah	15	2,082	17 10	43,450	3,070	19 0	2,361	214	101	8,516	...	...	1	874	3 11	4,651	2 11	4,335	16 0	215	6 11	Waratah.			
Wallsend	10	1,095	19 3	76,519	2,128	1 0	1,003	9,375	...	...	262	...	...	...	2,036	11 10	4,164	12 10	3,988	3 5	170	9 5	Wallsend.		
Hexham	7	311	5 10	15,665	1,442	16 1	162	2,119	620	...	42	11	...	...	537	11 6	1,980	7 7	2,010	2 5	23	14 10	Hexham.		
Tarro	2	180	8 4	6,551	64	9 1	513	262	3	...	47	...	...	...	66	0 10	710	9 11	701	10 8	8	10 3	Tarro.		
Thornton	1	135	0 0	2,412	103	13 1	510	20	...	...	30	...	...	8	3 0	169	16 1	82	7 10	87	8 8	Thornton.			
East Maitland	11	1,174	6 7	24,494	4,221	7 3	5,074	3,492	103	377	165	23	30	...	2,149	19 10	6,371	7 1	8,088	10 2	1,717	12 1	East Maitland.		
Morpeth	26	2,540	2 8	20,102	2,201	8 0	11,105	9,830	...	4,677	79	115	113	34,271	17,757	18 0	20,049	6 0	22,036	3 11	1,950	17 11	Morpeth.		
High-street	4	505	1 11	23,341	4,430	11 4	1,906	1,906	...	...	...	...	...	177	18 6	4,608	9 10	4,495	2 0	110	7 4	High-street.			
West Maitland	36	3,342	0 4	27,388	7,880	14 7	12,558	15,750	100	999	426	193	3,448	2,355	11,074	15 0	18,905	0 7	18,255	0 0 1/2	650	9 6 1/2	West Maitland.		
Farley	3	364	12 9	2,362	251	10 2	902	410	331	493	...	2	...	195	0 1	446	10 3	536	10 1	...	...	80	8 10	Farley.	
Lochinvar	4	370	0 0	2,728	572	17 1	703	360	...	...	10	74	1	...	509	12 6	1,032	9 7	830	0 9	216	8 10	Lochinvar.		
Allandale	2	174	13 0	2,792	471	15 0	1,963	997	...	...	...	...	...	313	1 0	784	16 9	700	5 2	24	11 7	Allandale.			
Greta	4	548	11 0	7,329	1,840	19 1	763	4,329	4,653	83	18	33	...	...	1,319	1 10	3,189	10 11	3,303	15 1	113	15 2	Greta.		
Branxton	5	643	19 7	5,016	1,184	8 4	2,223	1,711	...	51	182	1	186	...	891	15 0	2,078	3 4	2,231	16 11	155	12 7	Branxton.		
Whittingham	2	164	6 0	1,161	464	1 5	332	181	...	40	40	...	88	...	271	16 6	735	16 11	605	0 1	180	16 10	Whittingham.		
Singleton	26	2,678	18 0	14,043	6,844	17 11 1/2	4,483	6,869	2,492	1,063	261	7	161	...	5,281	15 2	12,122	13 1 1/2	10,480	10 2	1,637	2 11 1/2	Singleton.		
Glennie's Creek	1	145	0 0	803	207	18 10	119	240	1,181	...	...	...	...	140	17 6	318	16 4	334	0 3	14	7 1	Glennie's Creek.			
Ravensworth	5	239	18 1	1,414	275	14 7	188	237	...	...	25	...	...	116	6 2	332	0 9	376	3 0	15	17 9	Ravensworth.			
Musclebrook	25	1,741	2 2	6,752	3,927	13 7	2,483	4,503	...	...	270	18	2	6,017	5,712	9 2	9,040	8 3	8,935	4 9	705	3 6	Musclebrook.		
Aberdeen	6	467	11 8	1,309	409	4 11	233	567	...	35	3	...	...	500	15 7	997	0 6	1,155	0 1	...	...	157	19 7	Aberdeen.	
Seone	11	816	13 5	6,045	2,795	18 2	2,288	2,710	...	223	22	5	3,700	...	3,988	8 2	6,784	6 4	6,994	15 11	780	10 5	Seone.		
Wingen	4	381	0 11	990	378	18 6	105	267	...	...	...	...	...	235	5 0	614	4 1	501	17 7	112	6 6	Wingen.			
Blundford	4	257	17 8	880	493	11 2	294	231	...	...	7	...	...	344	6 9	837	17 11	759	7 10	78	10 1	Blundford.			
Murrumbidgee	17	2,083	7 0	2,938	2,057	14 6	416	1,184	...	122	17	7	...	...	2,245	7 10	4,293	2 4	4,217	7 0	75	15 4	Murrumbidgee.		
Doughboy Hollow	4	350	19 4	474	107	13 5	234	129	...	...	...	...	...	132	16 2	240	0 7	308	15 6	68	5 11	Doughboy Hollow.			
Willow-tree	5	673	2 1	1,944	584	10 0	807	526	...	...	0	21	...	...	1,500	1 4	2,144	11 4	1,367	19 7	776	11 9	Willow-tree.		
Quirindi	13	1,072	3 2	4,761	2,893	8 10	2,617	3,971	...	176	12	...	...	...	7,893	12 6	16,787	1 4	9,610	4 9	1,146	16 7	Quirindi.		
Werris Creek	10	880	5 8	3,037	2,068	1 0 1/2	564	311	...	...	...	...	...	...	712	18 6	2,781	0 0 1/2	2,780	10 4	8	10 3 1/2	Werris Creek.		
Breeza	6	456	0 6	1,309	699	14 6	367	347	...	...	3	1,622	...	...	1,103	0 1	1,773	0 7	1,849	12 5	76	11 10	Breeza.		
Curlewis	1	169	16 10	851	397	3 4	827	653	...	161	...	6	679	...	393	3 0	780	6 4	486	17 1	843	9 3	Curlewis.		
Gunnedah	11	827	14 9	3,497	3,464	15 5	1,912	2,470	...	105	12	21	5	7,142	6,518	5 10	9,083	1 3	11,195	16 3	1,212	15 0	Gunnedah.		
Boggabri	5	406	17 0	1,357	907	6 11	2,831	620	...	19	...	1	2,490	...	1,321	19 10	2,229	6 10	2,475	8 3	...	...	245	16 5	Boggabri.
Baan Baa	1	145	0 0	588	261	4 4	1,086	189	...	...	...	...	...	...	147	13 4	408	17 8	337	6 8	51	12 0	Baan Baa.		
Narrabri	15	1,042	7 1	231	6,968	13 3	9,064	8,376	...	202	1	23	52,317	0	29,046	11 1	36,915	4 4	40,848	13 5	3,933	9 1	Narrabri.		
Currabubula	6	401	1 6	1,567	483	10 1	777	309	...	...	6	41	1,570	...	357	7 8	841	6 9	820	4 1	11	12 8	Currabubula.		
West Tamworth	11	1,103	7 6	1,535	906	15 2	3,847	2,081	...	...	20	...	13,235	...	6,977	19 1	7,884	14 3	7,288	4 6	596	9 0	West Tamworth.		
Tamworth	21	1,311	10 0	8,793	9,738	16 7	6,246	8,515	...	848	252	2	470	...	16,963	5 1	25,702	1 8	24,574	18 6	827	3 2	Tamworth.		
Moonbi	6	505	18 6	1,732	479	17 6	710	280	...	...	1	794	4	...	261	19 0	741	17 0	1,290	9 8	478	12 8	Moonbi.		
Macdonald River	2	250	0 0	446	141	17 8	239	223	...	...	25	337	4	...	87	3 9	280	1 6	299	7 6	70	6 1	Macdonald River.		
Walcha Road	8	631	18 10	2,325	2,017	9 7	1,075	1,522	...	83	14	4,933	...	...	3,015	5 2	5,832	14 9	6,935	4 6	1,093	9 7	Walcha Road.		
Kentucky	3	245	11 11	1,755	390	5 4	389	245	...	...	3	1,840	...	...	192	8 8	672	13 7	635	7 2	65	13 7	Kentucky.		
Uralla	11	949	12 8	4,550	2,693	13 8	1,903	2,758	...	42	7	...	16	...	6,770	5 5	9,464	4 1	8,860	2 7	694	1 6	Uralla.		
Armidale	22	2,199	9 0	11,033	11,457	5 2	4,015	2,445	...	979	96	78	3,692	13	26,743	18 3	89,201	8 5	31,406	15 8	6,704	7 9	Armidale.		
Dumaresq	5	245	2 7	1,019	210	14 3	442	149	...	...	...	...	...	...	252	8 2	468	2 5	464	15 11	1	13 0	Dumaresq.		
Black Mountain	3	173	14 2	387	263	0 1	1,497	106	...	...	...	...	...	...	172	9 4	435	9 5	456	5 5	20	16 0	Black Mountain.		
Guym	6	667	16 4	3,141	1,643	13 6	2,742	1,077	...	...	13	1,235	...	...	5,413	7 0	7,067	5 6	6,121	19 11	985	5 7	Guym.		
Ben Lomond	4	194	13 0	790	255	11 8	677	255	...	...	1	591	32	...	394	2 10	589	14 6	679	15 7	90	1 1	Ben Lomond.		
Glencoe	5	244	19 3	803	440	6 0	564	194	...	...	29	167	...	...	371	5 1	811	11 1	1,131	16 10	320	4 9	Glencoe.		
Glen Innes	15	1,174	16 7																						

APPENDIX 19.

PERMANENT WAY Materials, Rails for Renewals, and Miscellaneous Articles imported for the Railways during year ending 30th June, 1890.

Date of Arrival.	Name of Ship.	Description of Material.	Supplied by	Weight.	Rate.	Invoice Cost.	Freight.	English Charges	Colonial Charges	Total Cost.	Cost.
Return of Miscellaneous Articles imported for the New South Wales Railways for the year ending 30th June, 1890.											
1889.				T. c. q. lb.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
11 Sept.	Oronsay	280 c.-s. engine and tender tyres.	Vickers, Sons, & Co., Ld.	93 2 2 19	24 0 0	2235 4 1	120 4 5	66 1 6	8 10 9	2439 0 0	26 13 9½
3 Aug.	Ardgowan	100 c.-s. carriage and waggon axles.	Vickers, Sons, & Co., Ld.	19 4 3 8	25 17 6	497 17 2	23 14 6	14 16 8	1 14 0	538 2 10	27 19 3½
11 Sept.	Oronsay	100 c.-s. carriage and waggon axles.	Vickers, Sons, & Co., Ld.	19 4 3 8	25 17 6	497 17 2	23 14 6	14 16 8	1 14 0	538 2 7	27 19 3½
11 Sept.	Oronsay	1 c.-s. crank axle.	Vickers, Sons, & Co., Ld.	0 18 1 3	96 15 10	93 15 10	1 8 5	2 19 7	0 1 11	101 5 9	101 5 9
11 Sept.	Oronsay	200 c.-s. engine and tender tyres.	Vickers, Sons, & Co., Ld.	41 17 0 12	24 0 0	1604 10 7	68 1 5	29 15 2	3 16 9	1696 3 11	26 3 10
11 Sept.	Oronsay	24 c.-s. tender axles	Vickers, Sons, & Co., Ld.	4 9 2 24	33 0 0	148 0 7	5 16 1	4 7 8	0 8 5	158 12 9	35 7 6
15 Aug.	Trafalgar	50 c.-s. carriage and waggon axles.	Vickers, Sons, & Co., Ld.	9 12 1 18	25 17 6	248 18 7	11 17 3	7 9 6	0 17 3	269 2 7	27 10 5½
11 July	Iberia	6 sets train tablet apparatus.	Tyer & Co.		50 0 0	300 0 0			0 2 2	300 2 2	50 0 4½
11 July	Iberia	1000 volute springs	Charles Cammell & Co.		0 3 3	162 10 0	23 15 4	4 11 7	1 0 9	191 17 8	0 3 10
18 July	Valetta	6 Emery wheels, 15 in. x 4½ in. x 7½ in. x 16 in.	Le Sterne & Co., Ld.		3 11 3	21 7 6	0 11 9	0 14 2	0 0 5	22 13 10	3 15 7½
18 July	Valetta	12 Emery wheels, 20 in. x 2½ in. x 2½ in. x 16 in.	Le Sterne & Co., Ld.		4 3 3	40 10 0	1 3 8	1 9 2	0 0 11	52 12 9	4 7 8½
2 Sept.	Thomas Stephens.	46 steel taps for boiler mountings.	Sir John Whitworth & Co., Ld.		0 16 1½	37 2 6	0 10 6	1 5 10	0 0 2	38 19 0	0 16 11½
25 July	Garonne	6 sets train tablet apparatus.	Tyer & Co.		50 0 0	300 0 0			0 2 5	300 2 5	50 0 5
11 Sept.	Oronsay	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
11 Sept.	Oronsay	100 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	19 10 0 20	18 0 0	351 3 3	78 10 1	25 4 11	3 16 6	950 2 9	19 3 8
11 Sept.	Oronsay	50 c.-s. axles for above	Vickers, Sons, & Co., Ld.	9 12 1 18	19 10 0	187 12 0					
2 Sept.	Thomas Stephens.	100 c.-s. carriage and waggon axles	Vickers, Sons, & Co., Ld.	19 4 3 8	25 17 6	497 17 2	21 7 7	14 16 9	1 14 6	535 16 0	27 16 11½
2 Sept.	Thomas Stephens.	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
2 Sept.	Thomas Stephens.	100 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	19 10 0 20	18 0 0	351 3 3	78 11 8	25 4 10	3 16 6	958 18 3	19 1 6
2 Sept.	Thomas Stephens.	50 c.-s. axles for above	Vickers, Sons, & Co., Ld.	9 12 1 18	19 10 0	187 12 0					
4 Oct.	Brilliant	100 c.-s. carriage and waggon axles.	Vickers, Sons, & Co., Ld.	19 4 3 8	25 17 6	497 17 2	21 7 6	14 16 9	1 14 6	535 15 11	27 16 11½
6 Aug.	Curco	500 volute springs	Chas. Cammell & Co., Ld.		0 3 3	81 5 0	11 17 8	2 9 3	0 10 5	96 2 4	0 3 10½
14 Aug.	Ballaarat	Lowmoor pan head rivets	The Phoenix Bolt and Nut Co., Ld.	27 0 0 0	29 10 0	796 10 0	38 15 1	20 4 11	2 14 1	838 4 1	31 15 8½
14 Aug.	Ballaarat	B.B.H. best head rivets	The Phoenix Bolt and Nut Co., Ld.	24 0 0 0	19 10 0	468 10 0	31 8 11	12 0 7	2 8 2	616 17 8	21 10 0
4 Oct.	Brilliant	Copper rods	The Broughton Copper Co., Ld.	3 10 0 8	49 15 5	174 4 3	4 17 9	5 6 6	0 7 1	184 15 7	52 14 10
4 Oct.	Canara	22 driving-wheel centre castings.	R. W. Cameron & Co.		15 7 5½	333 4 8	32 19 9	13 10 2	1 7 8	380 2 3	17 11 0
4 Oct.	Brilliant	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
4 Oct.	Brilliant	100 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	19 10 0 20	18 0 0	351 3 3	78 11 8	25 4 10	3 16 6	958 18 3	19 1 6½
4 Oct.	Brilliant	50 c.-s. axles for above	Vickers, Sons, & Co., Ld.	9 12 1 18	19 10 0	187 12 0					
15 Sept.	Hankow	6 sets train tablet apparatus.	Tyer & Co.		50 0 0	300 0 0			0 2 5	300 2 5	50 0 5
29 Oct.	Port Jackson	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
29 Oct.	Port Jackson	100 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	19 10 0 20	18 0 0	351 3 3	78 11 8	25 4 10	3 16 6	952 10 11	19 1 2½
29 Oct.	Port Jackson	50 c.-s. axles for above	Vickers, Sons, & Co., Ld.	9 12 1 18	19 10 0	187 12 0					
4 Oct.	Brilliant	Best spring steel	Jno Hy. Andrew & Co.	25 15 3 18	10 19 5	252 18 11	29 7 0	8 9 11	2 7 4	323 3 2	12 10 6½
13 Sept.	Parramatta	Telegraph wire	Richd. Bohnsen and Nephew.	50 0 1 7	15 15 0	757 14 11	79 13 7	4 12 8	4 12 0	870 13 11	17 10 0½
30 Sept.	Onzaba	Copper rivets	The Broughton Co., Ld.	0 13 0 0	79 6 8	51 1 4	1 2 3	1 0 2	0 1 4	58 15 1	62 14 2
31 Dec.	Ladakh	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
31 Dec.	Ladakh	100 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	19 10 0 20	18 0 0	351 3 3	78 8 2	24 6 2	3 16 4	952 15 11	19 1 1½
31 Dec.	Ladakh	50 c.-s. axles for above	Vickers, Sons, & Co., Ld.	9 12 1 18	19 10 0	187 12 0					
1 Nov. 1890.	Arcadia	6 sets train tablet apparatus	Tyer & Co.		50 0 0	300 0 0			0 2 5	300 2 5	50 0 5
4 Feb.	Cambrian Prince.	100 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	625 0 0					
4 Feb.	Cambrian Prince.	200 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	37 0 1 12	18 0 0	702 6 5	147 3 5	48 9 7	7 13 1	1005 16 6	19 1 2
4 Feb. 1889.	Cambrian Prince.	100 c.-s. axles for above	Vickers, Sons, & Co., Ld.	19 4 3 8	19 10 0	375 4 0					
15 Nov.	Iberia	6 sets train tablet apparatus	Tyer & Co.		50 0 0	300 0 0			0 2 5	300 2 5	50 0 5
15 Nov.	Iberia	30 steel toes	The Steel Co. of Scotland	9 10 3 21	16 12 0	304 8 2	11 12 9	3 0 6	0 13 1	119 19 6	12 3 8
30 Dec.	Macquarie	100 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	625 0 0					
30 Dec.	Macquarie	200 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	39 0 1 12	18 0 0	702 6 5	147 3 5	48 9 6	7 13 1	1005 16 6	19 1 2
30 Dec.	Macquarie	100 c.-s. axles for above	Vickers, Sons, & Co., Ld.	19 4 3 8	19 10 0	375 4 0					
30 Dec.	Macquarie	Cleaning composition	Robert Kearsley & Co.	1 0 2 3	18 18 0	19 8 0	1 11 11	0 13 9	0 2 8	21 16 4	21 6 3
15 Nov.	Iberia	Mild steel	The Steel Co. of Scotland	5 0 0 0	9 0 4½	45 1 11	5 18 2	1 8 2	0 9 2	52 17 6	10 11 6
27 Dec.	Star of Victoria	6 sets train tablet apparatus	Tyer & Co.		50 0 0	300 0 0			0 2 5	300 2 5	50 0 5
21 Dec. 1890.	Bungaree	288 seamless brass loco tubes	The Broughton Copper Co., Ld.	3 13 0 21	60 13 4	222 0 0	14 3 11	6 6 7	0 8 3	342 18 9	66 9 8
1 Feb.	Atlanta	36 ribbon dating presses	John B. Edmundson		1 19 0	70 4 0	0 13 1	2 4 3	0 0 7	73 1 11	2 0 7½
31 Jan.	Micronesia	300 c.-s. tyres, 2 ft. 7½ in. diam.	Vickers, Sons, & Co., Ld.	37 11 2 12	18 0 0	676 9 0	47 8 11	19 7 2	3 8 11	746 14 0	19 17 4½
3 Jan.	Widemann	320 seamless brass loco. tubes	The Broughton Copper Co., Ld.	3 18 2 15	60 13 4	233 12 1	15 6 4	6 10 6	0 8 11	260 17 10	66 8 10
17 Feb. 1889.	Windsor Park	300 c.-s. tyres, 2ft. 7½ in. diam	Vickers, Sons, & Co., Ld.	50 7 2 21	18 0 0	1011 18 5	71 3 9	23 19 10	5 3 4	1120 5 4	19 17 3½
25 Dec. 1890	Orient	6 sets train tablet apparatus	Tyer & Co.		50 0 0	300 0 0			0 2 5	300 2 5	50 0 5
3 Jan.	Micronesia	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
3 Jan.	Micronesia	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
3 Jan.	Micronesia	200 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	39 0 1 12	18 0 0	702 6 5	147 3 5	48 9 7	7 13 1	1005 16 6	19 1 2
3 Jan.	Micronesia	100 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	19 4 3 8	19 10 0	375 4 0					
17 Feb.	Windsor Park	50 pairs wheels	Patent Shaft and Axle-tree Co., Ld.		6 5 0	312 10 0					
17 Feb.	Windsor Park	100 c.-s. tyres for above	Vickers, Sons, & Co., Ld.	19 10 0 20	18 0 0	351 3 3	78 11 8	24 6 2	3 16 7	952 19 8	19 1 2½
17 Feb.	Windsor Park	50 c.-s. axles for above	Vickers, Sons, & Co., Ld.	9 12 1 18	19 10 0	187 12 0					
9 Jan.	Lusitania	749 Shelton Crown best iron plates.	The Shelton Iron and Steel Co., Ld.	33 4 1 13	9 5 3	335 9 7	47 10 9	9 5 6	3 6 5	395 12 3	10 18 5½

APPENDIX 19—continued.  
PERMANENT WAY MATERIAL, &c.—continued.

Date of Arrival.	Name of Ship.	Description of Material.	Supplied by	Weight.	Rate.	Invoice Cost.	Freight.	English Charges.	Colonial Charges.	Total Cost.	Cost
<b>Return of Miscellaneous Articles Imported, &amp;c.—continued.</b>											
1890.				T. c. q. lb.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
9 Jan.	Lusitania	800 Shelton Crown iron bars	The Shelton Iron and Steel Co., Ltd.	19 17 0 11	8 10 7½	169 7 9	28 1 4	4 15 4	1 19 5	202 0 10	per ton. 10 3 6
9 Jan.	Lusitania	193 wrought-iron buffers	George Turton		2 14 1½	271 17 6	8 11 4	7 8 3	0 13 4	238 10 5	each. 2 17 8½
8 Mar.	Agnes Oswald	150 pairs wheels	Patent Shaft and Axle-tree Co., Ltd.		6 5 0	937 10 0					per ton. 10 3 3
8 Mar.	Agnes Oswald	300 c.-s. tyres	Vickers, Sons, & Co., Ltd.	58 10 2 4	18 0 0	1053 0 8	236 8 2	2 72 12	8 11 9	8237 4 2	per ton. 5 3 4½
8 Mar.	Agnes Oswald	150 c.-s. axles	Vickers, Sons, & Co., Ltd.	23 17 0 2½	10 10 0	562 16 0	39 7 6	2 10 5	2 6 10	129 3 9	each. 4 15 1½
22 Mar.	Queen Elizabeth	No. 1 Shots pig-iron	Schotts Iron Co.	25 0 0 0	3 8 0	85 0 0	39 7 6	2 4 6	2 5 10	118 17 10	each. 0 3 7½
22 Mar.	Queen Elizabeth	No. 2 Shots pig-iron	Schotts Iron Co.	25 0 0 0	3 0 0	75 0 0					per ton. 13 6 10
21 Jan.	Oroya	400 c.-s. volute springs	Ibbotson Bros. & Co., Ltd.		6 3 3	65 0 0	5 15 7	2 0 0	0 6 2	73 1 9	each. 13 6 10
21 Jan.	Oroya	Cotter Steel	Sanderson Bros. & Co.	0 13 2 12	11 0 0	7 9 8	1 1 0	0 9 10	0 1 3	9 1 9	each. 7 12 9
25 Mar.	Theophane	10 9 ft. 5 in. gas holders	James Russell & Sons		6 9 3½	64 16 0	9 8 1	1 19 3	0 3 4	70 7 5	each. 5 8 0
25 Mar.	Theophane	5 6 ft. gas holders	James Russell & Sons		4 6 3½	21 21 3	4 14 0	0 12 11	0 1 7	26 19 11	per ton. 23 6 3
2 April	Don	100 c.-s. carriage and waggon axles	Vickers, Sons, & Co., Ltd.	19 4 3 8	23 0 0	500 5 4	23 8 2	14 6 11	1 14 5	614 14 10	each. 23 6 3
2 April	Don	100 c.-s. carriage and waggon axles	Vickers, Sons, & Co., Ltd.	19 4 3 8	23 0 0	500 5 4	23 8 2	14 7 0	1 14 5	644 14 11	each. 61 10 3
31 Jan.	Parramatta	1 pair loco. cylinders	Dubs & Co.		53 0 0	55 0 0	5 2 7	1 13 4	0 3 4	61 19 3	0 4 0 9
3 April	Don	400 c.-s. volute springs	Ibbotson Bros. & Co., Ltd.		0 4 2	33 6 8	6 2 5	2 10 5	0 6 2	61 5 8	2 18 5½
21 Jan.	Oroya	100 wrought-iron buffers	George Turton		2 14 4½	271 17 6	12 7 5	7 5 6	0 13 3	292 3 8	each. 12 2 4
21 Jan.	Oroya	100 wrought-iron buffers	George Turton		2 14 4½	271 17 6	12 7 5	7 5 6	0 13 3	292 3 8	each. 2 18 5½
21 Jan.	Oroya	10 12 ft. 5 in. gas holders	James Russell & Sons, Ltd.		8 15 6	87 15 0	30 11 5	2 12 1	0 4 5	121 3 2	per ton. 2 18 5½
7 Feb.	Orizaba	100 wrought-iron buffers	George Turton		2 14 4½	271 17 6	12 7 5	7 7 9	0 14 0	292 7 2	
1889.											
18 Sept. 1890.	Echuca	24 patent dust-proof axle-boxes	Mance & Co.		1 4 8	29 12 0	2 13 7		0 2 0	31 8 4	each. 1 7 0½
20 Feb.	Liguria	100 wrought-iron buffers	George Turton		2 14 4½	271 17 6	12 7 5	7 5 6	0 14 6	292 4 6	per ton. 2 18 5½
20 Feb.	Liguria	100 wrought-iron buffers	George Turton		2 14 4½	271 17 6	12 7 5	7 5 6	0 14 6	292 4 6	each. 2 18 5½
25 Feb.	Echuca	510 bars Shelton Crown best iron	The Shelton Iron and Steel Co., Ltd.	23 12 1 24	8 10 7½	201 10 9	31 0 2	5 17 1	2 3 4	240 11 4	per ton. 10 3 8½
25 Feb.	Echuca	53 bars Shelton Crown angles	The Shelton Iron and Steel Co., Ltd.	2 4 3 21	8 15 6	19 14 4	2 19 0	0 11 6	0 4 1	23 8 11	each. 10 3 6½
25 Feb.	Echuca	200 bars Shelton Crown angles	The Shelton Iron and Steel Co., Ltd.	20 10 1 0	17 3 7½	360 4 7	27 10 3	10 9 3	1 18 0	400 2 7	per ton. 19 1 0
25 Feb.	Echuca	65 bars Shelton Crown angles	The Shelton Iron and Steel Co., Ltd.	7 1 0 21	9 10 1½	67 2 2	9 5 3	1 18 10	0 12 11	78 19 2	each. 11 3 8½
3 May	Cabul	60 pairs wheels	Patent Shaft and Axle-tree Co., Ltd.		6 5 0	312 10 0					per ton. 19 3 8½
3 May	Cabul	100 c.-s. tyres for above	Vickers, Sons, & Co., Ltd.	10 10 0 20	18 0 0	351 3 3	78 16 1	21 6 2	3 16 7	958 4 1	each. 23 0 2½
3 May	Cabul	60 c.-s. axles for above	Vickers, Sons, & Co., Ltd.	9 12 1 18	19 10 0	187 12 0					each. 2 18 5½
3 May	Cabul	100 c.-s. carriage and waggon axles	Vickers, Sons, & Co., Ltd.	10 4 3 8	26 0 0	500 5 4	23 8 2	14 8 1	1 14 5	544 16 1	per ton. 2 18 5½
30 April 1890.	Routenburg	35 standard fettler's gauges	James Parker & Sons		2 12 3½	62 4 6	0 10 6	2 17 1	0 0 3	65 11 10	each. 2 18 5½
22 Mar.	Iberia	200 wrought-iron buffers	George Turton		2 14 4½	543 15 0	24 14 10	14 10 11	1 6 7	584 7 4	per ton. 379 4 7
20 April	Routenburg	3 24 ft. x 13 ft. stone-breakers	H. R. Marsden		318 10 6½	941 18 8	163 15 7	26 18 0	5 0 8	1137 18 8	per ton. 28 6 8½
31 May	Lyndhurst	100 c.-s. carriage and waggon axles	Vickers, Sons, & Co.	10 4 3 8	24 0 0	500 5 4	23 8 2	14 7 5	1 14 5	544 15 4	each. 6 0 11½
9 Mar.	Arcadia	5718 square ft. morocco hides	Heiman Kohnstamm		0 0 10½	250 3 3	7 5 7	6 16 0	0 1 4	264 0 8	per ton. 11 3 9½
18 Mar.	Culgoa	80 bars iron	The Shelton Iron and Steel Co., Ltd.	16 18 2 4	9 10 10½	160 18 8	22 4 4	4 11 5	1 13 10	189 7 10	each. 19 3 8½
31 May	Lyndhurst	50 pairs wheels	Patent Shaft and Axle-tree Co., Ltd.		6 5 0	312 10 0					per ton. 19 3 8½
31 May	Lyndhurst	100 c.-s. tyres for above	Vickers, Sons, & Co.	19 10 0 20	18 0 0	351 3 3	78 16 1	21 6 2	3 16 7	958 4 0	each. 12 13 6
31 May	Lyndhurst	60 c.-s. axles for above	Vickers, Sons, & Co.	9 12 1 18	19 10 0	187 12 0					each. 10 8 4
22 Mar.	Iberia	18 12 ft. 5 in. gas holders	James Russell & Co., Ltd.		8 15 6	157 19 0	48 4 10	4 9 2	0 7 5	211 0 5	per ton. 10 8 4
22 Mar.	Iberia	5 9 ft. 5 in. gas holders	James Russell & Co., Ltd.		6 0 8	32 8 4	13 8 0	0 13 9	0 2 0	46 17 1	each. 19 8 6½
22 Mar.	Iberia	2 6 ft. gas holders	James Russell & Co., Ltd.		4 0 3½	8 12 8	5 7 3	0 5 4	0 0 10	14 6 1	per ton. 12 13 6
20 May	Condor	60 steel sheets	The Steel Co. of Scotland	4 7 0 7	10 19 4½	47 15 0	6 10 0	1 10 1	0 8 0	55 3 1	each. 10 8 4
27 Mar.	Coromandel	427 bars Shelton Crown best angle iron	The Shelton Iron and Steel Co., Ltd.	3 11 1 0	8 15 6	268 4 3	40 2 4	7 0 5	3 1 2	318 8 2	per ton. 19 8 6½
27 Mar.	Coromandel	50 bars Shelton Crown best angle iron	The Shelton Iron and Steel Co., Ltd.	3 15 0 0	17 11 0	65 16 3	4 18 6	1 14 0	0 7 6	72 16 9	each. 10 16 0½
27 Mar.	Coromandel	26 bars Shelton Crown best angle iron	The Shelton Iron and Steel Co., Ltd.	3 1 1 3	17 8 6½	53 8 7	4 0 6	1 7 11	0 6 2	60 3 1	per ton. 10 16 0½
27 Mar.	Coromandel	170 bars Shelton Crown best angle iron	The Shelton Iron and Steel Co., Ltd.	18 2 2 10	9 2 9½	165 14 4	23 15 10	4 6 10	1 16 3	196 13 3	each. 10 3 4½
27 Mar.	Coromandel	940 bars Shelton Crown best iron	The Shelton Iron and Steel Co., Ltd.	88 19 1 11	8 10 7½	332 8 10	51 3 0	8 14 3	3 17 11	395 4 0	per ton. 12 19 4½
27 Mar.	Coromandel	400 bars Shelton Crown best iron channels	The Shelton Iron and Steel Co., Ltd.	52 1 0 20	11 5 2½	586 5 2	63 0 6	15 7 3	5 4 1	675 3 0	each. 19 1 2½
29 May	Condor	50 pairs wheels	The Patent Shaft and Axle-tree Co., Ltd.		6 5 0	312 10 0					per ton. 13 8 9½
29 May	Condor	100 c.-s. tyres	Vickers, Sons, & Co.	19 30 0 20	18 0 0	351 3 3	78 16 1	21 6 2	3 16 7	952 19 8	each. 19 1 2½
29 May	Condor	50 c.-s. axles	Vickers, Sons, & Co.	9 12 1 18	19 10 0	187 12 0					per ton. 13 8 9½
29 May	Condor	400 bars Shelton Crown best iron channels	The Shelton Iron and Steel Co., Ltd.	52 1 0 20	11 15 5½	611 12 7	65 14 6	17 10 1	4 16 5	699 12 7	each. 11 6 2
29 May	Condor	170 bars Shelton Crown best iron angles	The Shelton Iron and Steel Co., Ltd.	18 2 2 10	9 12 0½	174 11 1	22 17 9	4 10 11	1 13 8	204 2 0	per ton. 16 12 0
29 May	Condor	Cotter steel	Brown Bayler's Steel Works Co., Ltd.	0 14 1 3	14 10 0	10 7 0	0 19 9	0 8 11	0 1 4	11 17 6	each. 28 3 10
29 May	Condor	100 c.-s. carriage and waggon axles	Vickers, Sons, & Co., Ltd.	19 4 3 8	26 0 0	500 5 4	26 1 2	14 7 5	1 14 5	542 8 4	per ton. 0 2 3½
25 April	Carthage	704 I.R. cylindrical cushions	North British Rubber Co., Ltd.		0 2 2	76 5 4	1 16 9	2 4 10	0 0 8	80 7 7	each. 0 2 3½
25 April	Carthage	432 I.R. cylindrical cushions	North British Rubber Co., Ltd.		0 2 2	46 16 0	1 2 7	1 8 6	0 0 5	49 7 0	per ton. 0 0 3½
29 May	Morayshire	22502 ft. 6-in. tubes, 1-in. tubes for interlocking	Stewart Bros.		0 0 2½	218 5 8	28 3 1	7 7 6	0 15 11	284 11 9	each. 968 4 1
22 May	Star of England	2 loco. boilers for passenger engines	Dubs & Co.		808 0 0	1,616 0 0	273 3 3	3 43 2	1 4 2	1936 8 2	per ton. 0 6 5½
25 April	Carthage	50 K size lamp glasses	W. Pope & Son		0 3 3	9 2 10	6 7 7	0 10 8	0 0 4	16 1 5	each. 19 11 2½
11 June	Pericles	50 pairs wheels	Patent Shaft and Axle-tree Co., Ltd.		6 5 0	312 10 0					per ton. 19 11 2½
11 June	Pericles	100 c.-s. tyres	Vickers, Sons, & Co.	19 10 0 20	18 0 0	351 3 3	78 16 1	21 6 2	3 16 7	952 19 6	each. 19 11 6½
11 June	Pericles	50 c.-s. axles	Vickers, Sons, & Co.	9 12 1 18	19 10 0	187 12 0					per ton. 19 10 0
27 April	Hubbuck	27 bars Shelton Crown best iron angles	The Shelton Iron and Steel Co., Ltd.	2 16 2 10	17 13 5½	50 0 0	3 14 3	1 7 0	0 5 8	53 7 8	each. 19 10 0
27 April	Hubbuck	50 bars Shelton Crown best iron angles	The Shelton Iron and Steel Co., Ltd.	3 16 0 6	18 0 0	67 13 10	4 18 6	1 17 0	0 7 6	74 17 4	

APPENDIX 19—continued.  
PERMANENT WAY MATERIAL, &c.—continued.

Date of Arrival.	Name of Ship.	Description of Material.	Supplied by	Weight.	Rate.	Invoice Cost.	Freight.	English Charges.	Colonial Charges.	Total Cost.	Cost.
<b>Return of Miscellaneous Articles Imported, &amp;c.—continued.</b>											
1899.				T. c. q. lb.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
27 April	Hubbuck	55 bars Shelton Crown best iron angles.	The Shelton Iron and Steel Co., Ltd.	7 1 0 21	0 10 10 1/2	70 11 1	9 5 4	1 19 3	0 14 1	82 9 2	11 13 8 1/2
27 April	Hubbuck	60 bars Shelton Crown best iron angles.	The Shelton Iron and Steel Co., Ltd.	2 11 3 0	9 5 3	23 19 5	3 7 11	0 13 1	0 5 2	28 5 10	10 13 8
27 April	Hubbuck	605 bars Shelton Crown best iron.	The Shelton Iron and Steel Co., Ltd.	25 0 1 20	9 0 4 1/2	225 18 3	32 16 7	6 5 2	2 10 0	267 5 0	10 13 7 1/2
27 April	Hubbuck	580 bars Shelton Crown best convex iron.	The Shelton Iron and Steel Co., Ltd.	11 7 1 21	9 0 4 1/2	102 11 2	14 18 7	2 16 11	1 2 9	121 0 5	10 13 7 1/2
27 April	Hubbuck	80 bars Shelton Crown best channels.	The Shelton Iron and Steel Co., Ltd.	16 18 1 20	9 19 10 1/2	163 2 2	22 4 3	4 13 11	1 13 11	197 14 3	11 13 8 1/2
3 May	Victoria	16 12 ft. 5 in. gas holders.	James Russell & Sons, Ltd.		8 15 6	140 8 0	40 16 3	3 15 4	0 0 6	191 6 1	11 19 1 1/2
3 May	Victoria	8 6 ft. gas holders.	James Russell & Sons, Ltd.		4 0 3 1/2	34 10 3	11 6 1	0 18 6	0 3 3	46 13 1	5 16 0
1 June	Wilcannia	150 carriage-bearing springs.	Thos. Turton & Sons		1 3 0	172 10 0	11 12 0	4 11 3	0 14 8	189 8 10	1 5 3
1 June	Wilcannia	150 carriage-bearing springs.	Thos. Turton & Sons		1 3 0	172 10 0	11 12 7	4 11 8	0 14 10	189 9 1	1 5 3
1 June	Wilcannia	132 carriage-bearing springs.	Thos. Turton & Sons		1 3 0	181 16 0	10 4 8	4 8 10	0 13 0	197 2 6	1 5 4
1 June	Wilcannia	2 loco. boilers for passenger engines.	Dubs & Co.		808 0 0	1616 0 0	273 2 1	12 7 9	4 2 0	1025 12 7	967 16 3 1/2
1 June	Wilcannia	1 loco. boiler for passenger engine.	Dubs & Co.		808 0 0	808 0 0	183 11 1	21 6 7	2 1 5	967 19 1	967 10 1
1 June	Wilcannia	200 iron tubes, 4 ft. long.	John Spencer		0 9 11	90 2 6	7 8 5	2 17 3	0 8 1	109 16 3	0 10 11 1/2
1 June	Wilcannia	300 bars best iron.	Taylor Bros. & Co.	10 3 0 10	17 15 10 1/2	180 13 9	14 13 3	4 18 3	1 0 4	201 6 1	19 16 8
20 May	Valetta	370 I.R. body blocks.	Geo. Spencer		0 1 8 1/2	31 11 4	1 1 0	1 1 8	0 0 3	33 14 3	0 1 5 1/2
20 May	Valetta	343 I.R. body blocks.	Geo. Spencer		0 1 8 1/2	29 0 2	1 1 0	1 0 4	0 0 3	31 1 0	0 1 10
11 June	Pericles	1020 bars Shelton Crown best iron.	The Shelton Iron and Steel Co.	43 10 3 25	9 0 4 1/2	410 15 11	67 10 1	11 14 9	4 3 6	451 4 3	10 12 7 1/2
11 June	Pericles	420 bars Shelton Crown angles.	The Shelton Iron and Steel Co.	31 5 1 6	9 5 3	288 13 6	39 6 11	3 5 1	2 17 2	330 2 7	10 16 11 1/2
11 June	Pericles	92 bars Shelton Crown angles.	The Shelton Iron and Steel Co.	9 10 0 0	17 3 5 1/2	167 17 8	11 10 11	4 10 0	0 17 5	185 11 0	19 10 7 1/2
11 June	Pericles	730 bars Shelton Crown best iron.	The Shelton Iron and Steel Co.	36 10 3 18	9 15 0	330 6 3	49 2 10	10 3 5	3 7 0	415 10 6	11 7 8
1 June	Wilcannia	150 Tannin draw and buffer springs.	Turton Bros & Matthews		0 11 0	82 10 0	2 0 7	2 8 11	0 2 7	87 3 1	0 11 7 1/2
4 June	Ballararat	16 12 ft. 5 in. gas holders.	James Russell		8 15 6	140 8 0	47 15 11	3 12 4	0 7 5	192 3 8	12 0 2 1/2
4 June	Ballararat	10 9 ft. 5 in. gas holders.	James Russell		6 0 8	64 16 9	23 3 9	1 15 1	0 3 6	88 19 0	8 17 11
4 June	Ballararat	110 buffer and draw springs.	John Brown & Co., Ltd.		1 13 0	191 8 0	27 12 1	5 0 7	1 12 4	225 13 0	1 13 11
4 June	Ballararat	750 lamp g'asses.	W. Pope & Son		0 4 2 1/2	159 0 11	53 2 9	4 4 7	0 4 8	216 12 11	0 5 9 1/2
27 June	Fifeshire	200 iron tubes, 4 ft. long.	John Spencer		0 9 11	90 2 6	7 8 5	2 17 3	0 8 1	109 16 3	0 10 11 1/2
27 June	Fifeshire	1000 brass loco. tubes.	The Broughton Copper Co.	12 0 0 15	74 12 0 1/2	895 14 9	37 16	6 23 10 5	1 8 10	958 10 8	79 16 8
27 June	Fifeshire	2 loco. boilers for goods engines.	Boyer, Peacock, & Co.		914 0 0	1828 0 0	190 10	3 47 13 5	4 11 2	2207 14 10	1035 7 5
27 June	Fifeshire	1 loco. boiler for passenger engine.	Dubs & Co.		808 0 0	808 0 0	113 17 4	21 4 7	2 1 0	945 2 11	945 2 11
27 June	Fifeshire	1 loco. boiler for passenger engine.	Dubs & Co.		808 0 0	808 0 0	113 17 5	21 4 7	2 1 0	945 3 0	945 3 0
18 June	Parramatta	150 carriage hg. springs.	Thos. Turton & Sons		1 3 0	172 10 0	11 13 3	4 12 0	0 14 10	189 10 1	1 5 3 1/2
26 June	Liguria	200 carriage hg. springs.	Thos. Turton & Sons		1 3 0	230 0 0	15 11 1	0 5 6	0 19 9	252 16 4	1 5 3 1/2
26 June	Liguria	36 ribbon dating presses.	Jno B. Edmondson		1 18 10 1/2	70 0 0	2 3 5	2 2 7	0 0 6	74 6 6	2 1 3 1/2
26 June	Liguria	20 D retorts.	The Glenbog Union Fire Clay Co.		4 0 0	80 0 0	49 12 3	2 7 6	1 11 0	133 11 2	6 13 6 1/2
19 June	Parramatta	50 head or tail lamps.	J. Deffries & Son		1 10 0	75 0 0	10 16 6	2 3 2	0 1 6	88 0 2	1 15 2 1/2
12 Jan.	Firth of Solway	5 Mogul passenger loco. engines.	Dubs & Co.		2766 0 0	18325 0 0		221 4 0		14046 4 0	2309 4 10
22 Mar.	Queen Elizabeth	5 Mogul passenger loco. engines.	Dubs & Co.		2766 0 0	18325 0 0		221 4 0		14046 4 0	2309 4 10
22 Mar.	Riverina	302 brass loco. tubes.	The Broughton Copper Co., Ltd.	4 9 2 2	60 13 4	271 10 9	17 10	1 7 7 7	0 11 1	296 19 6	66 7 0
19 June	Orontes	100 wrought-iron buffers.	Geo. Turton		2 16 10 1/2	234 7 6	10 1 3	3 2 11	0 13 2	303 4 10	3 0 7 1/2
19 June	Orontes	100 wrought-iron buffers.	Geo. Turton		2 16 10 1/2	234 7 6	10 1 2	3 2 10	0 13 3	303 4 11	3 0 7 1/2
19 June	Orontes	100 wrought-iron buffers.	Geo. Turton		2 16 10 1/2	234 7 6	10 1 2	3 3 0	0 13 3	303 4 11	3 0 7 1/2
19 June	Orontes	23 sets aut. brake fittings.	The Westinghouse Brake Co., Ltd.		22 0 0	616 0 0	8 6	6 17 12 6	0 5 0	642 4 0	22 18 8 1/2
19 June	Orontes	1 patent magnetting machine.	John Parkinson		18 0 0	18 0 0	1 3 6	0 13 2	0 0 4	19 10 11	19 16 11
23 June	Oceana	150 carriage-bearing springs.	Thos. Turton & Sons		1 3 0	172 10 0	10 13 0	4 11 4	0 14 10	188 11 2	1 5 1 1/2
23 June	Oceana	250 wagon-bearing springs.	Thos. Turton & Sons		0 14 8	178 2 6	17 10 4	4 13 11	1 4 3	201 11 0	0 16 12
23 June	Oceana	103 buffer and draw springs.	Chas. Cammell & Co.		2 7 6	236 10 0	21 18 1	6 12 9	1 10 4	256 11 2	2 13 0 1/2
26 June	Liguria	Soft (copper) bolts.	Pascoe, Grenfell & Sons	18 10 0 19	61 15 6	634 10 0	25 19	5 22 10 10	1 10 5	834 10 8	65 10 0

Indent for Raw Material required for the manufacture in the Colony of New South Wales of 10 Locomotive Boilers and Tenders, being respectively 5 each of Classes 131 and 304. Colonial Contracts dated 21st June and 20th October, 1888.

1888.					£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
18 July	Valetta	65 steel T bars	David Colville & Sons	1 19 2 17	8 6 0	16 8 7	3 2 0	0 14 3	0 3 7	20 8 11	10 6 4
25 July	Garonne	1000 2in. steel tubes	John Wilson & Sons		0 7 3 1/2	303 7 3	42 16 5	9 16 11	1 7 9	417 8 4	0 8 4 1/2
11 July	Iberia	457 bars iron	David Colville & Sons	16 6 3 0	9 10 1 1/2	155 6 2	25 11 9	4 7 9	1 10 0	180 18 3	11 8 0 1/2
11 July	Iberia	80 channels iron	David Colville & Sons	10 3 3 8	9 0 4 1/2	91 18 2	16 1 1	2 11 2	0 18 8	111 0 1	10 18 8 1/2
11 July	Iberia	95 angles iron	David Colville & Sons	2 1 3 14	7 16 0	16 6 8	3 6 0	0 9 7	0 3 10	20 0 1	9 14 0
11 July	Iberia	68 plates iron	David Colville & Sons	8 11 0 22	9 10 1 1/2	81 7 6	13 9 7	2 5 9	0 15 8	97 18 6	11 8 8 1/2
11 July	Iberia	9 plates iron	David Colville & Sons	2 9 2 7	9 19 10 1/2	24 15 3	3 13 0	0 13 7	0 4 6	29 11 4	11 18 8 1/2
11 July	Iberia	28 barrels rivets, steel	David Colville & Sons	5 5 0 11	14 2 9	74 5 10	8 5 6	2 4 11	0 9 8	85 5 11	10 4 7 1/2
26 July	Britannia	2 barrels rivets, steel	David Colville & Sons	0 7 2 0	14 2 9	5 6 1	1 1 0	0 8 9	0 0 8	16 8 6	18 3 0
0 Aug.	Cuzco	1170 steel tubes, 2in.	John Wilson & Son		0 6 8 1/2	391 14 9	45 17	1 10 11 11	1 9 1	440 12 10	0 7 8 1/2
26 July	Britannia	104 boiler plates	The Steel Co. of Scotland	38 0 3 7	9 15 0	370 17 11	69 18	4 9 17 5	4 5 8	444 10 4	11 13 11 1/2
26 July	Britannia	203 boiler plates	The Steel Co. of Scotland	33 12 2 0	8 8 2 1/2	282 15 4	52 19 3	7 11 9	3 15 8	347 2 0	10 6 5 1/2
5 Sept.	Lusitania	10 angles	The Steel Co. of Scotland	0 3 0 21	10 8 8 1/2	1 3 0	0 3 8	0 0 9	0 0 0	1 3 5	8 13 3 1/2
5 Sept.	Lusitania	80 channels	The Steel Co. of Scotland	9 11 1 7	9 12 6 1/2	92 2 0	11 6 1	2 13 11	0 27 7	100 10 7	11 3 8
5 Sept.	Lusitania	93 bars iron	The Steel Co. of Scotland	9 2 2 7	8 17 11 1/2	81 4 4	11 9 0	2 5 4	0 16 6	95 15 11	10 9 10 1/2
5 Sept.	Lusitania	10 angles iron	The Steel Co. of Scotland	0 12 2 7	8 8 2 1/2	5 5 6	1 5 0	0 2 10	0 1 1	6 14 11	10 15 0
5 Sept.	Lusitania	109 boiler plates	The Steel Co. of Scotland	21 0 3 0	0 15 0	203 2 6	26 15 6	5 14 5	1 18 7	230 10 11	11 7 8 1/2
5 Sept.	Lusitania	10 boiler plates	The Steel Co. of Scotland	4 16 1 7	9 15 0	46 19 1	4 2 4	1 6 2	0 9 10	52 16 5	10 19 5
5 Sept.	Lusitania	451 bars iron	The Steel Co. of Scotland	6 14 3 0	8 17 11 1/2	69 18 10	5 15 3	1 13 5	0 12 4	67 19 10	10 1 10
5 Sept.	Lusitania	48 boiler plates	The Steel Co. of Scotland	6 4 1 7	7 17 6 1/2	52 6 6	7 19 4	1 9 3	0 11 5	62 5 6	10 0 4 1/2
7 Sept.	Parramatta	85 steel angles	The Steel Co. of Scotland	1 15 3 21	8 8 2 1/2	15 2 3	2 12 0	0 8 6	0 3 2	18 6 0	10 3 8
14 Sept.	Parramatta	37 nuts steel boiler rivets.	The Steel Co. of Scotland	5 3 2 7	13 3 3	74 14 9	8 15 0	2 2 2	0 11 2	86 3 10	15 3 7
15 Nov.	Iberia	65 tees	The Steel Co. of Scotland	2 0 0 0	8 17 11 1/2	17 15 10	2 7	2 0 10 4	0 3 8	21 3 0	10 11 0

APPENDIX 19—continued.

PERMANENT WAY MATERIAL, &c.—continued.

Table with columns: Date of Arrival, Name of Ship, Description of Material, Supplied by, Weight, Rate, Invoice Cost, Freight, English Charges, Colonial Charges, Total Cost, Cost. Includes entries for 1890 with various ship names like Ulrica, Echuca, Arcadia, etc.

Indent for Permanent Way Materials for Relaying Southern, Western, and Northern Lines, T Rails (80 lb.), and Fastenings.

Table with columns: Date of Arrival, Name of Ship, Description of Material, Supplied by, Weight, Rate, Invoice Cost, Freight, English Charges, Colonial Charges, Total Cost, Cost. Includes entries for 20 Feb, 7 Mar, 2 April, etc.

Indent for Permanent Way Materials. To repay Fastenings borrowed for maintenance from Construction Stock for T Rails

70 lb. per yard.

Table with columns: Date of Arrival, Name of Ship, Description of Material, Supplied by, Weight, Rate, Invoice Cost, Freight, English Charges, Colonial Charges, Total Cost, Cost. Includes entries for 1890, 27 Dec, 31 Dec, etc.

Indent for Permanent Way Materials for Renewals. Extra Fastenings for double-headed Rails, 75 lb. per yard.

Table with columns: Date of Arrival, Name of Ship, Description of Material, Supplied by, Weight, Rate, Invoice Cost, Freight, English Charges, Colonial Charges, Total Cost, Cost. Includes entries for 31 Dec, 17 Sept, 5 Nov.

Indent for Permanent Way Materials for Renewals. Extra Fastenings for T Rails, 70 lb. per yard.

Table with columns: Date of Arrival, Name of Ship, Description of Material, Supplied by, Weight, Rate, Invoice Cost, Freight, English Charges, Colonial Charges, Total Cost, Cost. Includes entries for 31 Dec, 27 Dec, 27 Dec, etc.

APPENDIX 19—continued.  
PERMANENT WAY MATERIAL, &c.—continued.

Date of Arrival.	Name of Shp.	Description of Material	Supplied by	Weight.	Rate.	Invoice Cost.	Freight.	English Charges.	Colonial Charges.	Total Cost.	Cost.
<b>Indent for Permanent Way Materials for Duplicating Line, Granville to Liverpool. Bullheaded Rails, 30 ft. long (80 lb. per yard), and Fastenings.</b>											
1899.				T. c. q. lb.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
7 Mar.	British General	30000 chair-spikes	Patent Nut and Bolt Co., Ltd.	44 12 3 12	11 0 0	491 1 5	3712 0 0	9 2 2	3 18 1	541 13 8	12 2 84
2 April	Don	14000 bolts and nuts	Ibbotson Bros. & Co.	8 19 2 6	18 2 6	162 14 5	7 10 0	3 2 0	0 14 3	174 1 2	19 7 0
9 Mar.	Port Denison	2521 chairs	Head, Wrightson, & Co.	50 15 0 0	3 19 6	202 6 7	40 1 8	4 8 10	4 0 7	250 17 8	4 18 7
9 Mar.	Aradia	2440 chairs	Head, Wrightson, & Co.	49 2 0 0	3 19 6	195 3 5	38 13 4	3 12 7	8 17 9	241 7 1	4 18 4
7 April	Port Fairy	1420 chairs	Head, Wrightson, & Co.	23 12 0 0	3 19 6	113 13 8	22 10 0	2 6 8	2 5 3	140 16 1	4 18 5
3 May	Cabul	1289 chairs	Head, Wrightson, & Co.	25 10 3 0	3 19 6	103 6 0	16 11 4	2 1 3	2 7 6	121 6 1	4 15 8
4 April	Britannia	6516 fish-plates	Bolckow, Vaughan, & Co.	48 10 3 12	8 1 0	374 13 5	47 4 4	4 10 0	4 1 4	430 9 7	9 0 0
11 June	Ardencaple	544 rails	Bolckow, Vaughan, & Co.	300 8 2 8	5 13 6	1704 18 7	101 10 6	20 19 0	22 10 8	1945 19 3	6 9 6
11 June	Pericles	281 rails	Bolckow, Vaughan, & Co.	100 1 1 20	5 13 6	567 18 2	63 10 0	1 5 7	7 10 1	648 5 8	6 9 6
3 May	Victoria	281 rails	Bolckow, Vaughan, & Co.	100 2 0 16	5 13 6	563 2 1	78 16 9	3 4 11	7 10 2	602 13 13	0 12 4
4 June	Ballarut	7640 chairs	Head, Wrightson, & Co.	153 15 0 20	3 19 6	611 3 10	121 1 9	11 3 0	12 3 5	755 12 0	4 18 3
19 June	Orontes	40000 teak keys	Bayliss, Jones, & Bayliss		19 8 9	777 10 0	76 15 6	14 9 2	1 19 0	870 13 8	21 15 4
19 June	Orontes	140 rails	Bolckow, Vaughan, & Co.	40 19 1 4	5 13 6	288 10 11	31 17 0	4 12 1	3 15 0	323 15 0	6 9 7
23 June	Oceana	4624 chairs	Head, Wrightson, & Co.	95 0 1 0	3 19 6	377 13 6	74 16 6	6 13 7	7 10 6	403 19 0	4 18 3
18 June	Parramatta	10555 chairs	Head, Wrightson, & Co.	218 4 1 14	3 19 6	867 8 4	171 16 11	15 15 15	3 17 6	1072 6 0	4 18 3

Indent for Permanent Way Materials for Duplicating Line, Teralba to Adamstown. Bullheaded Rails, 30 ft. (80 lb. per yard) and Fastenings.

19 Feb.	Beauloch	6590 chair-spikes	Patent Nut and Bolt Co.	36 16 0 5	11 0 0	404 16 6	30 19 10	7 11 11	3 4 4	446 12 7	12 2 84
25 Mar.	Theophane	11600 bolts and nuts	Ibbotson Bros. & Co.	7 8 2 26	18 2 6	134 15 9	6 4 4	2 12 1	0 11 9	144 3 11	19 8 11
18 Mar.	Culgoon	286 rails	Bolckow, Vaughan, & Co.	102 2 3 12	5 13 6	573 13 2	80 8 9	0 11 7	13 3	676 19 1	6 12 6
5 April	Murrumbidgee	404 rails	Bolckow, Vaughan, & Co.	144 5 2 24	5 13 6	818 36 6	113 12 7	12 16 1	10 16 5	956 1 7	0 12 6
16 Mar.	Dana-cus	2580 fish-plates	Bolckow, Vaughan, & Co.	20 11 1 20	8 1 0	185 12 0	20 17 5	2 5 6	1 10 0	199 10 19	0 5 3
9 Mar.	Aradia	2510 chairs	Head, Wrightson, & Co.	51 5 0 0	3 19 6	293 14 4	40 7 2	3 16 7	4 1 2	251 19 3	4 18 4
3 May	MacCullum More.	2931 chairs	Head, Wrightson, & Co.	60 7 0 0	3 19 6	233 17 10	38 9 6	4 12 0	4 15 7	287 14 11	4 15 4
31 May	Lyndhurst	456 rails	Bolckow, Vaughan, & Co.	23 8 2 24	5 13 6	1323 11 5	149 7 2	2 1 17	11 17 11	1517 10 11	6 9 6
8 May	Cabul	1248 chairs	Head, Wrightson, & Co.	25 2 0 0	3 19 6	93 29 4	16 0 8	1 19 5	1 19 10	119 19 8	4 15 5
29 May	Condor	2263 fish-plates	Bolckow, Vaughan, & Co.	16 4 0 0	8 1 0	180 8 2	13 12 9	1 18 4	1 8 4	147 7 7	0 1 11
30 April	Routenburn	1551 rails	Bolckow, Vaughan, & Co.	555 0 0 0	5 13 6	3149 12 6	353 16 3	349 12 5	4 12 6	3504 14 8	6 9 6
29 May	Combermere	33000 teak keys	Bayliss, Jones, & Bayliss		19 8 9	611 8 9	63 4 0	11 18 7	1 12 1	718 3 5	21 15 3
27 April	Hubbuck	10218 chairs	Head, Wrightson, & Co.	293 3 1 24	3 19 6	819 10 9	162 7 4	15 17 4	4 16 6	5 1014 1 10	4 18 4
10 May	Port Phillip	2390 chairs	Head, Wrightson, & Co.	48 2 0 5	3 19 6	191 4 2	37 17 7	3 10 5	3 16 2	236 14 4	4 18 5
3 May	Victoria	4514 chairs	Head, Wrightson, & Co.	90 17 2 10	3 19 6	361 4 11	71 11 4	6 12 8	7 3 13	446 12 10	4 18 3
19 May	Port Victor	5164 chairs	Head, Wrightson, & Co.	163 18 2 23	3 19 6	413 2 9	81 16 10	8 0 7	8 4 7	511 4 9	4 18 4
3 May	Victoria	648 fish-plates	Bolckow, Vaughan, & Co.	4 12 2 3	8 1 0	87 5 2	4 18 9	0 8 11	0 8 1	42 15 11	0 4 11
28 June	Oceana	260 chairs	Head, Wrightson, & Co.	5 4 1 0	3 19 6	20 14 5	4 2 0	0 17 0	0 8 3	26 2 2	5 0 1

Indent for Permanent Way Materials for Renewals. D.H. Rails, 30 ft. (76 lb. per yard), and Fastenings.

31 Dec.	Ladakh	2210 c.-i. chairs	Head, Wrightson, & Co.	25 6 0 0	3 17 6	93 0 9	16 2 7	1 19 1	2 0 1	118 2 6	4 13 3
31 Dec.	Ladakh	6200 bolts and nuts	Bayliss, Jones, & Bayliss	3 11 0 0	16 10 0	53 11 6	2 19 6	1 4 0	0 6 1	63 1 8	17 15 5
3 Dec.	Patriarch	2552 c.-i. chairs	Head, Wrightson, & Co.	29 9 0 0	3 17 6	114 2 5	18 15 6	2 5 3	2 6 8	187 9 10	4 13 3
3 Dec.	Patriarch	33000 chair-spikes	Ibbotson Bros. & Co.	18 12 0 19	10 15 0	200 0 0	15 10 9	3 16 6	1 12 3	220 10 6	11 15 3
1899.											
4 Feb.	Cambrian Prince	3721 c.-i. chairs	Head, Wrightson, & Co.	43 1 0 0	3 17 6	166 16 5	27 8 11	3 4 1	3 8 2	200 17 11	4 13 4
1893.											
27 Dec.	Battle Abbey	7516 c.-i. chairs	Head, Wrightson, & Co.	86 15 1 8	3 17 6	336 4 5	55 0 4	6 7 5	6 17 5	404 15 7	4 13 3
1899.											
19 Feb.	Beauloch	3100 fish-plates	Guest & Co.	15 7 3 26	7 10 0	115 0 11	12 15 11	1 16 4	1 6 7	131 8 9	8 10 8
19 Feb.	Ulrica	294 rails	Bolckow, Vaughan, & Co.	99 15 0 0	4 18 3	490 0 6	63 11 10	8 8 4	7 9 8	369 10 4	6 14 3
7 Mar.	British General	652 rails	Bolckow, Vaughan, & Co.	221 4 1 4	4 18 3	1086 14 2	141 0 7	18 8 10	.....	1246 8 7	5 12 8
26 Feb.	Lochee	291 rails	Bolckow, Vaughan, & Co.	99 15 0 0	4 18 3	490 0 6	63 11 10	8 8 4	.....	369 10 4	6 14 3
31 Jan.	Bayley	310 rails	Bolckow, Vaughan, & Co.	193 3 2 8	4 18 3	516 18 9	82 16 7	8 13 0	7 17 10	616 6 2	5 17 2

Indent for Permanent Way Materials for Renewals. Bullheaded Rails (80lbs.) 30 feet.

1899											
26 Nov.	Hubbuck	64800 chair spikes	Ibbotson, Bros., & Co.	37 10 0 0	10 0 0	395 5 0	37 14 8	6 17 1	1 3 5	494 1 9	11 11 6
23 Nov.	Hubbuck	30900 oak keys	Ransomer & Rapier		10 0 0	300 0 0	142 2 10	5 10 11	1 14 3	449 8 0	14 19 7
21 Dec.	Bungaree	40000 oak keys	Ransomer & Rapier		10 0 0	400 0 0	189 10 0	7 15 1	2 7 1	593 12 2	14 19 9
26 Nov.	Hubbuck	5632 c.-i. chairs	Head, Wrightson, & Co.	162 17 3 25	3 15 6	614 13 10	128 5 7	12 2 5	12 17 11	768 4 9	4 14 4
15 Nov.	Iberia	26000 bolts and nuts	Ibbotson, Bros., & Co.	16 7 2 10	14 2 0	231 8 6	16 11 8	4 2 6	1 8 7	253 11 3	15 0 7
2 Dec.	Bungaree	3195 c.-i. chairs	Head, Wrightson, & Co.	79 3 2 0	3 15 6	285 17 1	55 9 3	5 11 10	6 11 6	332 9 8	4 14 5
21 Dec.	Bungaree	47500 chair spikes	Ibbotson, Bros., & Co.	27 18 3 9	10 0 0	257 15 11	28 2 9	5 9 4	2 8 6	323 16 6	11 11 9
28 Nov.	Austral	4755 c.-i. chairs	Head, Wrightson, & Co.	96 16 0 0	3 15 6	395 8 5	76 4 7	4 10 7	13 3 4	565 11 1	4 14 4
9 Dec.	Cuzco	653 rails	Bolckow, Vaughan, & Co.	235 14 1 4	4 17 3	1140 3 3	185 12 6	10 16 7	17 13 7	1369 5 10	5 16 2
25 Dec.	Orient	749 rails	Bolckow, Vaughan, & Co.	294 5 2 24	4 17 3	1235 1 9	203 2 7	2 2 1	7 19 16	1535 2 4	5 16 2
1899.											
21 Jan.	Elderslie	810 rails	Bolckow, Vaughan, & Co.	300 0 0 0	4 17 3	1453 15 0	236 5 0	26 5 5	5 22 10	1743 15 5	5 16 3
21 Jan.	Elderslie	10300 fish-plates	Bolckow, Vaughan, & Co.	76 3 1 21	7 5 0	552 4 11	77 3 5	7 12 4	6 13 0	643 13 8	8 0 0
26 Feb.	Lochee	480 rails	Bolckow, Vaughan, & Co.	100 0 0 0	4 17 3	486 5 0	63 15 0	8 8 1	.....	558 8 1	5 11 8
26 Feb.	Lochee	250 rails	Bolckow, Vaughan, & Co.	100 0 0 0	4 17 3	486 5 0	63 15 0	8 8 2	.....	558 8 2	5 11 8
9 Jan.	Lauzania	379 rails	Bolckow, Vaughan, & Co.	125 7 0 16	4 17 3	653 3 6	106 11 10	11 0 7	10 3 0	780 7 11	5 16 2
10 Feb.	Ulrica	196 rails	Bolckow, Vaughan, & Co.	70 0 0 0	4 17 3	340 7 6	44 12 0	5 18 9	5 5 5	396 3 9	5 13 2
19 Feb.	Beauloch	250 rails	Bolckow, Vaughan, & Co.	100 0 0 0	4 17 3	486 5 0	63 15 0	8 8 4	.....	565 13 0	5 13 2
17 Jan.	Port Caroline	14555 c.-i. chairs	Head, Wrightson, & Co.	295 0 1 9	3 15 6	1113 13 9	232 0 6	21 15 0	22 7 1	1301 2 4	4 14 3
7 Mar.	British General	250 rails	Bolckow, Vaughan, & Co.	100 0 0 0	4 17 3	486 5 0	63 15 0	8 8 0	.....	558 8 0	5 11 8
8 Mar.	Agnes Oswald	17 rails	Bolckow, Vaughan, & Co.	6 1 1 20	4 17 3	29 10 5	3 17 0	0 12 8	0 0 1	84 9 8	5 13 7
31 Jan.	Bayley	15116 c.-i. chairs	Head, Wrightson, & Co.	393 18 3 10	3 15 6	1147 7 7	239 7 2	22 4 4	4 24 1	3143 0 4	4 14 3
31 Jan.	Bayley	1048 rails	Bolckow, Vaughan, & Co.	374 5 2 24	4 17 3	1919 19 4	294 15 1	31 8 5	23 1 5	2174 4 3	5 16 2
20 Feb.	Echuca	9304 c.-i. chairs	Head, Wrightson, & Co.	197 8 3 6	3 15 6	746 6 8	155 9 0	14 9 7	7 15 12	930 18 7	4 14 3

APPENDIX 19—continued.  
PERMANENT WAY MATERIAL, &c.—continued.

Date of Arrival.	Name of Ship.	Description of Material.	Supplied by	Weight.	Rate.	Invoice Cost.	Freight.	English Charges.	Colonial Charges.	Total Cost.	Cost.
<b>Indent for Permanent-way Materials for Renewals S.T. Rails, 30 feet, 80 lb., and Fastenings.</b>											
1889.				T. c. q. lb.)	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
27 Dec.	Battle Abbey	15200 bolts and nuts	Thbotson Bros. & Co.	9 0 3 20	18 0 0	162 16 0	7 11 0	3 3 0	0 15 8	174 6 5	19 6 5
3 "	Patnarch	15200 "	Patent Nut and Bolt Co.	8 15 1 15	16 0 0	140 6 2	7 7 10	2 15 8	0 15 4	151 5 0	17 5 0
3 "	"	40000 screws	"	17 17 16	17 10 0	312 10 0	15 0 0	5 18 8	1 11 3	335 0 5	18 15 27
1890.											
7 Feb.	Cambrian Prince.	40000 "	"	17 17 0 16	17 10 0	312 10 0	15 0 11	5 17 10	1 11 8	335 0 0	18 15 23
1 "	Atlanta	15200 fish-plates	Charles Cammell & Co.	72 3 2 15	6 17 6	496 5 2	57 19 10	7 6 7	0 0 5	546 12 0	7 17 31
17 "	Windsor Park	80000 spikes	Ibbotson Bros. & Co.	33 10 1 16	11 2 0	367 15 9	27 12 2	0 18 2	2 17 4	405 2 11	12 5 11
17 "	"	642 rails	Bolekw, Vaughan, & Co.	193 11 1 20	5 1 0	952 7 6	123 8 0	26 9 1	14 10 4	1136 14 11	5 17 64
31 Jan.	Micronesia	1120 "	"	400 0 0 0	5 1 6	2030 0 0	255 0 0	33 17 3	....	2318 17 3	6 16 114
7 Mar.	British General	240 "	"	100 0 0 0	5 1 6	507 19 0	43 15 0	8 10 4	....	579 15 4	5 15 114
10 Feb.	Ulrica	348 "	"	124 5 2 21	5 1 6	630 15 0	79 4 8	10 12 9	0 6 5	729 18 10	5 17 64
25 Mar.	Thephano	539 "	"	192 10 0 0	5 1 0	970 18 0	122 14 5	16 4 10	14 8 0	1130 0 9	5 17 54
26 Feb.	Lochee	1424 "	"	510 0 0 0	5 1 0	2535 5 0	325 2 6	43 2 6	13 11 1	3270 1 11	5 16 54
31 Jan.	Rayley	830 "	"	314 5 2 24	5 1 6	1595 0 0	247 10 1	26 12 2	23 11 5	1592 13 8	6 0 54
8 Mar.	Agnes Oswald	812 "	"	300 14 1 4	5 1 6	1520 2 6	191 14 1	25 5 7	22 11 1	1765 13 8	5 17 54
30 Jan.	Australasian	221 "	"	73 10 2 8	5 1 6	400 11 3	62 3 3	6 15 10	5 18 5	475 8 9	6 0 44

APPENDIX 20.

RAILWAY Return of the number and nature of the Accidents and Injuries to Life and Limb which have occurred during the year ending 30th June, 1890.

Date of Accident.	Passengers killed or injured.		Servants of the Department or of Contractors killed or injured.		Trespassers, &c.		Nature or Causes of Accident.
	Cause beyond their own control.	Their own misconduct or want of caution.	Cause beyond their own control.	Their own want of caution.	Own want of caution.		
1889.							
1 June.	Killed	Injured	Killed	Injured	Killed	Injured	Man found on line near Granville; leg cut off.
3 "	...	...	...	...	...	...	Do do Redfern tunnel.
3 "	...	...	...	...	...	...	Man run over, Darling Harbour.
4 "	...	...	...	...	...	...	Boy caught between truck and sheep-race at Culcairn.
5 "	...	...	...	...	...	...	Boy killed, Excelsior siding.
10 "	...	...	...	...	...	...	Employee, shunter, Darling Harbour, crushed between buffers.
13 "	...	...	1	...	...	...	Lady leaving train in motion, Newtown.
15 "	...	...	...	...	...	...	Fireman broke arm, Old Junee.
15 "	...	...	...	...	...	...	Porter fell down, injured his knee, Newcastle.
20 "	...	...	...	...	1	...	Locomotive inspector killed, Bathurst.
21 "	...	...	...	...	1	...	Fettler killed, Murrumbidgee.
21 "	...	...	...	...	...	1	Guard fell over crate, Fairfield.
21 "	...	...	...	...	...	1	Ganger injured, through trolley running over a dog.
22 "	...	...	...	...	...	1	Shunter's hand crushed at Bullock Island.
23 "	...	...	1	...	...	...	Passenger fell out of car between Muswellbrook and Aberdeen.
25 "	...	...	...	...	...	1	Shunter's arm run over at Dubbo.
5 July.	...	...	1	...	...	...	Little girl left train in motion at Burwood.
9 "	...	...	...	...	...	1	Man run over at Darling Harbour.
12 "	...	...	...	...	...	1	Do do near Glenfield.
15 "	...	...	1	...	...	...	Woman fell on bridge at Burwood and broke leg.
15 "	...	...	...	...	...	1	Man's hand hurt in catch of dump-car.
20 "	...	...	...	...	1	...	Man killed; stone fell on his hand. Mudgee line.
22 "	...	...	...	...	...	1	Boy's leg injured at Hamilton, getting on coal-waggon.
24 "	...	...	...	...	...	1	Guard injured leg at Tintinhull, entering van in motion.
24 "	...	...	...	...	...	1	Ganger injured at Stanwell Park; trolley struck by engine.
27 "	...	...	1	...	...	...	Passenger fell on platform at Arncliffe; broke leg.
27 "	...	...	...	...	...	1	Man injured, Cockle Creek; fall of earth in cutting.
27 "	...	...	...	...	...	1	Porter's foot crushed between points, Strathfield.
27 "	...	...	...	...	...	1	Fettler knocked down at Eveleigh.
30 "	...	...	...	...	...	1	Little girl crossing line at Croydon.
30 "	...	...	...	...	...	1	Fettler knocked down; leg and foot cut off.
31 "	...	...	...	...	1	...	Gatekeeper run over at Wickham.
3 Aug.	...	...	...	...	...	1	Man knocked down at Carlton.
3 "	...	...	1	...	...	...	Passenger entering train in motion at Carlton.
5 "	...	...	...	...	...	1	Porter's foot crushed loading machinery.
9 "	...	...	...	...	1	...	Gatekeeper knocked down by goods, Bowenfels.
10 "	...	...	...	...	...	1	Little girl knocked down by train, Thornleigh.
12 "	...	...	...	...	...	1	Driver of omnibus injured at Plattsburg.
12 "	...	...	...	...	...	1	Porter's hand injured at Honeysuckle Point.
15 "	...	...	1	...	...	...	Passenger fell from platform, Bethunga; broke leg.
16 "	...	...	...	...	...	1	Fettler injured near Springwood; trolley run into.
17 "	...	...	...	...	...	1	Porter's foot crushed at Rooty Hill.
20 "	...	...	...	...	...	1	Engineman's finger broken.
23 "	...	...	...	...	...	1	Man fell at Darling Harbour; fractured collar-bone.
23 "	...	...	...	...	...	2	Two young men knocked down at Hexham.
23 "	...	...	...	...	...	1	Young man knocked down, same train, at Hexham.
23 "	...	...	...	...	...	1	Porter crushed between buffers, Tenterfield.
26 "	...	...	...	...	...	1	Fettler fell over bridge between Carrick and Marulan.
26 "	...	...	...	...	...	1	Fettler knocked down at Strathfield.
27 "	...	...	...	...	...	1	Man run over by engine, Bullock Island.
29 "	...	...	...	...	...	1	Officer-in-charge knocked down by train.
29 "	...	...	...	...	...	1	Porter jammed between buffers at Gunnedah.
5 Sept.	...	...	...	...	...	1	Assistant guard's foot crushed at Auburn.
7 "	...	...	...	...	...	1	Man knocked down between Fassfern and Teralba.
7 "	...	...	...	...	...	1	Do do at Burwood crossing.

## APPENDIX 20—continued.

Date of Accident.	Passengers killed or injured.		Servants of the Department or of Contractors killed or injured.				Trespassers, &c.		Nature or Causes of Accidents.
	Causes beyond their own control.	Their own misconduct or want of caution.	Causes beyond their own control.	Their own want of caution.	Causes beyond their own control.	Their own want of caution.	Own want of caution.		
	Killed	Injured.	Killed	Injured.	Killed	Injured	Killed	Injured.	
1889.									
7 Sept...	...	...	...	...	...	...	1	...	Shunter's foot crushed at Newcastle.
9 "	...	...	...	...	...	...	1	...	Guard hurt his back.
10 "	...	...	...	...	...	...	1	...	Shunter knocked down.
11 "	...	...	...	...	...	...	1	...	Woman knocked off bridge near Corrimal.
11 "	...	...	...	...	...	...	1	...	Porter's leg broken loading galvanized iron.
14 "	...	...	...	...	...	...	...	1	Boy fell between cars and platform at Blacktown.
17 "	...	...	...	...	...	...	1	...	Fettler run over by empty train, Petersham.
19 "	...	...	...	...	...	...	1	...	Guard dislocated shoulder.
23 "	...	...	...	...	...	...	1	...	Guard's hand injured at Granville.
26 "	...	...	...	...	...	...	1	...	Man's hand injured at Stanwell Park.
3 Oct...	...	...	...	...	...	...	1	...	Porter injured at Coolaman; fell from waggon.
4 "	...	...	...	...	...	...	2	...	Ganger and fettler killed; trolley ran into.
5 "	...	...	...	...	...	...	1	...	Guard's leg cut off, Sydney.
6 "	...	...	...	...	...	...	1	...	Fireman crushed between buffers, Gundagai.
8 "	...	...	...	...	...	...	1	...	Porter run over at Bathurst.
9 "	...	...	...	...	...	...	1	...	Porter knocked down, Sydney.
10 "	...	...	1	...	...	...	...	...	Passenger leaving train in motion at Hamilton.
11 "	...	...	...	...	...	...	1	...	Fettler's leg injured near Quirindi.
13 "	...	...	...	...	...	...	1	...	Telegraph porter fell from train at East Maitland.
16 "	...	...	...	...	...	...	1	...	Porter's hand crushed.
17 "	...	...	...	...	...	...	1	...	Man knocked down between Picton and Douglas Park.
18 "	...	...	1	...	...	...	...	...	Passenger left train in motion at Ashfield.
21 "	...	...	1	...	...	...	...	...	Do do Granville.
22 "	...	...	...	...	...	...	1	...	Man found dead on line near Teraba.
24 "	...	...	...	...	...	...	1	...	Fireman injured his back getting on engine at Eveleigh.
24 "	...	...	...	...	...	...	1	...	Man found dead on line at North Goulburn.
25 "	...	...	...	...	...	...	1	...	Man injured by fall of earth, Gundagai.
26 "	...	...	...	...	...	...	1	...	Labourer's hand injured at Blayney.
28 "	...	...	...	...	...	...	1	...	Fettler knocked down at Sydney tunnel.
31 "	...	...	...	...	...	...	...	1	Man injured at Wentworth Falls.
2 Nov...	...	...	...	...	...	...	1	...	Telephone boy run over at Eveleigh.
2 "	...	...	...	...	...	...	1	...	Shunter broke leg at Narrandera.
4 "	...	...	...	...	...	...	1	...	Cleaner's leg crushed at Armidale.
4 "	...	...	...	...	...	...	1	...	Gatekeeper struck by train at Orange.
7 "	...	...	1	...	...	...	...	...	Woman left train in motion, Sydney; injured leg.
10 "	...	...	1	...	...	...	...	...	Do do Erskinville.
11 "	...	...	...	...	...	...	1	...	Fettler's arm injured at Mumbil.
18 "	...	...	1	...	...	...	...	...	Girl slightly injured at Hamilton; left train in motion.
19 "	...	...	...	...	...	...	1	...	Shunter's head injured, Darling Harbour.
23 "	...	...	...	...	...	...	1	...	Ganger run over by train at Willow-tree.
24 "	...	...	...	...	...	...	1	...	Ganger seriously injured; tricycle ran off road.
26 "	...	1	...	...	...	...	...	...	Passenger's leg injured at Hawkesbury River.
27 "	...	...	...	...	...	...	1	...	Fettler's finger broken; stone fell on it at Eveleigh.
1 Dec...	...	...	...	...	...	...	1	...	Man found on line at Cardiff.
1 "	...	...	...	...	...	...	...	1	Boy dropped lighted match in spirit cask.
2 "	...	...	...	...	...	...	1	...	Shunter's lips crushed at Darling Harbour.
3 "	...	...	1	...	...	...	...	...	Passenger fell in front of train at Clyde; leg crushed.
3 "	...	...	...	...	...	...	1	...	Fettler's head injured, Bathurst yard.
11 "	...	...	...	...	...	...	1	...	Porter run over at Hurstville.
13 "	...	...	...	...	...	...	1	...	Child run over at Bullock Island.
15 "	...	...	...	...	...	...	1	...	Do Hamilton.
15 "	...	...	...	...	...	...	1	...	Woman knocked down at Hamilton.
22 "	...	...	...	...	...	...	1	...	Man's body found on line between Otford and Lilydale.
23 "	...	...	...	...	...	...	1	...	Engine driver fell from engine.
24 "	...	...	1	...	...	...	...	...	Man attempting to enter train in motion at Katoomba.
25 "	...	...	...	...	...	...	1	...	Man's foot run over by engine, Darling Harbour.
26 "	...	...	1	...	...	...	...	...	Lady injured her back leaving train at Burwood.
26 "	...	...	...	...	...	...	1	...	Woman fell into culvert at Newcastle; slightly injured.
30 "	...	1	...	...	...	...	...	...	Lady's foot injured at Sydney.
1890.									
4 Jan...	...	1	...	...	...	...	...	...	Passenger's ankle sprained.
4 "	...	...	...	...	...	...	2	...	Fettlers injured near Narrandera; trolley derailed.
7 "	...	...	...	...	...	...	1	...	Porter injured his side loading rails, Darling Harbour.
12 "	...	...	...	...	...	...	1	...	Man fell over viaduct, Menangle; broke arm.
13 "	...	...	...	...	...	...	1	...	Man run over near Austinmere.
15 "	...	...	...	...	...	...	1	...	Driver fell off engine at Dora Creek.
25 "	...	...	...	...	...	...	1	...	Man knocked down, Redfern Tunnel.
25 "	...	...	...	...	...	...	1	...	Man fell over bridge, Farley.
27 "	...	...	...	...	...	...	1	...	Guard's head injured, Eveleigh.
29 "	...	...	...	...	...	...	1	...	Fettler run over, Eveleigh.
8 Feb...	...	1	...	...	...	...	...	...	Passenger injured; stone thrown through window.
9 "	...	...	...	...	...	...	...	1	Little girl's foot crushed.
12 "	...	...	...	...	...	...	1	...	Shunter crushed between buffers, Sydney yard.
15 "	...	...	...	...	...	...	1	...	Do do draw-hooks at Harden.
17 "	...	...	1	...	...	...	...	...	Boy run over, Sydney Station; leg crushed.
18 "	...	...	...	...	...	...	1	...	Fettler broke leg at Wellington.
19 "	...	...	...	...	...	...	1	...	Assistant guard slipped leaving train, Old Junee.
19 "	...	...	1	...	...	...	...	...	Man fell on platform at Burwood.
21 "	...	...	1	...	...	...	...	...	Passenger attempting to enter train at Burwood; leg injured.
22 "	...	...	1	...	...	...	...	...	Woman attempting to enter train High-street.
1 Mar...	...	...	...	...	...	...	1	...	Shunter injured, Sydney.
5 "	...	...	...	...	...	1	...	...	Driver's arm broken at Nevertire.
5 "	...	...	...	...	...	...	1	...	Shunter's foot crushed, Junee.
5 "	...	5	...	...	...	...	...	...	Train derailed at 23 miles 75 chains, Richmond line.

APPENDIX 20—continued.

Date of Accident.	Passengers killed or injured.		Servants of the Department or of Contractors killed or injured.				Trespassers, &c.		Nature or Causes of Accident
	Cause beyond their own control.	Their own misconduct or want of caution.	Cause beyond their own control.	Their own want of caution.	Killed	Injured.	Own want of caution.	Injured.	
1890.									
10 Mar...	...	...	...	...	...	...	1	...	Porter injured his back at Sydney; goods.
11 "	...	...	...	...	1	1	...	...	Driver killed; fireman injured—Bell accident.
14 "	...	...	...	...	...	...	1	...	Shunter injured arm shunting, Blayney.
14 "	...	...	...	...	...	...	1	...	Do foot do Eveleigh.
14 "	...	...	...	...	...	...	1	...	Porter run over by coal train.
17 "	...	...	...	1	...	...	...	...	Man leaving train in motion, Granville.
20 "	...	...	...	1	...	...	...	...	Lady do do injured foot, Granville.
20 "	...	...	...	...	...	...	1	...	Wife of fettler run over.
21 "	...	...	...	...	...	...	1	...	Shunter's foot crushed by door of waggon, Darling Harbour.
26 "	...	...	...	...	...	...	1	...	Fettler's finger crushed, Brogan's Creek.
26 "	...	...	...	...	...	...	1	...	Shunter knocked down at Redfern Tunnel.
27 "	...	...	...	1	...	...	...	...	Woman left train in motion, Sydney; leg injured.
1 April.	...	...	...	...	...	...	1	...	Shunter's hand crushed at Bullock Island.
5 "	...	...	...	...	...	...	1	...	Porter at Quirindi fell from ladder lighting signal.
8 "	...	1	...	...	...	...	...	...	Passenger by down mail pushed off platform of car near Doonside.
8 "	...	...	...	1	...	...	...	...	Woman leaving train in motion at Sydney; not much hurt.
9 "	...	...	...	1	...	...	...	...	Lady leaving train in motion; not much hurt.
11 "	...	...	...	...	...	...	...	1	Man knocked down at Eveleigh by train; collar bone broken.
12 "	...	...	...	...	...	...	...	1	Man run over by up mail at Quirindi; leg amputated.
14 "	...	...	...	1	...	...	...	...	Man left train in motion, Rockdale; not much hurt.
18 "	...	...	...	...	...	...	...	1	Man fell over bridge at Mt. Kiera loop line, Wollongong.
19 "	...	...	...	...	...	...	...	1	Man found dying condition, Woy Woy, taken to Gosford; died.
22 "	...	...	...	...	...	...	1	...	Guard sustained severe bruises.
22 "	...	...	...	...	...	...	1	...	Fireman injured at Flemington.
25 "	4	3	...	...	...	...	...	...	Passengers killed and injured in collision at Bathurst.
26 "	...	...	...	...	...	...	1	...	Ganger's foot run over, Willow-tree; since amputated.
29 "	...	...	1	...	...	...	...	...	Passenger jumped from train in motion, Croydon.
30 "	...	...	...	...	...	...	1	...	Shunter's finger cut off by tail rope slipping at Armidale.
1 May...	...	...	...	...	...	...	...	1	Man struck on head by piece stone, blasting, Coolabah.
2 "	...	...	...	...	...	...	1	...	Ganger injured by goods running into his tricycle.
3 "	...	...	...	...	...	...	1	...	Fettler's foot sprained, thrown from his trolley at Bourke.
5 "	...	...	...	...	...	...	...	1	Fettler injured.
13 "	1	9	...	...	...	2	...	...	Man asleep on line at Cardiff; passenger train ran over and cut Collision at Farley. (his arms off.)
14 "	...	...	...	1	...	...	...	...	Man left train in motion at Lochinvar; slightly injured.
16 "	...	...	...	...	...	1	...	...	Fettler's hand injured by a pick at Eskbank.
19 "	...	...	...	...	...	1	...	...	Man crushed at Uralla, loading logs.
19 "	...	...	...	...	...	1	...	...	Man run over at viaduct, near Canley Vale.
22 "	...	...	...	...	...	1	...	...	Fettler struck by express at Bowring.
23 "	...	...	...	...	...	1	...	...	Conductor fell from sleeping-car, Ravensworth.
24 "	...	...	...	1	...	...	...	...	Lady fell down subway, Stanmore; injured ankle.
24 "	...	...	...	...	...	1	...	...	Fireman fell from engine at 200 miles, South, head injured.
24 "	...	...	...	...	...	1	...	...	Man fell through bridge, Bullock Island, and was drowned.
28 "	...	...	...	...	...	1	...	...	Fireman injured head on tender.
28 "	...	3	...	...	...	...	...	...	Derailment of 8 p. m. mail at 431 miles 35 chains west.
31 "	...	...	...	...	...	1	...	...	Porter injured loading cattle at Scone.
4 June.	...	...	...	...	...	1	...	...	Cleaner crushed between buffers at Harden, and much injured.
4 "	...	...	...	...	...	1	...	...	Man crushed between buffer-stops.
5 "	...	...	...	...	...	1	...	...	Shunter at Maitland injured leg.
8 "	...	...	...	...	...	1	...	...	Fireman fell into ash-pit.
12 "	...	...	...	...	...	1	...	...	Shunter's hand crushed at Sydney, coupling up.
12 "	...	...	...	...	...	1	...	...	Guard's hand crushed at Orange while shunting.
13 "	...	...	...	...	...	1	...	...	Man fell from roof, Redfern Station, and broke his arm.
13 "	...	...	...	...	...	1	...	...	Man at Burwood; stepped in front of train.
13 "	...	...	...	...	...	1	...	...	Porter's thumb jammed shunting at Waratah.
15 "	...	...	...	...	...	1	...	...	Fettler slightly injured; tricycle run into, 80 miles, South-west.
17 "	...	...	...	...	...	1	...	...	Man in ballast gang injured his leg.
17 "	...	...	...	...	...	1	...	...	Man found dead under Dubbo Bridge.
20 "	...	...	...	...	...	1	...	...	Porter injured his leg.
20 "	...	...	...	...	...	1	...	...	Guard slipped while shunting and sprained ankle.
26 "	...	...	...	...	...	1	...	...	Man's body found on line at Scone.
24 "	...	...	...	...	...	1	...	...	Shunter injured chest and neck slightly.
24 "	...	...	...	...	...	1	...	...	Shunter's legs injured by waggon running over him at Penrith.
26 "	...	...	...	...	...	1	...	...	Flagman's leg cut off, Redfern Tunnel.
28 "	...	...	...	...	...	2	...	...	Injured in Sydney Tunnel.

APPENDIX 21.

RETURN showing the Total Mileage of each Engine for year ending 30th June, 1889.

No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.
1	28,478	79	31,459	151	23,483	223	28,499	295	20,274	367	10,627
2	31,174	80	26,313	152	27,658	224	23,008	296	18,444	368	21,691
3	24,118	81	14,199	153	11,777	225	23,799	297	30,095	369	30,785
4	21,534	82	22,211	154	22,708	226	30,031	298	27,791	370	24,547
5	153	83	31,142	155	13,286	227	25,982	299	24,495	371	28,343
10	20,350	84	20,586	156	19,439	228	17,926	300	17,444	372	23,793
13	3,689	85	12,227	157	36,688	229	33,769	301	17,448	373	16,619
14	36,166	86	21,191	158	15,136	230	29,673	302	22,128	374	37,503
15	16,951	87	16,314	159	22,870	231	29,189	303	13,308	375	33,336
16	16,373	88	15,569	160	30,153	232	20,532	304	30,275	376	34,277
17	11,126	89	18,593	161	20,373	233	26,275	305	32,798	377	33,286
18	10,699	90	26,553	162	26,214	234	32,391	306	34,813	378	31,446
19	22,774	91	11,441	163	22,536	235	21,600	307	30,791	379	29,754
20	18,211	92	25,754	164	25,081	236	21,441	308	22,951	380	30,374
21	16,770	93	30,847	165	22,050	237	28,644	309	23,401	381	32,756
22	18,884	94	26,339	166	16,075	238	29,637	310	27,013	382	32,665
23	13,397	95	27,114	167	13,315	239	19,521	311	23,522	383	23,453
24	15,773	96	21,791	168	22,933	240	25,922	312	25,232	384	29,441
25	16,008	97	41,977	169	23,988	241	28,799	313	16,274	385	29,662
26	538	98	17,740	170	13,136	242	21,498	314	30,356	386	20,621
27	19,441	99	29,686	171	26,157	243	29,739	315	26,637	387	19,452
28	11,517	100	16,814	172	7,676	244	29,825	316	25,610	388	34,173
29	972	101	31,765	173	35,142	245	24,383	317	26,652	389	17,836
30	1,593	102	24,318	174	24,911	246	20,303	318	25,582	390	9,908
31	2,050	103	23,597	175	22,897	247	25,263	319	28,024	391	46,592
32	29,677	104	17,519	176	19,739	248	21,889	320	24,009	392	15,029
33	8,200	105	8,613	177	15,434	249	29,928	321	25,232	393	21,065
34	17,622	106	22,071	178	28,459	250	23,562	322	23,022	394	10,786
35	Nil.	107	27,143	179	19,518	251	25,772	323	23,691	395	24,325
36	19,332	108	13,333	180	7,448	252	30,814	324	24,916	396	27,053
37	19,692	109	22,778	181	11,864	253	24,151	325	25,237	397	26,254
38	13,572	110	21,713	182	28,222	254	24,850	326	23,896	398	23,224
39	7,016	111	29,975	183	15,663	255	37,295	327	29,168	399	16,565
40	13,735	112	16,526	184	34,529	256	42,485	328	35,397	400	32,218
41	25,721	113	18,499	185	22,964	257	28,430	329	37,282	401	26,755
42	11,658	114	23,539	186	25,603	258	41,440	330	38,247	402	25,738
43	15,492	115	25,501	187	24,552	259	22,453	331	35,204	403	28,598
44	17,397	116	26,386	188	15,717	260	43,485	332	37,473	404	13,177
45	19,687	117	17,973	189	40,139	261	33,409	333	36,909	405	25,597
46	32,524	118	17,081	190	28,561	262	30,817	334	34,502	406	17,647
47	19,596	119	27,004	191	29,659	263	33,023	335	31,994	407	23,601
48	16,292	120	29,664	192	21,770	264	29,576	336	31,965	408	21,976
49	16,892	121	23,711	193	17,996	265	29,002	337	25,668	409	22,115
50	23,439	122	30,310	194	27,965	266	15,561	338	28,217	410	24,300
51	23,170	123	21,044	195	16,349	267	34,576	339	34,947	411	31,564
52	9,242	124	24,325	196	21,909	268	34,304	340	38,789	412	25,238
53	12,582	125	24,119	197	19,899	269	31,785	341	34,345	413	16,265
54	25,171	126	20,521	198	19,688	270	22,760	342	32,818	414	25,300
55	17,992	127	7,137	199	18,458	271	24,812	343	33,354	415	24,344
56	11,056	128	9,444	200	15,209	272	36,271	344	30,156	416	25,844
57	22,631	129	10,512	201	22,115	273	32,780	345	26,041	417	27,400
58	21,594	130	6,127	202	31,174	274	25,990	346	29,897	418	23,401
59	9,805	131	30,715	203	28,480	275	34,765	347	14,922	419	41,036
60	7,981	132	28,844	204	18,224	276	16,421	348	25,971	420	33,263
61	14,840	133	24,119	205	13,884	277	20,316	349	30,592	421	24,749
62	29,902	134	34,053	206	24,091	278	19,594	350	33,116	422	35,370
63	23,613	135	Nil.	207	20,670	279	21,936	351	16,950	423	25,279
64	21,404	136	979	208	21,733	280	32,417	352	12,583	424	30,340
65	20,945	137	11,574	209	17,693	281	31,370	353	15,734	425	30,653
66	12,500	138	19,168	210	20,016	282	31,604	354	25,819	426	27,904
67	13,293	139	17,330	211	27,189	283	22,030	355	22,763	427	27,262
68	7,054	140	Nil.	212	25,392	284	25,792	356	16,397	428	29,346
69	16,303	141	19	213	15,637	285	18,917	357	23,344	429	17,476
70	7,192	142	23,408	214	22,181	286	17,914	358	26,065	430	23,421
71	17,976	143	19,342	215	20,087	287	26,850	359	19,854	431	27,459
72	6,511	144	20,659	216	20,767	288	19,385	360	26,511	432	13,976
73	22,826	145	21,388	217	20,259	289	20,275	361	21,638	433	25,466
74	7,642	146	26,821	218	26,419	290	16,734	362	23,117	434	32,246
75	22,363	147	16,660	219	20,977	291	34,924	363	18,018	435	21,302
76	29,616	148	23,797	220	20,462	292	16,068	364	20,208		
77	22,166	149	24,116	221	27,741	293	12,642	365	31,012		
78	26,085	150	19,548	222	25,609	294	25,021	366	29,070		
										Total Engines,	429

Total mileage... 9,895,966 miles.

## APPENDIX 22.

## RETURN showing the Total Mileage of each Engine for year ending 30th June, 1890.

No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.	No. of Engine.	Miles run by each Engine.
1	34,782	78	31,033	152	31,464	226	32,131	300	20,237	374	36,475
2	27,813	79	24,031	153	35,231	227	19,239	301	25,796	375	Nil.
3	22,172	80	28,831	154	20,936	228	21,535	302	24,914	376	20,738
4	23,131	81	30,950	155	23,350	229	37,779	303	22,041	377	25,303
5	Nil.	82	38,624	156	25,074	230	31,470	304	13,118	378	31,204
6	16,188	83	27,519	157	33,377	231	35,829	305	25,286	379	25,713
7	14,834	84	16,581	158	30,875	232	30,509	306	31,672	380	20,219
8	7,290	85	32,832	159	27,330	233	26,955	307	27,235	381	20,584
10	16,986	86	21,072	160	36,243	234	28,221	308	27,067	382	26,934
13	153	87	22,718	161	25,356	235	29,617	309	38,403	383	27,025
14	31,002	88	19,132	162	37,483	236	20,357	310	24,225	384	35,235
15	21,707	89	26,153	163	37,365	237	35,325	311	23,537	385	20,490
16	16,748	90	33,365	164	27,287	238	24,914	312	34,127	386	20,673
17	23,501	91	14,510	165	22,852	239	32,426	313	25,052	387	27,503
18	20,202	92	26,299	166	14,884	240	29,391	314	30,342	388	17,346
19	23,001	93	19,724	167	28,639	241	29,918	315	33,611	389	10,877
20	22,042	94	20,024	168	33,122	242	33,294	316	31,097	390	188
21	10,818	95	35,218	169	33,187	243	28,875	317	31,482	391	43,835
22	16,975	96	27,020	170	26,201	244	25,008	318	29,753	392	20,655
23	13,891	97	27,614	171	30,772	245	31,208	319	28,970	393	14,616
24	13,319	98	31,436	172	36,349	246	32,529	320	35,098	394	13,032
25	20,994	99	21,238	173	28,732	247	29,418	321	25,768	395	6,641
26	23,190	100	35,759	174	26,559	248	33,918	322	27,006	396	Nil.
27	14,745	101	22,528	175	28,481	249	35,135	323	29,302	397	28,181
28	19,266	102	11,216	176	21,894	250	24,846	324	33,205	398	26,859
29	4,171	103	18,930	177	30,149	251	35,662	325	34,719	399	30,004
30	4,211	104	27,957	178	26,349	252	30,997	326	23,994	400	13,397
31	6,036	105	Nil.	179	33,355	253	30,972	327	36,429	401	9,685
32	29,132	106	23,591	180	21,146	254	31,656	328	32,037	402	8,573
33	Nil.	107	24,905	181	32,993	255	25,555	329	23,730	403	31,569
34	30,272	108	25,610	182	33,699	256	48,414	330	30,093	404	19,384
35	16,338	109	20,782	183	33,637	257	33,356	331	24,985	405	11,197
36	22,272	110	17,925	184	29,683	258	42,162	332	28,661	406	19,899
37	21,059	111	32,381	185	38,443	259	38,892	333	31,630	407	13,810
38	24,119	112	28,834	186	23,416	260	40,348	334	28,439	408	23,958
39	23,870	113	28,698	187	17,198	261	16,936	335	26,813	409	9,928
40	14,491	114	30,017	188	27,870	262	17,188	336	30,525	410	21,233
41	21,457	115	30,603	189	29,580	263	23,184	337	5,228	411	19,077
42	17,131	116	27,910	190	34,352	264	25,730	338	29,878	412	14,862
43	18,895	117	26,899	191	29,997	265	34,601	339	30,131	413	19,356
44	27,108	118	29,384	192	16,492	266	32,002	340	33,857	414	30,430
45	17,263	119	37,523	193	26,120	267	33,861	341	29,216	415	38,091
46	9,747	120	30,797	194	30,791	268	34,026	342	31,908	416	18,570
47	22,469	121	26,968	195	32,109	269	17,501	343	27,992	417	18,806
48	22,288	122	28,981	196	36,353	270	37,368	344	36,391	418	33,630
49	21,281	123	17,925	197	23,098	271	16,349	345	34,085	419	27,617
50	15,295	124	22,164	198	31,675	272	39,735	346	33,914	420	38,089
51	15,403	125	23,812	199	27,199	273	14,889	347	34,600	421	18,828
52	22,886	126	19,355	200	25,990	274	19,291	348	29,869	422	21,587
53	29,805	127	8,347	201	33,236	275	29,541	349	39,391	423	32,482
54	9,099	123	9,066	202	25,130	276	34,237	350	32,072	424	26,614
55	13,307	129	10,475	203	21,573	277	23,389	351	29,870	425	22,758
56	24,809	130	15,675	204	29,952	278	35,914	352	9,379	426	32,405
57	22,074	131	27,350	205	19,407	279	41,860	353	12,889	427	27,410
58	26,313	132	29,443	206	21,941	280	32,598	354	31,465	428	26,218
59	28,759	133	23,557	207	23,652	281	23,379	355	29,021	429	36,309
60	29,070	134	18,127	208	15,926	282	36,135	356	35,843	430	15,755
61	31,835	135	10,758	209	27,158	283	41,155	357	31,651	431	32,380
62	19,836	136	34,960	210	29,269	284	18,866	358	25,744	432	25,901
63	16,937	137	7,527	211	21,050	285	27,513	359	22,983	433	25,694
64	20,408	138	35,539	212	19,776	286	12,130	360	14,222	434	29,177
65	30,152	139	16,648	213	25,650	287	16,842	361	24,327	435	22,533
66	31,109	140	28,879	214	22,334	288	11,420	362	23,807	436	10,297
67	27,062	141	Nil.	215	31,636	289	19,274	363	21,253	437	8,744
68	14,168	142	33,627	216	23,930	290	15,780	364	25,560	438	1,818
69	21,342	143	30,259	217	34,821	291	17,592	365	24,131	439	7,048
70	3,338	144	22,929	218	26,906	292	12,074	366	18,600	440	9,214
71	11,743	145	28,373	219	33,652	293	16,949	367	19,681	441	2,510
72	8,086	146	23,090	220	27,470	294	15,963	368	16,200	442	4,673
73	16,081	147	31,465	221	26,788	295	26,415	369	27,307	443	2,501
74	26,893	148	28,510	222	31,532	296	19,547	370	27,413	444	1,597
75	14,253	149	29,305	223	15,131	297	16,163	371	26,966	445	1,424
76	18,468	150	20,642	224	20,338	298	12,077	372	25,785		
77	22,984	151	25,058	225	32,394	299	19,375	373	30,736		
442 Engines.											

Total mileage... 10,898,894 miles.

## COMPARATIVE Summary of Engines running a given mileage, years ending 30th June:—

Miles.	1889.	1890.	Miles.	1889.	1890.
Nil.	3	6	20,001 to 25,000	110	78
Under 1,000	5	2	25,001 to 30,000	101	113
1,000 to 3,000	2	5	30,001 to 35,000	59	85
3,001 to 5,000	1	4	35,001 to 40,000	14	36
5,001 to 7,500	7	5	40,001 to 45,000	6	5
7,501 to 10,000	9	12	Over 45,000	1 (46,592)	1 (48,414)
10,001 to 12,500	14	12			
12,501 to 15,000	18	19			
15,001 to 20,000	79	59			
				429	442

## APPENDIX 23.

DATES of Opening and the length in miles of the different sections of Railway Lines, from the commencement to 30th June, 1890.

Date of opening	From where opened.	To where opened.	Length in Miles.	Date of opening.	From where opened.	To where opened.	Length in Miles.
26 Sept., 1855..	Sydney .....	Parramatta .....	14	1 June, 1880..	Orange .....	Wellington .....	66
26 ,, 1856..	Granville .....	Liverpool .....	9	1 Sept., 1880..	South Wagga .....	Gerogery .....	59
5 April, 1857..	Near Newcastle .....	East Maitland .....	17	1 Feb., 1881..	Wellington .....	Dubbo .....	30
9 Mar., 1858..	Near Newcastle .....	Newcastle .....	1	3 ,, 1881..	Gerogery .....	Albury .....	18
17 May, 1858..	Liverpool .....	Campbelltown .....	12	28 ,, 1881..	Junee .....	Narrandera .....	60
27 July, 1858..	East Maitland .....	West Maitland .....	2	1 Sept., 1881..	Narrandera .....	Darlington .....	38
2 ,, 1860..	West Maitland .....	Lochinvar .....	7	9 Jan., 1882..	Tamworth .....	Moonbi .....	12
4 ,, 1860..	Parramatta .....	Blacktown .....	8	1 Mar., 1882..	Darlington .....	Carrathool .....	34
12 Dec., 1861..	Blacktown .....	Rooty Hill .....	3	10 ,, 1882..	Campbelltown .....	Camden .....	7½
24 Mar., 1862..	Lochinvar .....	Branxton .....	8	15 May, 1882..	Wallerawang .....	Capertee .....	23
1 May, 1862..	Rooty Hill .....	South Creek .....	5	4 July, 1882..	Carrathool .....	Hay .....	34
7 July, 1862..	South Creek .....	Penrith .....	5	11 July, 1882..	Gunnedah .....	Boggabri .....	24
1 Sept., 1862..	Campbelltown .....	Menangle .....	6	2 Aug., 1882..	Moonbi .....	Urala .....	51
7 May, 1863..	Branxton .....	Singleton .....	14	1 Oct., 1882..	Boggabri .....	Narrabri .....	72
1 July, 1863..	Menangle .....	Picton .....	13	20 ,, 1882..	Dubbo .....	Nevertire .....	63
2 May, 1864..	East Maitland .....	Morpeth .....	3	3 Feb., 1883..	Urala .....	Armidale .....	15
1 Dec., 1864..	Blacktown .....	Richmond .....	16	9 June, 1883..	Nevertire .....	Nyngan .....	36
1 Mar., 1867..	Picton .....	Mittagong .....	24	14 ,, 1883..	Albury .....	River Murray .....	1
11 July, 1867..	Penrith .....	Weatherboard .....	28	3 Jan., 1884..	Joppa Junction .....	Tarago .....	29
2 Dec., 1867..	Mittagong .....	Sutton Forest .....	9	9 June, 1884..	Capertee .....	Kylstone .....	31
1 May, 1868..	Weatherboard .....	Mount Victoria .....	15	19 Aug., 1884..	Armidale .....	Glen Innes .....	63
6 Aug., 1868..	Mittagong .....	Marulan .....	23	2 Sept., 1884..	Nyngan .....	Byrock .....	78
19 May, 1869..	Singleton .....	Muswellbrook .....	51	10 ,, 1884..	Kylstone .....	Mudgee .....	32
27 ,, 1869..	Marulan .....	Goulburn .....	20	16 ,, 1884..	Narrandera .....	Jerilderie .....	65
18 Oct., 1869..	Mount Victoria .....	Bowenfels .....	20	15 Oct., 1884..	Sydney .....	Hurstville .....	9
1 Mar., 1870..	Bowenfels .....	Wallerawang .....	8	4 Mar., 1885..	Tarago .....	Bungendore .....	20
1 July, 1870..	Wallerawang .....	Rydal .....	6	26 ,, 1885..	Murrumburrah .....	Young .....	18
20 Oct., 1870..	Musclebrook .....	Abenicea .....	7	3 Sept., 1885..	Byrock .....	Bourke .....	43
17 April, 1871..	Aberdeen .....	Scone .....	9	21 Dec., 1885..	Orange .....	Molong .....	22
1 Aug., 1871..	Scone .....	Wingen .....	10	26 ,, 1885..	Hurstville .....	Sutherland .....	6
1 Jan., 1872..	Liverpool .....	Sidings, Collingwood, &c.	2	9 Mar., 1886..	Sutherland .....	Waterfall .....	9
5 April, 1872..	Wingen .....	Murrurundi .....	14	1 June, 1886..	Cootamundra .....	Gundagai .....	34
22 ,, 1872..	Rydal .....	Locke's Platform .....	19	1 Sept., 1886..	Glen Innes .....	Tenterfield .....	57
1 July, 1872..	Locke's Platform .....	Macquarie Plains .....	5	17 ,, 1886..	Strathfield .....	Hornsby .....	14
4 Mar., 1873..	Macquarie Plains .....	Raglan .....	5	1 Nov., 1886..	Blayney .....	Cowra .....	43
4 Feb., 1875..	Raglan .....	Kelso .....	8	7 April, 1887..	Hornsby .....	Hawkesbury .....	15
9 Nov., 1875..	Goulburn .....	Gunning .....	31	21 June, 1887..	Clifton .....	Wollongong .....	12½
4 April, 1876..	Kelso .....	Bathurst .....	9	15 Aug., 1887..	Gosford .....	Warntah .....	50
3 July, 1876..	Gunning .....	Bowling .....	29	8 Sept., 1887..	Bungendore .....	Queanbeyan .....	17½
1 Nov., 1876..	Bowling .....	Binalong .....	14	10 ,, 1887..	Kogarah .....	Sans Souci .....	5
1 ,, 1876..	Bathurst .....	Blayney .....	27	9 Nov., 1887..	Wollongong .....	North Kiama .....	21½
12 Mar., 1877..	Binalong .....	Murrumburrah .....	20	7 Dec., 1887..	Queanbeyan .....	Michelago .....	30½
19 April, 1877..	Blayney .....	Orange .....	20	16 Jan., 1888..	Mullett Creek .....	Gosford .....	10
13 Aug., 1877..	Murrurundi .....	Quirindi .....	24	16 ,, 1888..	Tenterfield .....	Wallangarra .....	11
1 Nov., 1877..	Murrumburrah .....	Cootamundra .....	25	13 Feb., 1888..	Cowra .....	Blayney .....	45
2 April, 1878..	Newcastle .....	Bullock Island Branch .....	1½	3 Oct., 1888..	Waterfall .....	Clifton .....	12
5 ,, 1878..	Cootamundra .....	Bethungra .....	15	1 May, 1889..	Brooklyn .....	Mullett Creek .....	6
6 Jul., 1878..	Bethungra .....	Junee .....	18	31 ,, 1889..	Michelago .....	Cooma .....	39
3 Sept., 1878..	Junee .....	North Wagga Wagga .....	18				
14 Oct., 1878..	Quirindi .....	Tamworth .....	38		Total, 30th June, 1889 .....		2,171½
25 Mar., 1879..	Werris Creek .....	Breeza .....	15	1 Jan., 1890..	Hornsby .....	St. Leonards .....	10½
1 Sept., 1879..	North Wagga .....	South Wagga Wagga .....	5		Total, 30th June, 1890 .....		2,182
11 ,, 1879..	Breeza .....	Gunnedah .....	26				

## APPENDIX 24.

## NEW SOUTH WALES GOVERNMENT RAILWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Appointments of Employees from the 1st July, 1889, to the 30th June, 1890.

Date.	Name.	Position.	Rate.	Remarks.
HEAD-QUARTERS' STAFF.				
1889. 1 Dec.	Corns, J. G. S.	Traffic Officer	£500 per annum.	
1890. 1 Jan.	Hodgson, C. A.	"	£500 "	
SECRETARY'S BRANCH.				
1889. 1 Sept.	Franck, Harry	Clerk	£170 per annum	Transferred from Stores Branch.
1890. 20 Jan.	Williamson, D. C.	"	£150 "	Shorthand and Typewriting.
17 Feb.	Eastard, W. G.	" (Junior)	£110 "	
14 April	Garlick, John	" (Apprentice)	£30 "	
0 June	Tyrer, Walter H.	" (Junior)	£52 "	From Tramways, vice F. Martin.
CHIEF ACCOUNTANT'S BRANCH.				
1889. 16 Dec.	Seale, Ernest G.	Clerk (Junior)	£30 per annum	Transferred from Traffic Branch.
1890. 1 Jan.	Hall, Thomas	Chief Accountant	£1,000 "	
16 "	Watts, F. W.	Clerk (Junior)	£75 "	Transferred from Traffic Branch.
17 Mar.	Butler, J.	" do	£52 "	Exchanged with John Oag.
TRAFFIC AUDITOR'S BRANCH.				
1890. 27 Aug.	Ire and, H.	Clerk (Apprentice)	10/- per week	
1890. 30 June	Holt, Arthur B.	Clerk do	£30 per annum	Vice Henry Thornton.
ENGINEER FOR EXISTING LINES BRANCH.				
1889. 17 July	Connor, Henry	Fettler	7/6 per day	Reinstated.
6 Aug.	Bushby, Frederick	"	7/6 "	Re-employed.
7 "	Allen, John	Ganger	9/- "	
10 "	Moor, Fred. C.	Cadet	£90 per annum	
23 "	Lee, George	Fettler	7/6 per day	
30 "	Doyle, Joseph	Cadet	£110 per annum	
1 Sept.	Cameron, James A.	Clerk	£250 "	Transferred from Account Branch.
1 "	Kerr, Gregory A.	"	£225 "	
9 "	Slingson, David C.	District Engineer	£300 "	Transferred from Construction Department.
14 "	Roberts, F.	Clerk	£125 "	Transferred from Traffic Branch.
20 "	Coulter, William	Watchman	7/6 per day	Transferred from Stores Branch.
30 "	Jawden, Thomas	Clerk (Junior)	£110 "	Re-employed.
1 Oct.	Langhton, William	"	£155 per annum	Transferred from Stores Branch.
1 "	Higgins, Thomas	Storekeeper	£225 "	
1 "	Birrell, James D.	Clerk	£185 "	
1 "	Bailey, John	Storeman	8/6 per day	
1 "	Tyndall, H. J.	Store Clerk	£150 per annum	Re-employed.
12 "	Innes, Peter	Labourer	7/6 per day	Transferred from Stores Branch.
30 "	Cusack, James	Fettler	7/6 "	From Tramways. Exchanged with W. Dotts
7 Nov.	Allan, John	Ganger	9/- "	Reinstated, vice Ashwood.
1 Dec.	Nichols, Alan	Clerk	£200 per annum	Transferred from Secretary's Office.
1890. 1 Jan.	Foxlee, W.	Deputy Engineer	£700 per annum	To fill vacancy.
16 "	Cochran, John	Clerk	£150 "	Shorthand and Typewriting.
31 "	Oliver, William	Messenger	8/- per day	Transferred from Secretary's Branch.
13 Feb.	Lough, William	Labourer	7/6 "	Re-employed.
3 Mar.	Gambill, Frank L.	Junior Clerk	£50 per annum	
7 "	M'Kander, John	Labourer	7/6 per day	Reinstated.
17 "	Cross, John	Inspector and Adjuster of Weighing-machines.	£250 per annum	
1 June	Dillow, Thomas	Labourer	6/6 per day	Vice Langford.
9 "	Wood, Thomas	Draftsman	£140 per annum	
10 "	Watson, John H.	Clerk	£150 "	
16 "	Vogan, Harold S.	Draftsman	£200 "	
LOCOMOTIVE ENGINEER'S BRANCH.				
1889. 13 July	M'Kenzie, David	Apprentice	2/6 per day	Re-employed.
31 "	Doohan, Patrick	Fireman	10/- "	
31 "	Carruthers, Henry	Locomotive Accountant	£450 per annum	Transferred from Secretary's Branch.
19 Aug.	Sixsmith, George	Fitter	10/- per day	Transferred from Tramways.
19 "	Sulth, Charles	Turner	10/- "	
26 "	Pawley, John W.	Clerk	£310 per annum	Transferred from Stores Branch.
16 Sept.	Burns, John	Fireman	10/- per day	Reinstated.
16 "	Perrau, M.	Clerk (Junior)	£110 per annum	Transferred from Stores Branch.
21 "	Summers, W.	Cleaner	7/- per day	Re-employed.
1 Oct.	Beattie, William H.	Labourer	£105 per annum	Transferred from Stores Branch.
23 "	O'Brien, John	Clerk	7/- per day	" " "
29 "	Quayle, Thomas	"	7/- "	" " "
5 Nov.	Woolley, William	Cleaner	3/6 "	From Existing Lines Branch, Tramways.
18 "	Pike, Charles	"	5/- "	From Tramways.
20 "	Smith, Albert W.	Assistant Fuelman	6/6 "	Reappointed.
1 Dec.	Wark, John A.	Gas Superintendent	£350 per annum	
1890. 2 Jan.	Denison, George	Clerk	£150 "	Transferred from Supernumerary Staff.
13 "	Muir, W.	Cleaner	6/- per day	Vice C. Langham.
16 "	Lovell, Henry	Striker	7/- "	Vice B. Howe.
16 "	Almond, Peter	Blacksmith	10/8 "	Vice D. Scarth.
29 "	Gerrard, James	File-cutter	8/6 "	Vice S. Wheatley.
14 Feb.	Hayes, John D.	Clerk (Apprentice)	£30 per annum	New System of Accounts.
14 "	Fischer, John G.	"	£150 "	" " "
15 "	Broadhurst, Joseph	" (Junior)	£75 "	" " "
15 "	Wales, Edward L.	" (Apprentice)	£30 "	" " "
15 "	Beardsmore, Chas. E.	" do	£30 "	" " "
17 "	Gray, Alexander M.	" (Junior)	£110 "	" " "
17 "	Gilder, George A.	"	£150 "	" " "
17 "	Wenman, William	Boiler-maker's Helper	7/- per day	Vice M. Burke.
18 "	Franck, H. J.	Clerk	£170 per annum	Transferred from Secretary's Branch.
22 "	Haswell, John F.	Draftsman	£325 "	Increased work.
24 "	Schubert, Robert	Storeman	7/6 per day	Vice Henderson.
25 "	Buchanan, Arthur W.	Clerk (Apprentice)	£30 per annum	Vice E. Wailes, transferred to Interlocking Branch.
27 "	Whitpains, Charles	Striker	7/6 per day	Vice B. Lloyd.
27 "	Jordan, George E.	Clerk (Apprentice)	£30 per annum	New System of Accounts.
27 "	Roberts, William	Painter	10/- per day	Vice Thompson.
28 "	Mountain, R.	Cleaner	6/- "	Vice G. Wray.
3 Mar.	Hill, Henry R.	Draftsman	£235 per annum	Increased work.
4 "	Burridge, C.	Cleaner	6/- per day	Vice M'Brice.
5 "	Hallett, William	Labourer	6/6 "	Vice M'Gregor.
17 "	Allway, Henry	Blacksmith	9/- "	From Supernumerary Staff, vice Hopkins.
21 "	Hampton, Thomas	Coppersmith	9/- "	Re-employed, vice Maxwell.
28 "	Mortimer, James	Labourer	7/6 "	Reinstated.

## APPENDIX 24—continued.

Date.	Name.	Position.	Rate.	Remarks.
1860.				
31 Mar	Gulliford, Chas E.	Clerk (Apprentice)	£30 per annum	New System of Accounts.
15 April	Hadley, Nicholas W.	Fitter	10/- per day	From Supernumerary Staff, vice Hickson.
10 "	Wright, Robert	Labourer	6/6 "	Vice M'Gregor.
24 "	Halpin, James	Boilermaker's Assistant	7/- "	Vice Burke.
9 May	Butterworth, Herbert	Cleaner	2/6 "	From Traffic Branch.
12 "	Kavnagh, Joseph	Office Boy	12/6 per week	Vice Doady
14 "	Allen, R.	Turner	9/4 per day	From Traffic Branch.
19 "	York, Samuel W.	Apprentice	10d. "	Vice Poole.
8 June	Nicoolls, Robert G.	Storesman	7/- "	Reinstated.
5 "	Smith, Thomas	Fitter	9/4 "	From Supernumerary Staff, vice Hearn.
6 "	Wilson, James	Cleaner	4/- "	From Tramways.
9 "	Dawson, Herbert	Apprentice	10d. "	Vice Geelkie.
9 "	Westlake, William	Stecker	7/- "	Vice Morrison.
9 "	King, Robert	Labourer	6/6 "	Vice Mills.
16 "	Tonkin, Ernest	Apprentice	4/- "	From Permanent Way Branch.
23 "	Kitching, William	Fitter	10/- "	From Supernumerary Staff, vice Nightingale.
27 "	Cameron, Donald	Cleaner	6/- "	From Traffic Branch.
CHIEF TRAFFIC MANAGER'S BRANCH.				
1889.				
6 June	Scotting, John	Porter	6/- per day	Re-employed.
10 "	Reid, William	Clerk	£125 per annum	"
22 "	Picken, Paul N.	Gatekeeper	10/- per week	"
2 July	Brown, Frederick	"	15/- "	Vice O'Brien, transferred.
3 "	Foster, Annie	"	Free house	"
4 "	Jocelyn, Mrs.	"	"	"
5 "	Carroll, Margaret	"	15/- per week	"
5 "	Marshall, Emma	"	5/- "	Vice Harriet Roach.
12 "	Carroll, Mary	"	15/- "	Vice Jane Cannon.
12 "	Campbell, James	Porter	7/- per day	From Existing Lines Branch, vice Mitchell.
19 "	Watson, Mrs	Gatekeeper	Free house	"
22 "	M'Cann, James	"	7/- per day	From Existing Lines Branch, vice Cahill.
23 "	Allen, Edward	"	7/- "	From Existing Lines Branch, vice Emelhaing.
23 "	Cox, Joseph	"	7/- "	From Existing Lines Branch, vice Rayfield.
23 "	Bingham, Thomas	"	6/- "	From Existing Lines Branch, vice Harris.
23 "	Hudson, Mrs.	Gatekeeper	Free house	"
24 "	Walton, Story	"	30/- per week	From Existing Lines Branch.
26 "	M'Donald, Mary	"	5/- "	Vice Winifred Porter.
30 "	Fairbairn, Mrs.	"	10/- "	"
9 Aug.	Homery, Mary Ann	"	5/- "	Vice Margaret Ryan.
10 "	Duggan, Mary	"	10/- "	"
10 "	Tonkin, Mary	"	15/- "	"
27 Sept.	Fuz, G.	"	15/- "	Vice Margaret Carroll.
10 Oct.	M'Donald, Ann	"	2/6 per week and house.	Vice Mrs. Fisher.
12 "	Ornham, Henry	Porter	7/- per day	From Existing Lines Branch, vice Bradshaw
15 "	Robinson, Mrs.	Gatekeeper	Free house	Vice Mrs. Herbert.
19 "	Holland, Mary	"	2/6 per week and house.	Vice Mrs. Treadwell.
12 Nov.	Robke, Otto	"	10/- per week	Vice Picken.
26 "	Leary, Catherine	"	5/- per week and house.	Vice Mrs. Wood.
12 Dec.	Manson, William	Porter	7/- per day	From Tramways, vice C. Mann.
3 Dec.	Millican, Joseph	Clerk	10/- "	"
1890.				
3 Jan.	Holborne, Eliza	Gatekeeper	2/6 per week	"
23 "	Brown, Charles	Porter	5/6 per day	Transferred from Existing Lines Branch
24 "	Levy, Harriett	Gatekeeper	2/6 per week	Vice Mrs. Hart.
25 "	Puckett, Catherine	"	7/- "	"
1 Feb.	Ledger, W.	Junior Porter	20/- "	Vice Arrowsmith.
11 "	Burns, Mrs.	Gatekeeper	Free house	Vice H. Twyford.
12 "	Patfield, George	Operator	£25 per annum	Reinstated.
19 "	Bond, Frank	Porter	7/- per day	From Tramways.
20 "	Smith, E. L. G.	"	7/- "	Reinstated.
21 "	M'Donald, Francis	Gatekeeper	5/- per week	Vice Mary Mawdsley.
21 "	Binkley, J.	Junior Porter	2/6 per day	Vice Lightfoot.
5 March	Ross, John M.	Porter	7/- "	Transferred from Existing Lines Branch.
10 "	West, Julia	Gatekeeper	Free house	Vice Mrs. Heathcote.
13 "	Young, Thomas	Probationer	2/6 per week	Vice Robert Wilkinson.
14 "	Millican, Mrs.	Gatekeeper	15/- "	Vice W. Irwin.
18 "	Smith, Mary	"	Free house	Vice L. Wilbow.
21 "	Newell, Angellua	"	7/- per week	Vice Ann Appleby.
21 "	Bendall, Emily	"	7/- "	Vice Fanny Cameron.
28 "	Fitzgerald, Annie	"	5/- "	Vice S. Upton.
31 "	Donohue, Patrick	Porter	7/- per day	Vice J. M'Nutt.
2 April	Hunt, Thomas	Looking after Siding	7/6 per week	Vice Johnstone.
2 "	Kenny, Mary	Gatekeeper	15/- "	Vice Graham.
7 "	Waple, Alfred	Porter	9/- per day	Vice G. Jones.
7 "	Dewhurst, Elizabeth	Gatekeeper	7/- per week	Vice Regan.
7 "	Dewhurst, Sarah Ann	"	7/- "	Vice Regan.
7 "	Higgins, Ellen	"	Free house	Vice Wrightson.
11 "	Adams, Jennie	"	"	Vice Costello.
11 "	Costello, Ada	"	7/- per week	Vice Richards.
14 "	Hopking, Henry	Porter	7/- per day	From Permanent Way Branch.
15 "	Roberts, Sarah	Gatekeeper	Free house	"
18 "	Leman, Mrs	"	10/- per week	Vice Cumpsey.
19 "	Ferguson, Mrs. E.	"	25/- per week and free house.	Vice Lidden.
21 "	May, Charles	"	10/- per week and free house.	Vice Whitely.
9 May	Sheperd, Annie	"	7/- per week	Vice F. Ross.
1 "	Winter, Matilda	"	Free house	Vice Larkin.
3 "	Dwyer, Walter	Porter	6/- per day	Vice Carroll.
10 "	Wybourne, Mary Ann	Gatekeeper	3/- per week and free house.	Vice Drake.
10 "	Fulton, John	Porter	6/- per day	From Supernumerary Staff, vice Cracknell.
15 "	Driscoll, Mary	Gatekeeper	Free house	Vice Gallimore.
15 "	Driscoll, Thomas	Porter	7/- per day	From Permanent Way Branch, vice Gallimore.
16 "	Baker, Mary Ann	Gatekeeper	7/- per week and free house.	Vice May.
19 "	Daley, Thomas	Porter	6/- per day	From Supernumerary Staff, vice Brown.
19 "	Lithgow, William	"	6/6 "	Vice Hart.
22 "	Kiss, John A.	Telegraph Probationer	2/6 per week	Vice Arrowsmith.
26 "	Furby, William	Gatekeeper	2/6 per day	Vice Butterworth.
4 June	Coll, Edward	Porter	7/- "	From Permanent Way Branch.
3 "	Webb, Arthur	"	6/6 "	Vice Hancock.
6 "	Cole, Charles	Junior Porter	3/4 "	Vice Morgan.
7 "	Roberts, Sophia	Gatekeeper	7/- per week	Vice Wytho.
9 "	Wasson, William	Porter	7/- per day	From Permanent Way Branch.
9 "	Bellington, Emily	Gatekeeper	Free house	Vice Anderson.
12 "	Ongley, J. H.	Junior Porter	3/4 per day	Vice Downey.
1 "	Langford, Henry	"	7/- "	From Permanent Way Branch.
13 "	Fairbank, Ernest	"	7/- "	"
13 "	Woodward, William	Gatekeeper	25/- per week	Vice Kenny.
14 "	Payne, Eli	Porter	7/- per day	From Permanent Way Branch.
16 "	Hunter, William	"	6/- "	Vice Whalan.

## APPENDIX 24—continued.

Date.	Name.	Position.	Rate.	Remarks.
1889.				
10 June	Jeffries, Alice	Gatekeeper	Free house	vice Lamb.
20 "	Bull, John	Porter	6/- per day	" Cameron.
20 "	Trives, Margaret	Gatekeeper	25/- per week	" Adair.
22 "	Taylor, John	Porter	7/- per day	From Permanent Way Branch.
23 "	M'Carthy, James	"	7/- "	" "
23 "	Harvey, James	"	6/- "	vice Stafford.
26 "	Ford, Walter	Shunter	7/- "	From Supernumerary Staff, vice Carlyle.
26 "	Cohan, Herbert	Gatekeeper	15/- per week	vice Brazil
27 "	Hines, Bridget	"	Free house	" Richardson.
27 "	Marshall, Henry	"	7/- per week	" Doughan.
29 "	Bull, Lavina	"	7/- "	" Scholes.
30 "	M'Kay, James	"	10/- "	" Kent.
30 "	Martin, F. R.	Clerk (Junior)	£75 per annum	From Secretary's Office.
CONTROLLER OF STORES' BRANCH.				
1890.				
1 Feb.	Kingsmill, C.	Sheet Overseer	8/- per day	Transferred from Traffic Branch.
10 March	Thompson, Thomas	Timber Inspector	10/- "	" Existing Lines Branch.
27 May	Dwyer, John	Labourer	6/- "	Re-employed.
12 June	Hanson, Eustace H.	Clerk (Apprentice)	£30 per annum.	
27 "	M'Auley, George H.	"	£30 "	
PROPERTY AND ESTATE BRANCH.				
1890.				
1 Feb.	Vernon, John	Property and Estate Agent	£650 per annum.	Promoted from Assistant Accountant.
SIGNAL AND INTERLOCKING BRANCH.				
1889.				
1 July	Parry, John	Interlocking Engineer	£450 per annum.	Transferred from Existing Lines Branch.
1 "	Pland, Hugo	Draftsman	£260 "	" " " "
1 "	Johnson, William K.	Cadet	£90 "	" " " "
1 "	Patterson, Walter	Timekeeper	£125 "	" " " "
1 "	Thomas, Alexander	Sub-Inspector	£260 "	" " " "
1 "	Adams, John	"	£230 "	" " " "
1 "	Watson, James E.	"	£200 "	" " " "
15 Sept.	Sowell, Thomas	Draftsman	£248 "	" " Locomotive Engineer's Branch.
12 Nov.	Collins, William H.	Junior Clerk	£75 "	" " Traffic Branch.
1890.				
22 Feb.	Wallis, Edward L.	Clerk (Apprentice)	£30 per annum	" " Locomotive Branch.

## RETURN, in accordance with clause No. 44 of the Railway Act, showing the Removals of Employees, from 1st July, 1889, to 30th June, 1890.

Date.	Name.	Position.	Rate.	Remarks.
SECRETARY'S BRANCH.				
1889.				
31 July	Badham, C. A.	Clerk	£400 per annum.	Transferred to Public Works Department.
31 "	Caruthers, Henry	"	£450 "	Transferred to Locomotive Accountant.
31 "	Morgan, Dr.	Medical Officer	£180 "	Office abolished.
31 Aug.	Vernon, Donald	Secretary	£750 "	Retired.
31 "	Rend, W. V.	Acting Secretary	£1,080 "	"
30 Sept.	Roberts, Sir Alfred	Medical Officer	£150 "	Office abolished.
1 Dec.	Nichols, Alan	Clerk	£200 "	Transferred to Existing Lines Branch.
1890.				
31 Jan.	Oliver, William	Messenger	8/- per day	" " Locomotive Branch.
15 Feb.	Frank, H. J.	Clerk	£170 per annum.	" " Traffic Branch.
1 June	Martin, F. R.	" (Junior)	£75 per annum	"
CHIEF ACCOUNTANT'S BRANCH.				
1889.				
1 Sept.	Cameron, James A.	Clerk	£180 per annum.	Transferred to Existing Lines Branch.
1 "	Kerr, Gregory A.	"	£215 "	"
8 Dec.	Thompson, Fred. C.	Pay Clerk	£250 "	Retired.
1890.				
1 Feb.	Vernon, John	Assistant Accountant	£620 "	Promoted to Property and Estate Agent.
17 Mar.	Ong, John	Clerk (Junior)	£75 "	Exchanged with J. Butler of Traffic Branch.
TRAFFIC AUDITOR'S BRANCH.				
1889.				
12 Aug.	Hay, A.	Clerk	£185 per annum.	Retired.
31 "	Watson, H. J.	"	£200 "	"
1890.				
23 June	Thornton, Henry	" (Apprentice)	£40 per annum	Resigned.
(ENGINEER FOR EXISTING LINES BRANCH.				
1889.				
20 June	Maxwell, Bennett	Labourer	7/6 per day	Dismissed.
20 "	Mooney, Matthew	"	7/6 "	"
20 "	Connor, Henry	Fettler	7/6 "	"
20 "	Allen, John	Ganger	9/- "	"
27 "	Walton, Story	Fettler	7/6 "	Resigned.
1 July	Kenway, Arthur G.	In charge of Meatworks, Darling Harbour	£350 per annum.	Transferred to Treasury Department
1 "	Parry, John	Interlocking Engineer	£450 "	Transferred to Signal and Interlocking Branch.
1 "	Pland, Hugo	Draftsman	£290 "	" " " "
1 "	Johnson, William K.	Cadet	£90 "	" " " "
1 "	Patterson, Walter	Timekeeper	£125 "	" " " "
1 "	Thomas, Alexander	Sub-Inspector	£260 "	" " " "
1 "	Adams, John	"	£230 "	" " " "
1 "	Watson, James E.	"	£200 "	" " " "
1 "	M'Ander, John	Labourer	7/6 per day	Dismissed.
3 "	M'Gann, John	Ganger	9/- "	Decensed.
10 "	M'Donald, Alexander	"	9/- "	Dismissed.
10 "	Campbell, James	Labourer	7/6 "	Transferred to Traffic Branch.
13 "	Hand, Patrick	"	7/6 "	Resigned.
13 "	Ryan, John	"	7/6 "	"
15 "	Roech, John	"	7/6 "	"
18 "	Bingham, Thomas	Fettler	7/6 "	Transferred to Traffic Branch.
18 "	Allen, Edward	"	7/6 "	"
18 "	Cox, Joseph	"	7/6 "	"
18 "	White, Robert	"	7/- "	Resigned.
19 "	M'Conn, James	Labourer	7/6 "	Transferred to Traffic Branch.
19 "	Crawford, William	Carpenter	10/- "	Resigned.
20 "	M'Keough, Martin	Labourer	7/6 "	"
31 "	Murray, Matthew	Ganger	9/- "	Dismissed.
2 Aug.	Thomas, John	Labourer	7/6 "	Resigned.
7 "	Fischer, Gustav	Draftsman	£360 per annum.	Transferred to Construction Department.

## APPENDIX 24—continued.

Date.	Name.	Position.	Rate.	Remarks.
1899.				
9 Aug.	Love, George	Fettler	7/6 per day	Deceased.
14 "	Cook, George	Ganger	9/- "	Dismissed.
15 "	Allen, John	"	9/- "	"
15 "	O'Brien John	Labourer	7/6 "	Resigned.
22 "	Tomlinson, Anthony	"	7/6 "	"
28 "	Blakeway, Edward	Fettler	7/6 "	Killed.
26 "	Holgate, John	"	7/6 "	Resigned.
26 "	Cook, Charles	Labourer	7/6 "	"
31 "	Stephens, R. D.	Surveyor	£300 per annum.	Retrenchment.
31 "	Thomson, Max	Deputy Engineer	£525 "	Resigned.
31 "	Hollis, William	Sub-Inspector	£300 "	Dispensed with
31 "	Lansdown, Joseph	Fettler	7/6 per day	Resigned.
3 Sept.	Johnson, John	Fitter	8/6 "	Discharged.
3 "	Wrigley, William	Turner	10/8 "	"
3 "	Smith, John	Ganger	9/- "	Dismissed.
11 "	Douglass, Burgess	Fettler	7/6 "	Resigned.
10 "	Duggan, Andrew	Ganger	9/- "	Deceased.
17 "	Glen, William	Labourer	7/6 "	Discharged.
25 "	Hastings, James	"	7/6 "	Resigned.
2 Oct.	Hayes, William	Ganger	9/- "	"
8 "	Kenny, Edward	"	9/- "	Deceased.
8 "	Hall, William	Labourer	7/6 "	"
8 "	Cockburn, Henry	Fettler	7/6 "	Resigned.
9 "	Grantham, Henry	Labourer	7/6 "	Transferred to Traffic Branch.
17 "	Large, John	"	7/6 "	"
17 "	Pickering, John	"	7/6 "	"
10 "	Bray, James	"	7/6 "	Resigned.
26 "	Lewis, James	"	7/6 "	Transferred to Interlocking Branch.
7 Nov.	Ashwood, James	Ganger	9/- "	Resigned.
7 "	Smith, Thomas	Improver	4/- "	Transferred to Traffic Branch.
13 "	Reid, John	In charge of meat market	£5 per week	Resigned.
13 "	Crap, Robert	Fettler	7/6 per day	Deceased.
14 "	Wilson, John	"	7/6 "	Resigned.
14 "	Mitchell, John	Labourer	7/6 "	"
20 "	Goodwin, Hugh	Striker	7/6 "	"
21 "	Dwall, George	Fettler	7/6 "	"
6 Dec.	Cunningham, Peter	Plumber	10/- "	"
9 "	Ross, David	Fettler	7/- "	Deceased.
10 "	Scanlon, John	Labourer	7/6 "	Discharged.
12 "	Reidy, Daniel	"	7/- "	Resigned.
12 "	Lanyon, Edward	"	7/6 "	"
13 "	Yeates, Henry	"	7/6 "	"
21 "	Garbutt, Joseph	Fettler	7/6 "	"
21 "	Grace, James	Labourer	7/6 "	Discharged.
24 "	Glen, William	"	6/- "	"
1890.				
8 Jan.	Gorman, Michael	"	7/6 "	Deceased.
9 "	Duffell, William	"	7/6 "	Resigned.
10 "	Botts, William	Fettler	7/6 "	Exchanged with Jas. Cusack of Tramways
12 "	Fitzpatrick, Francis	Labourer	7/6 "	Deceased.
17 "	Cahill, Jerry	"	7/6 "	Resigned.
20 "	Brown, Charles	Bricklayer's Improver	4/6 "	Transferred to Traffic Branch.
31 "	Hassett, Richard	Messenger	£125 per annum.	Retired.
7 Feb.	Crossingham, James	Labourer	7/- per day	Deceased.
13 "	Riddle, William	"	7/6 "	Resigned.
14 "	Gilligan, John	"	7/6 "	"
16 "	Hitzinger, W. J.	Inspector	£310 per annum.	Retrenchment.
22 "	Schubert, Robert	Labourer	7/6 per day	Resigned.
25 "	Williams, George	Fettler	7/6 "	"
26 "	Sherman, James	"	7/6 "	"
26 "	South, William	Labourer	7/6 "	"
24 "	Ross, John M.	Fettler	7/6 "	Transferred to Traffic Branch.
7 Mar.	Rowlands, J. T.	Sub-Inspector	£230 per annum.	Retrenchment.
10 "	Thompson, Thomas	Carpenter	10/- per day	Transferred to Stores Branch.
13 "	Wilson, William	Labourer	7/6 "	Resigned.
18 "	Franks, James	"	7/6 "	"
29 "	Clifford, John	"	7/- "	"
31 "	Chapman, George	Carpenter	9/- "	Discharged.
2 Apr.	Richards, Charles	Fettler	7/6 "	Resigned.
4 "	Richards, Thomas	Ganger	9/- "	Deceased.
5 "	Bowen, William	Labourer	6/6 "	Resigned.
8 "	Boddington, Isaac	"	7/6 "	"
10 "	Johnson, John	Fettler	9/- "	"
10 "	Johnstone, Alfred	"	7/6 "	"
11 "	New, Alfred	"	9/- "	"
14 "	Hopkin, Henry	Labourer	7/6 "	Transferred to Traffic Branch.
22 "	Russell, Peter	Fettler	7/6 "	Discharged.
29 "	Nelson, Thomas	Ganger	9/- "	"
30 "	Daniels, Geo.	Carpenter	8/- "	Deceased.
8 May	Driscoll, Thomas	Labourer	7/6 "	Transferred to Traffic Branch.
9 "	Doyle, A.	"	7/- "	Resigned.
15 "	Turner, W.	"	7/6 "	"
16 "	Lawrence, Fred.	"	7/6 "	"
20 "	Madden, Daniel	"	7/6 "	"
22 "	Woodlands, James	"	7/6 "	Deceased.
23 "	Coll, Edward	"	7/6 "	Transferred to Traffic Branch.
31 "	McKay, James	"	7/6 "	Discharged.
1 June	Langford, Henry	Ganger	9/- "	Transferred to Traffic Branch.
4 "	Hellor, John	Labourer	7/6 "	Deceased.
7 "	Wasson, William	"	7/6 "	Transferred to Traffic Branch.
9 "	Martin, David	"	7/6 "	Deceased.
10 "	Tonkin, Ernest	Improver	4/- "	Transferred to Locomotive Branch.
12 "	Bigwood, George	Striker	7/6 "	Resigned.
13 "	Fairbanks, Ernest	Labourer	7/- "	Transferred to Traffic Branch.
14 "	Payne, Eli	"	7/6 "	"
14 "	Harvey, James	"	7/6 "	"
16 "	Fielding, James	"	7/6 "	Discharged.
16 "	Taylor, John	"	7/6 "	Transferred to Traffic Branch.
17 "	McCarthy, James	"	7/6 "	"
LOCOMOTIVE ENGINEER'S BRANCH.				
1890.				
23 May	Guttridge, L. P.	Fitter	8/6 per day	Resigned.
20 June	Falconer, J.	Fireman	10/- "	Dismissed.
27 "	Pike, A.	"	10/- "	Deceased.
6 July	Close, Alfred	Office-boy	10/- per week	Resigned.
6 "	Edwards, C.	Fitter	10/8 per day	"
9 "	Foster, Mathew	Labourer	7/6 "	Dismissed.
10 "	Shuttle, Joseph	Driver	13/- "	Resigned.
12 "	Tiernen, Peter	Cleaner	7/- "	Dismissed.
13 "	Williams, William	Fitter	10/8 "	Deceased.
23 "	Watson, T.	Cleaner	7/- "	Resigned.
27 "	Summers, W.	"	7/- "	"
31 "	Lennox, J.	Foreman	£385 per annum.	Retired.
1 Aug.	Sheperd, Jesse	Gasmaker	8/- per day	Discharged.
1 "	Horton, John R.	Clerk	£275 per annum.	Retired.

## APPENDIX 24—continued.

Date.	Name.	Position.	Rate.	Remarks.
1899.				
2 Aug.	Morton, Henry	Striker	7/6 per day	Resigned.
7 "	Burns, John	Fireman	10/- "	Left.
21 "	Richardson, James	Driver	14/- "	Deceased.
23 "	Bryant, R. H.	Shed-inspector	£270 per annum	Resigned.
23 "	Gavan, M.	Fuelman	8/- per day	Dismissed.
24 "	Cremen, John Brown	Clerk (Junior)	£120 per annum	Left.
24 "	Philpott, John	Ganger	10/- per day	Deceased.
25 "	Payne, George	Painter	10/8 "	Dismissed.
31 "	Oakley, W. A.	Storeman	£274 per annum	Retrenchment.
1 Sept.	Laing, Scott L.	Clerk	£260 "	Resigned.
5 "	Davey, Frederick	Inspector	£300 "	Retrenchment.
6 "	Brown, John	Oiler	8/- per day	Dismissed.
11 "	Hampton, T.	Coppersmith	8/0 "	Dispensed with.
11 "	Gee, G.	Patternmaker	9/6 "	"
12 "	Halliwell, George	Boilermaker	10/8 "	Resigned.
15 "	Sowell, Thomas	Draftsman	£248 per annum	Transferred to Interlocking Branch.
18 "	Carroll, William	Turner	11/4 per day	Resigned.
15 "	Willey, M.	Fireman	10/- "	Deceased.
21 "	Taylor, E.	Pumper	8/- "	Resigned.
23 "	Swinfield, Albert	Driver	11/- "	"
25 "	Burns, John	Fireman	10/- "	Deceased.
19 Oct.	Fitzgerald, Arthur	"	8/- "	Resigned.
26 "	Watkins, William	Carrriage-builder	10/0 "	Deceased.
26 "	Sator, Francis	Waggon-builder	10/- "	"
2 Nov.	Gosnell, George	Cleaner	7/- "	Discharged.
16 "	Sutton, William	Carrriage and Wheel Examiner	12/- "	Retrenchment.
18 "	Turton, William	Driver	13/- "	Resigned.
27 "	Blanchard, William	Oiler	7/- "	Discharged.
2 "	Cobb, John	Locomotive Foreman	£430 per annum	Retired.
			£50 per annum house-rent.	
2 Dec.	Foster, John	Fireman	10/- per day	Left.
6 "	Chisholm, James	Station Engine-driver	7/6 "	Discharged.
10 "	Dunn, Richard	Striker	7/- "	"
10 "	Lawton, George Y.	Labourer	7/6 "	Resigned.
18 "	Morrison, James	Fitter	11/2 "	Retrenchment.
23 "	Runge, John	Driver	14/- "	Deceased.
23 "	Murphy, James	Labourer	7/6 "	Discharged.
24 "	Evans, Samuel	Carrriage-builder	10/0 "	Deceased.
31 "	Whitlow, James	Fireman	8/- "	Resigned.
31 "	Geekie, Walter	Apprentice	10/11 per week	"
9 "	Gilland, James	Driver	14/- per day	Discharged.
9 "	Mason, Thomas	Fireman	9/- "	"
1890.				
7 Jan.	Richards, Arthur	Driver	12/- "	Deceased.
8 "	Walsh, Edward	Labourer	7/- "	Resigned.
9 "	Farquhar, James	Caretaker	7/- "	Retired.
13 "	Wheatley, Samuel	Grinder	12/- "	Deceased.
13 "	Langham, C.	Fireman	10/- "	Discharged.
14 "	Kiesel, Joseph	Turner	11/2 "	"
15 "	Howe, Benjamin	Striker	7/- "	Resigned.
16 "	Scarth, Dawson	Blacksmith	12/2 "	"
17 "	Henderson, James	Storeman	8/- "	Discharged.
18 "	Dawn, John	Cleaner	7/- "	Deceased.
31 "	Fitzpatrick, Denis	General Foreman	£350 per annum	Retrenchment.
31 "	Taylor, James	Labourer	7/6 per day	Retired.
31 "	Rowles, George	"	7/6 "	"
31 "	Asplet, George	Blacksmith's Assistant	7/6 "	"
31 "	Lloyd, Benjamin	Striker	7/6 "	"
31 "	Riley, John	Carpenter	10/8 "	"
31 "	Gill, C.	Boilermaker	10/8 "	"
31 "	Hopkins, Evan	Blacksmith	11/8 "	"
31 "	Davis, Edward	"	12/2 "	"
31 "	Whyte, William	Brass-finisher	10/6 "	"
31 "	Thompson, Joseph	Car Painter	10/- "	"
31 "	Burrows, Joseph	Labourer	7/6 "	"
31 "	Crowes, Richard	Machinist	9/2 "	"
31 "	Richardson, Thomas	Coppersmith	12/4 "	"
31 "	Weedon, Leonard	Boilermaker's Assistant	7/- "	"
5 Feb.	Nimmo, M.	Assistant Foreman	£235 per annum	Transferred to Locomotive Tramways
8 "	Hand, John	Boilermaker	10/6 per day	Deceased.
8 "	Maxwell, Henry	Coppersmith	10/8 "	Resigned.
12 "	Grisdale, Charles	Painter's Assistant	6/- "	Discharged.
17 "	Burke, Michael	Boilermaker's Helper	7/- "	Resigned.
20 "	Cameron, James	Carrriage and Wheel Examiner	10/8 "	"
22 "	Wailles, Edward	Clerk (Apprentice)	£30 per annum	Transferred to Interlocking Branch.
23 "	Wray, George	Fireman	10/- per day	Retired.
4 Mar.	M'Bride, Patrick	"	0/- "	Discharged.
5 "	M'Gregor, George	Labourer	7/6 "	Deceased.
6 "	Reid, Henry	"	7/- "	Transferred to Tramways
8 "	Mortimer, James	"	7/6 "	Discharged.
11 "	Heron, David	Driver	14/- "	Deceased.
26 "	Baker, Thomas	Fireman	8/- "	Resigned.
31 "	Phillips, Richard	Clerk	£160 per annum	Retrenchment.
31 "	Evans, John	Carrriage & Waggon Examiner	14/8 per day	"
31 "	Baker, John	"	12/- "	"
1 April	Perrin, Maurice	Clerk	£125 per annum	Retired.
15 "	Hickson, John	Fitter	10/8 per day	Incapacitated.
23 "	Nichols, Robt. G.	Storeman	7/- "	Discharged.
28 "	Poole, Frank	Apprentice	5/- "	Deceased.
10 May	Doody, Joseph	Office Boy	12/6 per week	Discharged
10 "	Morrison, George	Striker	7/- per day	"
13 "	Buchanan, John	Fireman	10/- "	"
13 "	Farnham, John	Driver	14/- "	"
18 "	Hearn, Samuel	Fitter	12/4 "	Resigned.
18 "	Nightingale, David	"	10/2 "	"
15 "	Madden, William	"	10/- "	Discharged.
16 "	Munroe, David	Labourer	7/- "	"
22 "	Mills, James H.	"	7/- "	Resigned.
23 "	Ashburn, Thomas	Fireman	10/- "	Deceased.
1 June	Broad, Albert E.	Draftsman	£110 per annum	Resigned.
4 "	Cook, James	Labourer	7/6 per day	Deceased.
12 "	M'Vic, Thomas	Pumper	8/- "	Resigned.
17 "	North, John	Globe-cleaner	3/6 "	Discharged.
25 "	Mays, Robert	Fireman	8/- "	"
26 "	Day, Percy	"	8/- "	"
CHIEF TRAFFIC MANAGERS' BRANCH.]				
1899.				
4 June	Day, Thomas	Coal guard	9/- per day	Dismissed.
10 "	Warren, George G.	Telegraph Operator	£60 per annum	Transferred to Public Telegraph Department.
15 "	Boaz, Handove	Gatekeeper	30/- per week	Dismissed.
1 July	Binns, M.	Porter	7/- per day	Resigned.
2 "	Howard, Patrick	"	7/- "	Dismissed.
4 "	Roach, Harriet J.	Gatekeeper	5/- per week	Resigned.

## APPENDIX 24—continued.

Date.	Name.	Position.	Rate.	Remarks.
1889.				
12 July	Adamson, James	Porter	7/- per day	Left.
12 "	Gee, G.	"	7/- "	"
12 "	Cannon, Jane	Gatekeeper	12/6 per week	Resigned.
16 "	Hyslop, George	Porter (Junior)	30/-	Dispensed with.
16 "	Maroney, M.	"	7/- per day	Resigned.
16 "	M'Neill, W.	Clerk (Junior)	20/- per week	"
22 "	Gleeson, James	Porter	7/- per day	Dismissed.
25 "	Porter, Winifred	Gatekeeper	5/- per week	Resigned.
25 "	Vickers, S.	Shunter (Junior)	30/-	"
31 "	Richards, Thomas	Gatekeeper	6/6 per day	Killed.
31 "	Day, F. O.	Porter	7/-	Dismissed.
8 Aug.	Ryan, Margaret	Gatekeeper	5/- per week	Resigned.
8 "	Dobson, John	"	25/-	"
9 "	Croall, A.	Porter	7/- per day	"
16 "	Ottoway, Thomas	Ticket Collector	7/0 "	Retired.
24 "	Townsend, J.	Relieving Signaller	8/- "	Deceased.
25 "	Scotland, D.	Station-master	£270 per annum	Retired.
31 "	Kuapp, Alfred	Clerk	£180	"
29 "	Beresford, J.	Porter	7/- per day	Dismissed.
29 "	Gates, W. C.	"	7/6 "	Resigned.
14 Sept.	Roberts, F.	Clerk	£125 per annum	Transferred to Existing Lines Branch.
17 "	Hartup, R.	Horse Driver	7/- per day	Killed.
18 "	Hughes, Henry	Assistant Guard	8/6 "	Deceased.
25 "	Munro, James	Porter	7/6 "	Resigned.
27 "	Carroll, Margaret	Gatekeeper	15/- per week	"
30 "	Bradshaw, John	Porter	7/6 per day	"
3 Oct.	Ryan, Bridget	Gatekeeper	5/- per week	Discharged.
10 "	Banfield, Mrs.	"	6/-	Resigned.
10 "	Elliott, S. A.	"	7/-	"
10 "	Lewis, Mrs.	"	2/6 "	"
15 "	Herbert, Mrs.	"	Free house	"
20 "	Treadwell, Mrs.	"	2/6 per week and house.	"
24 "	Roberts, Henry	"	7/- per day	Vale gates at Bathurst closed.
25 "	Symington, James	"	42/- per week	Resigned.
29 "	Elyard, Martha	"	30/-	Vale gates at Bathurst closed.
1 Nov.	Wrightson, Joseph	Telegraph Operator	£80 per annum	Transferred to Queensland Service.
2 "	Currie, Thomas L.	Guard	10/6 per day	Resigned.
7 "	Nash, William	Porter	7/6 "	"
7 "	Ashwood, Mrs. W.	Gatekeeper	5/- per week	"
7 "	Wood, Mrs.	"	5/-	"
8 "	Irvin, Hugh	Porter	7/6 per day	"
8 "	Darcey, Patrick	"	7/-	Deceased.
12 "	Collins, W. H.	Junior Porter	30/- per week	Transferred to Interlocking Branch.
18 "	Crapp, Albert	Telegraph Operator	£86 per annum	Discharged.
23 "	Mann, Charles	Porter	7/- per day	Transferred to Tramways.
1 Dec.	Carpenter, Abraham	Station-master	£225 per annum	Retired.
16 "	Seale, Ernest G.	Junior Porter	20/- per week	Transferred to Account Branch.
1890				
1 Jan.	Curran, John	Officer-in-Charge	£140 per annum	Discharged.
7 "	Dwyer, Patrick	Station-master	£225	Retrenchment.
14 "	Irwin, William	Porter	7/6 per day	Deceased.
14 "	Wilkinson, Robert	Station-master	£200 per annum	"
16 "	Watts, F. W.	Junior Porter	20/- per week	Transferred to Account Branch.
30 "	Johnstone, Sarah	Gatekeeper	5/-	Retrenchment.
20 "	Hart, Caroline	"	2/6	Resigned.
31 "	Burns, James	Station-master	£255 per annum	Retrenchment.
1 Feb.	Smith, E. L. G.	Porter	7/- per day	Discharged.
1 "	Hartigan, James	Gatekeeper	30/- per week	Retrenchment.
1 "	Arrowsmith, J. T.	Junior Porter	20/-	Resigned.
2 "	Mitchell, Francis J.	Telegraph Probationer	2/6	Discharged.
2 "	Kingsmill, C.	Sheet Repairer	7/- per day	Transferred to Stores Branch.
12 "	Wheeler, R.	Operator	£130 per annum	Retrenchment.
17 "	Twford, Harriett	Gatekeeper	30/- per week	Discharged.
20 "	Mawdsley, Mary	"	5/-	Resigned.
22 "	Lightfoot, Robert	Porter	7/- per day	Discharged.
25 "	M'Sweeney, M.	"	7/-	Transferred to Tramways.
1 Mar.	Muir, John	Station-master	£225 per annum	Retrenchment.
1 "	Hussey, Robert J.	Gatekeeper	10/- per week	"
10 "	Heathcote, Mrs.	"	Free house	Discharged.
11 "	M'Intosh, James	Foreman	11/- per day	Retrenchment.
14 "	Collingwood, Edgar	Porter	7/6 per day	Deceased.
15 "	Went, William H.	Inspector	13/-	Retrenchment.
16 "	Richards, Mrs.	Gatekeeper	7/- per week	Resigned.
16 "	Hickey, Louisa	"	5/- per week	Discharged.
17 "	Butler, J.	Clerk (Junior)	£52 per annum	Exchanged with J. Oag of Account Branch.
20 "	Appleby, Ann	Gatekeeper	7/- per week	Resigned.
20 "	Cameron, Fanny	"	7/-	"
26 "	Upton, Selina	"	5/-	Left.
29 "	Wilbow, Louisa	"	Free house	Resigned.
31 "	Johnstone, Mrs.	"	5/- per week	"
31 "	Johnstone, John	In charge of siding at Doodie Cooma.	7/-	"
31 "	M'Nutt, John	Porter	7/- per day	Retired.
2 April	Graham, Bridget	"	15/-	"
5 "	Davies, Isaac	Head Shunter	10/- per day	"
6 "	Regan, William	Gatekeeper	5/-	Discharged.
7 "	Wrightson, Jane	"	2/6 per week and free house.	"
8 "	Colquhoun, William	"	45/- per week	"
12 "	Dymond, Thomas	Night Officer	£120 per annum	"
13 "	Berkeley, Mrs.	Gatekeeper	Free house	Retrenchment.
13 "	Costello, Jennie	"	"	Resigned.
16 "	Abbott, John T.	Operator	£125 per annum	Discharged.
16 "	Gallimore	Porter	7/- per day	Resigned.
16 "	Gallimore, Lillian	Gatekeeper	Free house	"
18 "	Lidden, Mrs.	"	25/- per week and free house.	Discharged.
20 "	Whitely, Grace	"	Free house	Resigned.
21 "	Phelan, Samuel	Guard	12/- per day	Retired.
23 "	Jones, George	Porter	7/-	Discharged.
25 "	Adair, John	Gatekeeper	30/- per week	Retired.
30 "	Larkin, Margaret	"	2/6 " and free house.	Resigned.
1 May	Allen, Richard	Clerk	£125 per annum	Transferred to Locomotive Branch.
6 "	Morgan, Charles	Night Officer	£130	Discharged.
9 "	Butterworth, Herbert	Gatekeeper	2/6 per day	Transferred to Locomotive Branch.
10 "	Cracknell, Edward C.	Night Officer	£120 per annum	Discharged.
10 "	Drake, Catherine	Gatekeeper	5/- per week and free house.	Resigned.
10 "	Thompson, Samuel	Shunter	7/6 per day	Discharged.
12 "	Carroll, James	Porter	6/-	"
12 "	Hart, William	"	7/-	"
15 "	May, Charles	Gatekeeper	10/- per week and free house.	"
19 "	Brown, Samuel	Porter	7/- per day	"

## APPENDIX 24—continued.

Date.	Name.	Position.	Rate.	Remarks.
1890.				
27 May	Carlisle, J.	Foreman	£200 per annum.	Deceased.
28 "	Stafford, Edwin	Porter	7/- per day	"
6 June	Irwin, George	Assistant guard	8/6 "	Discharged.
6 "	Wythe, Jane	Gatekeeper	7/- per week	Resigned.
7 "	Anderson, Caroline	"	Free house	"
10 "	Richards, Thomas	Porter	7/- per day	Deceased.
11 "	White, John	"	7/- "	"
12 "	Kenny, Mary	Gatekeeper	15/- per week	Resigned.
13 "	Whelan, F.	Porter	7/- per day	Discharged.
13 "	Downey, John	Junior porter	30/- per week	Resigned.
20 "	Parsons, John A.	Acting night officer	6/- per day	Discharged.
25 "	Brazil, Patrick	Gatekeeper	30/- per week	"
26 "	Richardson, Mary Ann	"	Free house	Resigned.
26 "	Cameron, Donald	Porter (Junior)	5/- per day	Transferred to Locomotive Branch.
27 "	Doughan, Mrs.	Gatekeeper	Free house	Resigned.
29 "	Scholes, Ellen	"	7/- per week	Discharged.
30 "	Kent, Sophia	"	10/- "	Resigned.
18 April	Campey, Mrs. J.	"	Free house	"
8 May	Ross, Fanny	"	7/- per week	"
27 "	Hancock, Herbert	Junior porter	5/- per day	Discharged.
31 "	Fletcher, James	Officer-in-charge	£140 per annum.	"
31 "	Langford, Henry	Porter	7/- per day	"
2 June	Hilder, H.	Signalman	8/- "	Deceased.
12 "	Cromack, Mrs.	Gatekeeper	7/- per week	Discharged.
16 "	Greig, James	"	7/- per day	"
17 "	Griffiths, John	Clerk (Junior)	£110 per annum.	"
19 "	Lamb, Rose	Gatekeeper	Free house	Resigned.
19 "	Ryan, J. J.	Porter	7/- per day	Discharged.
19 "	Maloney, James	Gatekeeper	80/- per week	"
26 "	Carlyle, George	Shunter	7/6 per day	"
CONTROLLER OF STORES' BRANCH.				
1889.				
24 July	O'Brien, John	Labourer	7/- per day	Retrenchment.
24 "	Fordo, William	"	7/- "	"
30 "	Nicholl, John	"	7/- "	"
31 "	Lynch, Mathew	"	7/- "	"
31 "	Quayle, Thomas	"	7/- "	"
31 "	Sheldon, George	"	7/- "	"
31 "	Watsford, Joseph	"	7/- "	"
31 "	Fitzgerald, Edward	Stationery clerk (Junior)	£105 per annum.	"
8 Aug.	Love, John	Issuer	8/- per day	"
26 "	Fawley, John W.	Clerk	£290 per annum.	Transferred to Locomotive Engineer's Branch.
10 Sept.	Pernu, M.	" (Junior)	£110 "	"
1 "	Franck, Harry	"	£170 "	Transferred to Secretary's Branch.
19 "	Coulter, William	Watchman	7/- per day	Transferred to Existing Lines Branch.
1 Oct.	Laughton, William	Clerk	£155 per annum.	"
1 "	Higgins, Thomas	Overseer	£225 "	"
1 "	Birrell, James D.	Clerk	£185 "	"
1 "	Beattie, William H.	"	£165 "	Transferred to Locomotive Branch.
1 "	Linz, Joseph	Issuer	8/- per day	Retrenchment.
4 "	Innes, Peter	Labourer	7/6 "	"
ESTATE AND PROPERTY BRANCH.				
Nil.				
SIGNAL AND INTERLOCKING BRANCH.				
1889.				
14 Oct.	Conn, William	Signal fitter	9/- per day	Discharged.
1890.				
8 Mar.	Branch, William	Stat. engine-driver	10/- "	Deceased.
9 June	Coburn, William	Blacksmith	9/- "	Resigned.
23 "	Whalley, Charles	Labourer	7/6 "	"

## TRAMWAYS.

## APPENDIX 25.

## REPORT of the Tramway Locomotive Superintendent.

To the Commissioners for Railways,—

Gentlemen,

Randwick, 14 August, 1890.

I have the honor to report as follows, with regard to the Tramway Locomotive Branch under my charge, during the past year:—

*Workshops.*

The whole of the machinery in the engine-repairing, boiler, and carriage shops has been maintained in efficient working order. Two machines have been transferred here from the Railway Permanent-way Workshops, to meet the increased work now performed by this branch for the Permanent-way of the Tramways.

*Electric Lighting.*

The engine and dynamos in this department have been kept in running order, and the lighting of the Randwick Yard and Running Shed efficiently carried out.

*Engines.*

The total number of engines on the books is 88, but 80 only are available for present traffic. These have been maintained in efficient condition, and the requirements of the traffic met without interruption.

*Boilers.*

Extensive repairs have been carried out in this branch. Thirteen boilers have had their fire-boxes taken out and all defective parts renewed; 12 have had all tubes taken out, internally examined and repaired, and one new boiler has been made and turned into service.

*Cars.*

Forty-seven new cars, including one built by the department, have been supplied during the year. An average of five cars per month have been repainted, or touched up and varnished, and the whole stock has been maintained in efficient running order.

*General Remarks.*

In addition to the ordinary work of the Locomotive branch, one new travelling iron water-tank was made and turned into service. New points and crossings, point-boxes, &c., have been made and supplied to the Permanent-way branch. A large number of wood blocks, for road paving, were also cut and supplied to the latter branch.

During the year, the number of engines in steam daily was increased by 3·72, and the extra mileage, compared with that of the previous year, amounted to 165,656 miles, notwithstanding which the locomotive service, as a whole, has been conducted at a less cost for maintenance than on the preceding year.

## NORTH SHORE CABLE TRAMWAY.

*Cable.*

The new wire rope put in in November last became stranded in January, after working about two and a half months. It was with difficulty kept running until April, when it had to be replaced.

*Running Gear.*

The running gear has been partially remodelled, after the most modern pattern, with good results, and the further improvements authorized are being pushed forward as rapidly as possible.

*Cars.*

Four new cars have been added during the year to cope with increased traffic. Four cars have been thoroughly repaired and repainted, and the remainder maintained in efficient working order. The dummy cars require overhaul, and will be taken in hand shortly.

*Pumps.*

The pumps originally fixed and worked by the cable have been taken out and an improved supply secured by effecting a connection with the new main of the Water and Sewerage Board, adjoining the engine-house, to the tanks for supply water to the boilers at the depôt.

*General Remarks.*

The working of this line has not been as satisfactory as could be desired, but when all the improvements authorized by the Commissioners have been effected, the line will be in a more efficient condition than it has been at any time since it was opened for traffic.

GEO. DOWNE,

Locomotive Superintendent.

APPENDIX 26.

## APPENDIX 26.

## REPORT of Tramway Engineer.

Tramway Department, Office of Engineer for Tramways, 18 August, 1890.

To the Commissioners for Railways,—

Gentlemen,

I have the honor to report as follows on the condition of the Existing Tramways for the year ending 30 June, 1890.

Owing to the unusual amount of rain which fell during the year the work of maintaining the lines in good order has necessitated great care and heavy expenditure. This is especially the case in George-street West and Oxford-street, where the existing rails are unsuitable for streets paved with wood. When the rails of heavier and altered pattern, expected to arrive shortly, are laid, the cost of maintenance in these streets will be considerably reduced.

During the year portions of the Randwick line, through Moore Park and the Centennial Park, have been relaid for a distance of 2 miles 18 chains with 60lb. steel rails, in place of the 42lb. iron rails used when the line was first constructed.

The Botany tram-line is in course of duplication, a new departure being made in discontinuing the concrete foundation. By this it is believed the life of both rails and sleepers will be greatly extended, and the cost of maintenance reduced.

I have, &c.,

G. R. COWDERY.

## APPENDIX 27.

DR.	REVENUE Account—Tramways.						CR.
	Expenditure.			Revenue.			
	Year ending June 30, 1890.	Year ending June 30, 1889.	Year ending June 30, 1888.		Year ending June 30, 1890.	Year ending June 30, 1889.	Year ending June 30, 1888.
<b>CITY AND SUBURBAN.</b>	£ s. d.	£	£	<b>CITY AND SUBURBAN.</b>	£ s. d.	£	£
To maintenance of way, works, and stations	23,378 9 11	23,501	29,002	By Passengers—			
Locomotive-power	105,989 17 2	111,813	115,367	Fares, No. 57, 463, 659	244,405 19 2	221,470	215,355
Cars and waggons	20,217 10 7	14,850	13,678	Miscellaneous receipts	6,101 13 4	4,363	5,705
Traffic expenses	42,560 13 11	42,281	41,400				
Compensation	1,405 13 9	2,362	603				
General charges	7,904 18 5	5,276	4,108				
	207,517 2 9	208,092	204,227		249,607 12 6	225,833	221,060
<b>NORTH SHORE CABLE.</b>				<b>NORTH SHORE CABLE.</b>			
To maintenance of way, works, and stations	1,054 16 7	1,187	920	By Passengers—			
Locomotive-power	5,016 3 11	8,764	4,031	Fares, No. 2,269, 721	9,467 3 5	8,168	7,232
Cars and waggons	401 1 2	261	469	Miscellaneous receipts	25 7 0	10	16
Traffic expenses	1,406 6 5	1,553	1,402				
Compensation	100 0 0						
General charges	220 17 7	157	221				
	8,339 5 8	6,626	6,833		9,482 10 6	8,178	7,248
<b>NEWCASTLE &amp; PLATTSBURG.</b>				<b>NEWCASTLE &amp; PLATTSBURG.</b>			
To maintenance of way, works, and stations	1,011 16 2	835	750	By Passengers—			
Locomotive-power	5,010 18 2	4,355	4,136	Fares, No. 2,030, 397	9,972 3 10	9,300	8,085
Cars and waggons	414 9 9	85	247	Miscellaneous receipts		222	129
Traffic expenses	1,600 6 10	2,070	2,543				
Compensation	50 0 0						
General charges	120 9 0	172	123				
	8,210 10 11	9,117	8,138				
<b>Total, Tramways.</b>	<b>224,073 8 4</b>	<b>221,803</b>	<b>210,196</b>		<b>9,972 8 19</b>	<b>9,562</b>	<b>8,211</b>
<b>To net profit</b>	<b>44,888 18 6</b>	<b>21,723</b>	<b>17,323</b>				
	<b>268,962 6 0</b>	<b>242,503</b>	<b>236,519</b>	<b>Total, Tramways</b>	<b>268,962 6 9</b>	<b>242,503</b>	<b>236,519</b>

## APPENDIX 28.

## CITY AND SUBURBAN Tramways.—Schedules under Working Expenses.

	Year ending June 30, 1890.	Year ending June 30, 1889.	Year ending June 30, 1888.		Year ending June 30, 1890.	Year ending June 30, 1889.	Year ending June 30, 1888.
<b>A.—MAINTENANCE OF WAY AND WORKS.</b>	£ s. d.	£	£	<b>D.—TRAFFIC EXPENSES</b>	£ s. d.	£	£
Salaries, office expenses, and general superintendence	1,042 12 6	752	580	Traffic Manager's office and staff	2,368 14 8	2,355	2,131
Maintenance and renewals of permanent way, viz. :—				Clerks	1,142 11 10	1,078	922
Wages	£10,076 9 2	17,835	17,304	Staffmen, pointsmen, and flagmen	3,839 18 0	6,036	5,833
Materials	8,199 19 7	10,000	9,382	Conductors	21,078 12 0	19,658	19,438
	27,876 8 9			Car cleaners, shunters, lamp-trimmers	5,800 3 3	5,479	5,393
Repairs, &c., of bridges, culverts, and other works	1 13 0	68	464	Stores	2,409 6 6	1,861	1,833
Repairs, &c., of waiting-sheds and buildings	376 16 10	378	1,045	Advertising, printing, and stationery	311 13 1	78	317
Sundries	80 17 1	360	277	Travelling and incidental	576 9 0	286	215
				Sundries	2,516 5 7	5,470	3,392
<b>Total, Maintenance of Way and Works.</b>	<b>29,373 8 11</b>	<b>29,501</b>	<b>29,002</b>	<b>Total, Traffic Expenses</b>	<b>42,569 13 11</b>	<b>42,281</b>	<b>41,409</b>
<b>B.—LOCOMOTIVE POWER.</b>				<b>* Formerly shown in sundries.</b>			
Locomotive superintendence and clerks	2,641 1 5	3,053	3,925				
Locomotive foremen	639 3 4	812	560	<b>E.—COMPENSATION.</b>			
Locomotive drivers and firemen	41,774 19 3	39,597	37,523	For personal injury	1,185 3 3	2,333	603
Locomotive cleaners, coalmen, and labourers	9,577 3 3	10,235	10,724	For damage to vehicles, &c.	220 10 6	29	
Locomotive sundries	1,690 6 8	7,777	7,007	<b>Total, Compensation.</b>	<b>1,405 13 9</b>	<b>2,362</b>	<b>603</b>
Coal, coke, and wood	12,479 0 0	11,465	11,818				
Water	3,511 8 10	3,311	1,104	<b>F.—GENERAL EXPENSES.</b>			
Oil, tallow, and waste	2,322 19 2	2,631	2,279	Commissioners	681 5 0	650	207
Stores for cleaners	517 2 11	482	469	Secretary's office	600 0 0	687	559
Repairs and renewals of engines :—				Accountant's office	356 19 4	681	553
Wages	£21,175 0 8	26,746	32,350	Audit office	1,357 9 10	1,753	1,040
Materials	6,161 11 8	5,010	7,312	Stores office	594 10 0	1,191	1,196
	30,336 12 4			Telegraph branch	3 12 6	20	12
<b>Total, Locomotive Expenses</b>	<b>105,989 17 2</b>	<b>111,813</b>	<b>115,367</b>	Sundries	13,442 1 0	264	547
<b>C.—CARS AND WAGGONS.</b>				<b>Total, General Expenses</b>	<b>7,964 18 5</b>	<b>5,276</b>	<b>4,103</b>
Greasing and oiling :—				<b>Grand Total</b>	<b>207,517 2 9</b>	<b>208,092</b>	<b>204,227</b>
Wages	112 15 0	225	236				
Materials	214 14 0	140	121				
Car repairs :—							
Wages	5,889 9 1	7,352	9,604				
Materials	14,075 16 3	6,879	3,553				
Wagon repairs :—							
Wages	20 18 6	111	97				
Materials	3 17 9	136	61				
<b>Total, Cars and Waggons</b>	<b>20,217 10 7</b>	<b>14,850</b>	<b>13,678</b>				

† This includes commission on sale of tickets which was formerly deducted from earnings.

## APPENDIX 29.

## NORTH SHORE Cable Tram.—Schedules under Working Expenses.

	Year ending June 30, 1890.	Year ending June 30, 1889.	Year ending June 30, 1888.		Year ending June 30, 1890.	Year ending June 30, 1889.	Year ending June 30, 1888.
<b>PERMANENT WAY BRANCH.</b>							
Maintenance of Way :—	£ s. d.	£	£	<b>CARS AND WAGGONS.</b>	£ s. d.	£	£
Superintendence and office expenses	12 0 0	12	12	Car Repairs :—			
Repairs and renewals of buildings	14 13 6	104	159	Repairs and renewals of carriages and dummies	423 14 0	223	414
Repairs and renewals of line, sidings, &c.	988 3 1	1,054	749	Repairs and renewals of grippers	57 7 2	39	45
Sundries	80 0 0	10		Total Cars and Waggon expenses	481 1 2	262	459
Total Permanent Way expenses	1,054 16 7	1,180	920				
<b>LOCOMOTIVE BRANCH.</b>							
<i>General Expenses.</i>				<b>TRAFFIC BRANCH.</b>			
Superintendence and office expenses	164 2 4	50	43	Management and office expenses	42 2 6	46	
Repairs and renewals of machinery, tools, and implements	11 17 7	73	63	Repairs and renewals of furniture, fittings and implements	14 1 4	1	4
Lighting buildings and depots	111 15 1	98	84	Fuel and lighting	23 1 7	84	27
Sundries	168 15 5	107	70	Wages of clerks, conductors, &c.	1,278 15 5	1,079	1,071
	456 10 5	328	274	Sundries	60 10 2	47	20
<i>Running Expenses.</i>				Cleaning grooves	47 6 5	56	80
Wages of grip-men and stationary engine-drivers	1,441 7 6	1,486	1,389	Total Traffic expenses	1,469 6 5	1,263	1,202
Wages of cleaners, firemen, pulley-ollers, and running shed labourers	190 12 5	217	278				
Cost of fuel	560 14 4	635	476	<b>COMPENSATION.</b>			
Running stores for engines or cable, exclusive of fuel	193 0 2	120	160	Personal injury	100 0 0		
Cost of water	50 11 0	133	38				
Cleaning grooves	83 11 1	61	79				
	2,525 16 9	2,652	2,620	<b>GENERAL CHARGES.</b>			
<i>Repairing Expenses.</i>				Proportion of general establishment	32 8 0	46	88
Repairs and renewals of stationary engines	208 15 4	89	74	Store expenses	57 16 0	50	63
Repairs and renewals of cable	1,435 0 2	583	836	Office expenses and contingencies	37 1 1		14
Repairs and renewals of running gear and other cable fittings	293 16 9	99	175	Sundries	72 12 6	61	106
Repairs and renewal of water supply pipes, &c.	95 4 6	13	3	Total General expenses	220 17 7	157	221
	2,033 16 9	784	1,137				
Total Locomotive Expenses	5,016 3 11	3,764	4,031	<b>GRAND TOTAL</b>	8,330 5 8	6,626	6,833

## APPENDIX 30.

## PLATTSBURG Tramway.—Schedules Under Working Expenses.

	For the year ending 30th June, 1890.	For the year ending 30th June, 1889.	For the year ending 30th June, 1888.		For the year ending 30th June, 1890.	For the year ending 30th June, 1889.	For the year ending 30th June, 1888.
<b>A.—MAINTENANCE OF WAY AND WORKS.</b>							
Salaries, office expenses, and general superintendence	£ s. d.	£	£	<b>C.—CARS AND WAGGONS.</b>	£ s. d.	£	£
Maintenance and renewals of Permanent Way, viz :—				Greasing and oiling :—			
Wages	868 1 7	721	582	Wages	18 16 10	5	
Materials	35 15 10	111	131	Materials	13 6 1	22	23
Repairs, &c., of bridges, culverts, and other works	1 3 11	29	27	Car repairs :—			
Repairs, &c., of waiting sheds and buildings	50 3 10	11	3	Wages	322 10 5	651	176
Sundries	16 6 0	7	6	Materials	54 16 5	127	84
Total maintenance of Way and Works	1,011 18 2	835	750	Total Cars and Waggon expenses	414 0 9	805	287
<b>B.—LOCOMOTIVE POWER.</b>							
Locomotive Superintendent and clerks	£ s. d.	£	£	<b>D.—TRAFFIC EXPENSES.</b>	£ s. d.	£	£
Locomotive drivers and firemen	1,373 8 6	1,376	1,422	Traffic Manager's Office and Staff	22 0 0	108	160
Locomotive cleaners, coalmen, and labourers	705 4 1	673	677	Staffmen, pointsmen, and flagmen	441 13 8	1,202	1,218
Locomotive sundries	34 16 3	88	26	Conductors	721 1 9	796	873
Coal, coke, and wood	624 8 10	759	791	Car-cleaners, shunters, &c.	320 11 11	501	517
Water	32 4 10	23	13	Stores	57 11 0	108	72
Oil, tallow, and waste	166 16 8	131	94	Advertising	1 1 0		3
Stores for cleaners	40 18 0	46	43	Travelling and incidental	12 3 0		
Repairs and renewals of engines :—				Sundries	2 10 6	185	195
Wages	£1,610 13 8			Total Traffic expenses	1,609 6 10	2,900	2,843
Materials	313 2 4						
	1,924 1 0	1,259	1,023	<b>COMPENSATION.</b>	£ s. d.	£	£
Total locomotive expenses	5,016 18 2	4,355	4,136	Personal injury	50 0 0		
<b>F.—GENERAL CHARGES.</b>							
Proportion of general establishment	£ s. d.	£	£	Proportion of general establishment	91 6 0	90	50
Store expenses	27 12 0	73	66	Sundries	1 11 0	9	4
Sundries	1 11 0	9	4	Total General Charges	120 9 0	172	120
Total General Charges	120 9 0	172	120				
				<b>GRAND TOTAL</b>	8,216 19 11	9,117	8,136

APPENDIX 31.  
CITY AND SUBURBAN LINES.

TOTAL Tramway Rolling Stock on City and Suburban Lines and Vehicles renewed or replaced out of Revenue.

Year ending	Total Stock.				Renewals out of Revenue.			
	Motors.	Cars.	Goods trucks.	Water tanks.	Motors.	Cars.	Goods trucks.	Water tanks.
31 December, 1879.....	4	6	.....	.....	Nil.	Nil.	.....	.....
31 " 1880.....	10	20	.....	.....	"	"	.....	.....
31 " 1881.....	29	47	.....	.....	"	"	.....	.....
31 " 1882.....	46	83	4	.....	"	"	Nil.	.....
31 " 1883.....	57	99	4	.....	"	"	"	.....
31 " 1884.....	75	108	13	2	"	"	"	Nil.
31 " 1885.....	95	108	16	2	"	"	"	"
31 " 1886.....	96	127	16	2	"	1	"	"
31 " 1887.....	88	114	14	3	"	Nil.	"	"
30 June, 1888.....	88	125	14	3	"	"	"	"
30 " 1889.....	88	129	14	3	"	10	"	"
30 " 1890.....	88	145	14	4	"	31	"	1

NOTE.—During the year ending 31st December, 1887, eight motors and thirteen cars were transferred to the Newcastle-Plattsburg Tramway and during the year ending 30th June, 1889, five additional cars were similarly dealt with.

## APPENDIX 32.

## NORTH SHORE CABLE TRAMWAY.

TOTAL Rolling Stock on the North Shore Cable Tramway and Vehicles renewed or replaced out of Revenue.

Year ending	Total Stock.			Renewals out of Revenue.
	Dummies.	Cars.	Total.	
31 December, 1886.....	8	8	16	Nil.
31 " 1887.....	8	8	16	"
30 June, 1888.....	8	8	16	"
30 " 1889.....	8	10	18	"
30 " 1890.....	8	14	22	"

## APPENDIX 33.

## PLATTSBURG TRAMWAY.

TOTAL Rolling Stock on the Plattsburg Tramway and Vehicles repaired or replaced out of Revenue.

Year ending	Motors	Cars.	Trucks.	Total.
30 June, 1889.....	8	18	2	28
30 " 1890.....	8	18	2	28

## APPENDIX 34.

STATEMENT showing the cost of Construction and cost per Mile open on different Sections of the City and Suburban Tramway Lines on the 30th June, 1890.

Particulars.	Length in Miles.	Total Cost.	Cost per Mile.
Railway Station to Bridge-street.....	1½	£ 90,375	£ 51,643
Liverpool-street to Randwick and Coogee.....	5¼	107,587	20,493
Darlinghurst Junction to Waverley and Woollahra.....	3¾	49,099	14,023
Waverley to Bondi Beach.....	1½	25,400	14,519
Waverley to Randwick.....	1½	8,147	5,431
Crown-street Junction to Cleveland-street.....	0½	16,060	21,425
Railway Station to Glebe and Forest Lodge.....	2¼	38,021	16,898
Newtown (Glebe Junction) to Dulwich Hill.....	4¼	57,591	13,651
Forest Lodge Junction to Leichhardt.....	2¼	35,891	13,051
Railway Station Junction to Botany.....	6¼	83,651	12,393
Average cost of Construction.....	30½	511,840	16,781
Tramway Workshops.....		£55,186	
Rolling Stock.....		210,079	
Machinery.....		11,337	
Furniture.....		2,113	
		278,715	
	30½	790,555	25,920

## APPENDIX 35.

RETURN of the Number of Passenger Fares collected, Earnings and Working Cost, Total and per train mile, Percentage Working Cost to Earnings, Capital Invested, and Interest on Capital returned by the City and Suburban Tramways for each year from 1879 to 1890 inclusive.

Year.	Length of Line.	Number of Passenger Fares collected.	Car mileage.	Total Earnings	Working Expenses.	Earnings per Car Mile.	Working Cost per Car Mile.	Percentage of Working Cost to Gross Earnings.	Net Earnings.	Capital invested on lines open.	Interest on Capital.
1879*	1½	443,341	13,270	£ 4,416	£ 2,278	79.87	41.19	51.59	£ 2,138	£ 22,269	33.00
1880	4	2,086,897	84,074	18,980	13,444	54.18	38.38	70.83	5,536	60,218	12.34
1881	9½	7,090,125	296,906	62,549	52,107	50.56	42.12	83.31	10,442	169,450	6.16
1882	22	15,269,100	670,619	126,202	103,136	45.16	36.91	81.72	23,066	412,561	6.80
1883	25	25,684,285	1,076,096	190,699	178,877	42.53	39.80	93.80	11,822	544,105	2.22
1884	27½	30,202,303	1,242,491	219,942	215,167	42.48	41.56	97.83	4,775	643,111	0.76
1885	27½	39,591,753	1,220,500	223,340	207,095	43.91	40.90	93.13	15,345	708,109	2.17
1886	27½	52,977,578	1,222,943	226,367	201,737	44.42	39.59	89.12	24,630	742,113	3.32
1887	29½	50,103,256	1,220,026	214,125	201,458	42.12	39.63	94.08	12,657	731,582	1.76
1888	29½	51,563,197	1,216,543	221,060	204,227	42.56	39.32	92.38	16,833	742,555	2.27
1889	29½	52,810,026	1,338,386	225,833	206,002	40.49	36.95	91.25	19,741	771,255	2.56
1890	30½	57,463,650	1,474,646	219,508	207,517	40.60	36.46	83.17	41,991	790,555	5.31

\* The line was opened for three and a half months only in 1879, and for part of this period was worked with horse-power.  
 † Up to the year 1885, 3d. cash fares and 2d. tickets were counted as single fares; from 1886, inclusive, all tickets issued were at 1d. values, and cash fares paid are in this Return calculated at same rate.

## APPENDIX 36.

STATEMENT of the number of Persons employed on the Tramways on the 31st October, 1888, 30th June, 1889 and 1890.

Branches.	31st October, 1888.	30th June, 1889.	30th June, 1890.
Locomotive Branch—Salaried Staff	25	20	18
Wages Staff	592	571	597
Traffic Branch—Salaried Staff	22	17	15
Wages Staff	200	210	230
*Maintenance Branch—Salaried Staff			6
Wages Staff	198	170	222
Stores Branch—Salaried Staff	4	2	2
Wages Staff	7	1	1
Other Branches—Salaried Staff			1
Wages Staff			3
†Plattsburgh Tramway—Traffic Wages			15
Total, Salaried Staff	51	39	42
Total, Wages Staff	997	952	1,068
GRAND TOTAL	1,048	991	1,110

\* The Salaried Staff for 1888 and 1889 was part of Maintenance Branch, Railways.

† Was included in Traffic Branch, Railways, for 1888 and 1889.

## APPENDIX 37.

RETURN of the total Amount paid for Wages on the different Branches of the Tramways 1887-8, 1888-9, and 1890.

Branches.	1888.	1889.	1890.
TRAMWAYS :—			
Maintenance Branch.....	30,824	24,534	21,721
Locomotive ".....	97,751	89,867	88,362
Traffic ".....	31,087	*38,954	37,244
<b>TOTAL, TRAMWAYS.....£</b>	<b>159,662</b>	<b>*153,255</b>	<b>147,327</b>

NOTE. Includes all wages paid by the Department, whether on maintenance or new works.  
\* Adjusted figures

## APPENDIX 38.

RETURN of the number and nature of Accidents, and the Injuries to Life and Limb, which occurred on the Tramways from 1st July, 1889, to 30th June, 1890.

Date.	Servants of Department.		Passengers.		Other than Passengers.		Nature and Cause of Accident.
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	
1889.							
1 July .....					1		Man killed, entering tram in motion.
27 ".....						1	Man ran against motor, King-street.
5 August .....					1		Man killed, entering tram in motion.
21 ".....					1		" " "
3 September .....					1		Man run over.
15 ".....		1					Conductor jammed between cars, Bridge-street.
24 ".....						1	Man jumped on tram in motion.
4 October .....						2	Women injured—cart collided with tram.
4 ".....		1					Conductor knocked off car, Waverley.
7 ".....						1	Boy injured.
26 ".....	1						Conductor knocked off car.
29 ".....						1	Man injured—cart collided with tram, North Shore.
30 ".....			1				Man knocked off car, Belmore.
4 December .....				1			Boy injured—jumping off tram in motion.
6 ".....						1	" crossing in front of tram.
6 ".....						1	Man injured—knocked down by motor.
10 ".....						1	Child injured—knocked down by motor.
26 ".....				1			Man fell from tram whilst in motion.
29 ".....			1				Chinaman jumped off tram whilst in motion.
1890.							
9 January.....					1		Child run over.
14 ".....						1	Man injured—cart in collision with motor.
28 ".....						1	" " " " "
6 February .....	1						Driver killed—motor turned over.
14 ".....		1					Car-examiner jammed between cars.
15 ".....					1		Child run over.
8 March .....						1	Chinaman injured—cart in collision with tram.
20 ".....		1					Conductor knocked off tram.
5 April .....						1	Woman crossing in front of motor.
9 ".....						1	Chinaman jumped off tram in motion.
18 ".....					1		Man stepped suddenly in front of cars.
2 May .....						1	Chinaman injured—cart in collision with tram.
8 ".....				1			Man jumped off tram in motion.
22 ".....						1	Man injured—vehicle in collision with motor.
27 ".....						1	Child run over—leg amputated.
27 ".....		1					Junior Conductor injured by cart running against him.
29 ".....						1	Man injured—cart in collision with tram.
14 June .....						1	Boy injured—fish-cart in collision with tram.
14 ".....			1				Boy jumped off tram in motion.
14 ".....			1				Lady left tram whilst in motion.
18 ".....				1			Man left tram in motion.
23 ".....			1				" " " "
23 ".....				1			Woman left tram in motion.

APPENDIX 39.

RETURN of Miscellaneous Articles imported for the Tramways during the year ending 30th June, 1890.

Date of Arrival.	Name of Ship.	Description of Material.	Supplied by	Weight.	Rate.	Invoice Cost.	Freight.	English Charges	Colonial Charges	Total Cost.	Cost.
<b>Return of Miscellaneous Articles imported for the Tramways.</b>											
1889.											
15 Aug.	Trafalgar	100 c.s. motor tyres	Vickers, Sons, & Co.	13 0 8 3	32 10 0	439 7 9	18 14 3 13	1 10	1 4 0	471 8 7	34 13 11
4 Oct.	Brilliant	100 c.s. motor tyres	Vickers, Sons, & Co.	13 14 0 10	31 10 0	445 7 11	17 6 0	13 6 1	1 5 1	477 5 1	34 16 5 1/2
4 Oct.	Canara	500 pairs plain couplings complete (Eames' vacuum brake fixtures).	R. W. Cameron & Co.		0 10 7 1/2	480 13 10	5 18 9	31 10 0	0 3 2	527 15 3	1 7 1 1/2
4 Oct.	Canara	500 pairs plain couplings complete (Eames' vacuum brake fixtures).	R. W. Cameron & Co.		0 5 9 1/2	144 6 7	1 14 10	9 8 1	0 0 11	155 10 5	0 6 2 1/2
4 Oct.	Canara	100 diaphragms, complete	R. W. Cameron & Co.		5 13 4 1/2	567 0 2	6 17 5	37 1 7	0 3 7	611 2 9	0 2 2 1/2
4 Oct.	Canara	250 diaphragms, rubbers	R. W. Cameron & Co.		1 6 9 1/2	335 1 1	4 1 2	21 17 9	0 2 1	351 2 1	1 8 10 1/2
4 Oct.	Canara	1000 rubber gaskets	R. W. Cameron & Co.		0 0 6 1/2	25 15 5	0 6 3	1 13 11	0 0 2	27 15 9	0 0 6 1/2
22 Aug.	Victoria	50 c.s. car wheels	Hadfields Steel Foundry Co.		2 7 5	118 10 5	3 12 8	3 5 5	0 0 2	125 14 8	2 10 3 1/2
18 Sept.	Oroya	50 c.s. car wheels	Hadfields Steel Foundry Co.		2 7 5	118 10 5	3 12 8	3 5 5	0 0 2	125 14 8	2 10 4 1/2
30 Sept.	Orizaba	75 c.s. car wheels	Hadfields Steel Foundry Co.		2 7 5	177 15 8	5 8 11	4 18 8	0 0 3	189 12 6	2 10 3 1/2
15 Nov.	Iberia	75 c.s. car wheels	Hadfields Steel Foundry Co.		2 7 5	177 15 8	5 8 11	4 14 2	0 0 3	188 8 0	2 10 2 1/2
15 Nov.	Iberia	75 c.s. car wheels	Hadfields Steel Foundry Co.		2 7 5	177 15 8	5 9 0	4 14 2	0 0 3	188 8 1	2 10 2 1/2
15 Nov.	Iberia	100 c.s. car wheels	Hadfields Steel Foundry Co.		2 7 5	237 0 11	7 5 3	6 3 11	0 12 3	251 2 4	2 10 2 1/2
8 Dec.	Port Victor	175 c.s. car wheels	Hadfields Steel Foundry Co.		2 7 5	414 19 8	12 14 4	11 11 0	1 1 0	440 3 0	2 10 3 1/2
1889.											
23 Feb.	Echuca	150 c.s. car wheels	Hadfields Steel Foundry Co.		2 8 7 1/2	374 13 9	17 18 4	9 15 10	0 19 0	393 7 5	2 12 5 1/2
5 May	Calu	150 c.s. car wheels	Hadfields Steel Foundry Co.		2 8 7 1/2	364 13 9	14 14 11	10 9 10	0 19 0	380 18 0	2 12 1 1/2
6 April	Murrumbidgee	100 c.s. car wheels	Hadfields Steel Foundry Co.		2 8 7 1/2	213 2 6	11 14 4	6 13 5	0 12 0	252 3 0	2 12 5 1/2
20 May	Condor	100 steel axles	Steel, Peech, & Tozer	8 0 0 20	per ton.	160 3 7	11 2 3	4 18 11	0 16 0	170 15 9	22 1 6
27 April	Hubbuck	600 brass loco tubes	Muntz Metal Co., Ltd.	3 5 1 8	70 0 0	223 18 9	11 15 3	6 2 4	0 7 6	247 3 10	75 13 8 1/2
27 April	Hubbuck	400 copper loco tubes	Muntz Metal Co., Ltd.	2 7 3 27	81 13 4	195 19 3	8 12 1	5 6 1	0 5 5	210 1 10	87 11 2

Indent for Permanent Way Material for the Construction of Tramways--Leichardt to Five Dock.

1889.											
15 Nov.	Iberia	5500 fish-bolts and nuts	Ibbotson Bros. & Co., Ltd.	1 13 0 5	23 10 0	38 16 7	1 13 10	0 18 6	0 2 11	41 11 10	25 3 6
8 Dec.	Port Victor	1320 nuts	Steel, Peech, & Tozer, Ltd.	172 19 1 2	6 2 6	1059 8 0	136 4 8	17 3 0	12 19 5	1225 14 8	7 1 8 1/2
8 Dec.	Port Victor	2650 fish-plates	Steel, Peech, & Tozer, Ltd.	7 4 1 9	12 0 0	86 12 0	7 5 11	1 0 3	0 12 7	95 10 9	13 4 9 1/2
29 Jan.	Elderslie	18560 intermediate bolts	The Phoenix Bolt and Nut Co.	4 9 2 5	19 10 0	87 6 1	4 10 9	1 10 10	0 7 10	93 15 6	20 18 10 1/2
20 Jan.	Elderslie	11500 screws	The Phoenix Bolt and Nut Co.	2 5 2 3	19 10 0	44 9 6	2 0 0	0 15 9	0 3 11	47 15 2	20 19 8 1/2
20 Jan.	Elderslie	11500 spikes	The Phoenix Bolt and Nut Co.	2 0 1 7	15 0 0	30 4 8	2 0 10	0 11 1	0 3 6	33 0 1	16 7 6
20 Jan.	Elderslie	5500 ferrules	The Phoenix Bolt and Nut Co.	0 7 1 2	23 10 0	8 10 10	0 7 1	0 3 2	0 0 8	9 1 0	25 0 4 1/2

Indent for Permanent Way Materials for extension of Tramways--Waverley to Cemetery, Bondi Aquarium to the Beach, and Marrickville to Dulwich Hill.

1889.											
20 Aug.	Orient	177 rails	Darlington Steel and Iron Co.	25 5 2 24	5 13 9	143 16 8	23 4 8	2 7 3	1 17 11	171 6 1	6 15 5 1/2
20 Aug.	Orient	4320 fish-plates	Darlington Steel and Iron Co.	11 15 1 4	7 6 3	80 0 0	12 0 0	1 5 4	1 0 9	100 7 1	8 10 7 1/2
22 Aug.	Victoria	522 rails	Darlington Steel and Iron Co.	74 11 1 20	5 13 9	424 2 6	68 30 3	6 5 9	5 11 10	504 10 4	6 15 8 1/2
5 Sept.	Lusitania	502 rails	Darlington Steel and Iron Co.	64 9 1 4	6 13 9	366 12 10	60 4 7	5 17 3	4 16 8	436 11 4	6 16 5 1/2
13 Sept.	Parramatta	224 rails	Darlington Steel and Iron Co.	24 17 2 0	5 13 9	141 9 6	22 17 1	2 3 5	1 17 4	168 7 4	6 15 4 1/2
23 Nov.	Hubbuck	30031 steel stud bolts	Ibbotson Bros. & Co., Ltd.	8 0 1 0	19 10 0	159 17 0	8 1 1	2 14 8	0 13 11	171 0 8	21 7 8
26 Nov.	Hubbuck	28956 steel fish-bolts	Ibbotson Bros. & Co., Ltd.	8 11 9 0	18 19 0	162 0 5	8 13 0	2 15 2	0 14 13	174 8 6	20 7 5
26 Nov.	Hubbuck	18374 dog spikes	Ibbotson Bros. & Co., Ltd.	3 8 1 8	15 10 0	52 19 0	3 9 3	0 17 11	0 5 11	67 12 1	10 7 8
26 Nov.	Hubbuck	8640 iron ferrules	Ibbotson Bros. & Co., Ltd.	0 11 0 4	17 10 0	9 13 1	0 11 2	0 3 4	0 1 0	10 8 7	18 17 11

APPENDIX 40.

NEW SOUTH WALES GOVERNMENT TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Appointments of Employees from the 1st of July, 1889, to the 30th July, 1890.

Date.	Name.	Position.	Rate.	Remarks.
<b>LOCOMOTIVE BRANCH.</b>				
1889.				
6 Dec.	Baker, Charles H.	Messenger	2 6 per day	Transferred from Supernumerary Staff.
6 "	O'Maley, William	Cleaner	5 6 "	" "
6 "	Dolan, Daniel	"	6 0 "	" "
1890.				
28 Jan.	Knight, Wm. J.	Labourer	7/-	Vice J. Tyrell.
5 Feb.	Nuimo, M.	Assistant foreman	£255 per annum.	Transferred from Locomotive Branch, Railways
11 Mar.	Ad-head Joseph H.	Blacksmith	10/- per day	Vice J. Clarke.
13 "	Coffey, Edward	Cleaner	4 6 "	" G. Wilson
24 April	Russell, Thomas	"	4/-	" M'Ginley.
26 "	Williams, Charles	Apprentice	10 "	" Cullen.
20 May	Faircliff, Ernest J.	Cleaner	4/-	" Logan.
6 June	Pert, Alexander	Labourer	6 6 "	" R. Scott.
6 "	Laing, Walter	Cleaner	4/-	" Wilson.
14 "	Clarke, Archibald	Carpenter	3 4 "	" C. Ford.
23 "	Roe, John	Watchman	7/-	" Bristowe.
24 "	Fletcher, Herbert	Assistant oiler	3/-	" Boden.
27 "	Young, Chas. P.	Cleaner	2/-	From Supernumerary Staff.
27 "	Quirk, John	"	2/-	" "
27 "	Richardson, Walter	"	4/-	" "
27 "	Fleming, William J.	Shop-boy	2 3 "	" "
27 "	Walsh, Chas. E.	"	4/-	" "
27 "	Jones, Albert	Plumber	7 0 "	" "
27 "	O'Keefe, Henry W.	Cleaner	4/-	" "
27 "	Ewan, Alfred H.	"	4/-	" "
27 "	Walker, John T.	"	4 -	" "
27 "	Smith, Thomas W.	"	2 0 "	" "
28 "	Toby, Albert E.	"	4/-	" "
28 "	Horsfield, William	"	4 -	" "
28 "	White, Henry	"	4 -	" "
30 "	Wato, Albert S.	"	2/-	" "

## APPENDIX 40—continued.

Date.	Name.	Position.	Rate.	Remarks
TRAFFIC BRANCH.				
1889.				
8 July	Bremner, George	Assistant Conductor	7/- per day	From Railways, <i>vice</i> Sutherland.
8 "	Polack, W.	"	7/- "	<i>vice</i> Robertson.
16 "	Tierney, M.	Car-cleaner	7/- "	<i>vice</i> man promoted.
16 "	Walsford, Joseph	"	7/- "	"
25 "	Miller, R.	"	7/- "	<i>vice</i> Walson.
18 Nov.	Bond, Frank	Conductor	7/- "	<i>vice</i> Seal.
28 "	Mann, Charles	"	7/- "	<i>vice</i> Manson.
1890.				
24 Jan.	Furlong, Mrs.	Waiting-room Attendant	Rent free	<i>Fee</i> Mrs. Abnon.
24 Feb.	M'Sweeney, M.	Conductor	7/- per day	From Railways, exchanged with W. T. Gorton.
6 Mar.	Reid, Henry	Flagman	7/- "	"
15 "	Hassall, Samuel	Car-cleaner	6/- "	<i>Fee</i> P. Hinton.
MAINTENANCE BRANCH.				
1890.				
27 June	Beckett, Henry W.	Labourer	6/6 per day	From Supernumerary Staff.
27 "	Kirchner, John	"	6/6 "	"
27 "	Boulton, William	"	6/6 "	"

## NEW SOUTH WALES GOVERNMENT TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Removals of Employees, from the 1st of July, 1889, to the 30th of June, 1890.

Date.	Name.	Position.	Rate.	Remarks.
LOCOMOTIVE BRANCH.				
1889.				
22 June	Boyle, Albert D.	Fireman	8/- per day	Left.
5 July	M'Arthur, James	Labourer	7/- "	Dismissed.
13 "	Evans, Thomas	Fireman	8/- "	Resigned.
27 "	Warner, James	Boilermaker	11 2 "	Dismissed.
6 Aug.	Cass, Frederick	Labourer	7/- "	Deceased.
7 "	Waldon, George	Driver	13/- "	Resigned.
19 "	Sixsmith, George	Fitter	10/- "	Transferred to Railways.
19 "	Smith, Charles	Turner	11/- "	"
29 "	Breakwell, John W.	Fitter	12 4 "	Retrenchment.
29 "	Thornton, Sidney	"	10/- "	"
27 "	O'Shaughnessy, W.	Labourer	7/- "	Dismissed.
5 Sept.	Colquhoun, John	Blacksmith	11/- "	Retrenchment.
11 Oct.	Heron, James	Driver	13/- "	Discharged.
19 "	Horder, Charles	Machinist	7/6 "	Retrenchment.
19 "	Smith, John	Driver	11 "	Discharged.
23 "	Hickey, William	Watchman	7/- "	Left.
31 "	Woods, George	Foreman	£233 per annum	Retrenchment.
31 "	Brown, John A.	"	£233 "	"
31 "	Allen, William	"	£270 "	"
5 Nov.	M'Intosh, William	Blacksmith	11 4 per day	Deceased.
8 "	Musca, William	Labourer	7/- "	Resigned.
11 "	Burton, George	Machinist	8/8 "	Retrenchment.
12 "	White, William	Station Engine-driver	11/- "	Left.
18 "	Pike, Charles	Cleaner	5/6 "	Transferred to Railways.
11 Dec.	Heady, G.	Driver	11/- "	Retrenchment.
10 "	Lacey, John	Labourer	7/- "	Resigned.
21 "	Taylor, Arthur	"	7/- "	"
24 "	Cornwall, William	Machinist	8/8 "	"
24 "	Hewitt, John	Apprentice	1/9 "	Discharged.
25 "	Scott, Robert	Driver	11/- "	"
11 "	Wilson, George B.	"	13/- "	"
27 "	Magnall, Robert	Fireman	8/- "	Left.
1890.				
3 Jan.	Clarke, James	Blacksmith	11/- "	Resigned.
11 "	Tyrell, John R.	Labourer	7/- "	"
11 "	Christie, Thomas	Plumber	10/3 "	Discharged.
23 "	Mudden, James	Labourer	7/- "	Resigned.
30 "	Bradley, George	Cleaner	6/6 "	"
31 "	Brausch, Bruno	Fireman	9/- "	Discharged.
1 Feb.	Summer, Napoleon	Boilermaker	10/8 "	Resigned.
6 "	Logan, James	Driver	13/- "	Retrenchment.
17 "	Alexander, Andrew	Cleaner	6/6 "	Left.
7 April	M'Ginley, Neil	"	6/- "	"
12 "	Williams, Thomas	Labourer	7/- "	Discharged.
19 "	Callen, Robert J.	Apprentice	2/6 "	Resigned.
19 "	Bojen, Samuel	Fireman	9/- "	Left.
27 "	M'Cliffert, Henry	Fitter	10/2 "	Deceased.
4 June	Ford, Charles	Car-builder	10/6 "	Discharged.
12 "	Whitaker, Joshua	Car-examiner	15/4 "	Resigned.
19 "	Pedrocca, Hugh	Cleaner	6/6 "	Discharged.
29 "	Bristowe, George	Watchman	7/- "	Resigned.
24 "	Walsford, William	Apprentice	10/- "	"
TRAFFIC BRANCH.				
1889.				
8 July	Robertson, John	Conductor	9/- per day	Resigned.
20 "	Watson, Horatio	Car-cleaner	7/- "	Dismissed.
23 "	Williams, James	Conductor	8/6 "	"
27 "	Deveny, Timothy	Car-cleaner	7/- "	"
30 "	Bishop, John	Conductor	9/- "	Resigned.
9 Oct.	Rodgers, Samuel	"	7/6 "	Discharged.
31 "	Seal, Reuben	"	8/6 "	Deceased.
14 Nov.	Whyte, George	"	7/6 "	Discharged.
14 "	Yeomans, Joseph	"	7/6 "	"
16 "	Lane, John W.	Car-cleaner	7/- "	"
12 Dec.	Manson, William	Conductor	8/- "	Transferred to Railways, <i>vice</i> C. Mann
23 "	Steel, Thomas	"	9/- "	Discharged.
7 "	Hinton, F. J.	Car-cleaner	7/- "	"
1890.				
23 Jan.	Abnon, Mrs.	Waiting-room Attendant	0/- per week	Dispensed with.
27 "	O'Connell, Martin	Staffman	8/- per day	Discharged.
18 Feb.	Bond, Frank	Assistant Conductor	7/- "	Transferred to Railways.
24 "	Gorton, W. T.	Conductor	8/- "	Exchanged with M'Sweeney of Railways.
2 Mar.	Menary, William	"	9/- "	Retrenchment.
8 April	Scott, Ambrose	Assistant Conductor	8/- "	Discharged.
30 June	Tyler, W. H.	Clerk (Junior)	£32 per annum	Transferred to Secretary's Office.
MAINTENANCE BRANCH.				
1889.				
4 July	Lewis, William	Horse and Dray	12/- per day	Retrenchment.
4 "	Rout, Edward	"	12/- "	"
4 "	Murphy, Peter	"	12/- "	"
9 Aug.	Lloyd, Edward	Labourer	7/6 "	Deceased.
4 Sept.	Priol, Hepolit	"	7/6 "	Resigned.
12 Dec.	Baxter, James	"	7/6 "	Retired.
1890.				
28 Mar.	Gordon, John	"	7/6 "	Retrenchment.

LIST of concessions granted to the Staff since the Commissioners took office:—

The wages of all extra men increased from 6s. to 6s. 6d. per day, and a further increase to 7s. at the end of twelve months.

The salaries of Night Officers raised and the minimum rate increased £10; maximum rate, £20 per annum.

A new classification of signalmen introduced, giving a large number of advances to men in the Metropolitan and Newcastle districts; advance of pay given to signalmen continuously employed in country boxes.

Enginemmen and firemen's hours reduced from 55 to 54 hours per week, and nothing less than half-day to be paid for Sunday duty. Sunday duty also to be paid for at the rate of time and a quarter.

Fottlers' time to count from the time they were inside the railway fences and starting for work.

Permanent-way men paid 7s. 6d. per day after eighteen months' service, 7s. being the maximum for new hands when the Commissioners' took office.

Gangers allowed one quarter day's pay for walking their lengths on Sundays, and also supplied with tricycles. Also allowed six days good conduct holidays, instead of three which had been granted in August, 1888.

Good conduct holidays, six each year, extended to shunters, signalmen, assistant guards, and assistant conductors.

The minimum pay to gate-keepers increased to 7s. per week, in place of 2s. 6d. per week as previously.

An allowance of 6d. per night made to extra gangs when away from home. In addition a number of old carriages are being fitted with sleeping accommodation for the use of extra gangs, and vans with cooking-stoves, &c., are also being built. More liberal arrangements also made for visits to their homes.

Wages of workmen in shops more equitably adjusted.

Junior porters paid for Sunday duty, formerly the weekly wage covered the seven days work.

Goods-shed porters, Sydney and Darling Harbour, paid overtime at increase on ordinary rates. Ordinary pay only previously given.

Employees temporarily filling superior positions paid the rate attaching to the superior grade.

In addition to the above a large number of other concessions have been given which, although not of general application as they would only affect certain branches, yet all have a bearing upon the improvement of the Staff and have entailed an increase in the expenditure. For instance, the expenses to 3rd class operators were increased from 3s. to 5s. per day; additional holidays given to head porters, foremen, and platform inspectors; Sydney car examiners increased to a maximum of 8s. 6d. per day; gripmen, North Shore Tram line placed on same footing as conductors; conductors on Newcastle Tram lines pay increased to same standard as Sydney; employees detained through late running of trains not to lose pay; medical certificates not to be demanded from fettlers except in special cases; sick pay allowances to be paid irrespective of any consideration as to whether employees belong to benefit society.

## APPENDIX 40.

## NEW SOUTH WALES GOVERNMENT RAILWAYS.

## BY-LAW No. 34.

The Railway Commissioners of New South Wales, in pursuance of the powers conferred by the Government Railways Act of 1888, do hereby make the following By-law in respect of permanent appointments in the Railway Service; and all previous regulations conflicting therewith are hereby repealed.

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Conditions of Employment of Staff in the various Branches.

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## GENERAL CONDITIONS APPLICABLE TO THE WHOLE STAFF.

All future appointments and promotions will be made under the following regulations:—

No person over the age of 35 years shall be appointed to any grade in the Traffic Branch, or over the age of 40 years in the Engineering and Stores Branches, except with the special authority of the Board of Commissioners, and no one having once left the service (except in consequence of reduction of staff) will be readmitted except upon similar authority.

Whenever the Commissioners require additional permanent officers, notice thereof will be given three times in a Sydney daily paper; this notice will state the branches for which such additional officers are required, the necessary qualifications, and also the time and place of examination, which will be so arranged that, where it is considered necessary, persons residing in the country districts shall have reasonable facilities for being examined in the district in which they reside.

No person shall be appointed as an additional permanent officer who has not obtained a certificate of fitness from the Examiners.

If a greater number of candidates than are required for appointment obtain certificates from the Examiners, the Commissioners will appoint as many persons as are required, in such grades and to such situations as they may consider best. The persons in excess of the number required will be eligible for appointment for a period of twelve months then next ensuing from the date of such determination, without further examination. If the number of candidates for examination exceed three times the number to be employed, the most eligible candidates for examination will be selected, not exceeding the number specified.

All appointments will be made to the lowest position of the grade in each of the various branches of the Railway service, and on probation only, for a period of six months. After the period of such probation, and upon production of a certificate of fitness from the officer at the head of the branch in which such probationer was employed, and upon proof to the satisfaction of the Commissioners that all the provisions of the Railway Act have been complied with, such appointments will be confirmed by the Commissioners.

Mr. A. Richardson and Mr. D. H. Neale to be the Board of Examiners of candidates for employment. The heads of each Branch to be *ex officio* members of the Board.

No probationer shall have his appointment confirmed until he shall have insured his life as provided for in By-law No. 35, of the 12th December, 1889, issued in accordance with section 64 of the Government Railways Act of 1888.

Every person in the Railway Department will hold his situation conditionally on his being subject to and strictly observing the rules and regulations established from time to time for his guidance, whether published with the General Rules and Regulations or otherwise; and every employé must consider all rules of general application equally as binding upon him as those specially pertaining to his own particular position or duties.

Men who leave the service in consequence of reduction of staff or slackness of work, and are subsequently re-employed within six months of having left, to be paid at the same rate as they were previously in receipt of, if they are engaged on similar duties.

Promotion and increases of pay in all grades of the several branches will be made, except where scales are in operation, according to merit, and will be considered by the Commissioners on the recommendation of the head of the Branch.

The annual advances of pay, where scales are in operation, will be dependent and continued upon a certificate of efficiency and good conduct being given.

Only competent workmen will be engaged for service in the Locomotive, Permanent Way, and other shops; they will be paid the average rates of wages found to be prevailing in private establishments for work similar to that which they are required to perform.

No employé is allowed to engage in any business or employment outside the duties of his office.

All employés in every branch of the Railway Service, whether the same be officers or servants, shall retire from the Railway Service at the age of sixty years. *Provided*, however, that the Railway Commissioners may at their discretion, and with consent of the parties, require any of such officers or servants to continue in the said service after the age of sixty years, if it shall appear to the Commissioners that the retention of such officers or servants would be advantageous to the Service.

Before

Before any one is appointed to the Railway Service he must undergo a medical examination, and produce a certificate from the authorized medical officer that he is free from all bodily and mental infirmity, is physically able to perform the duties of the position he seeks, and that his eyesight and hearing are perfect. He must also produce certificates of good character.

Sons of employes of the Department are not to be employed at stations or in offices under their father's charge, except youths receiving salaries under £80 per annum, who are to be removed to some other station or office when their salaries are £80 per annum or upwards.

## EXAMINATIONS.

### SALARIED STAFF.

The educational examination for clerical apprentices and telegraph operators is to be as follows:—

*Arithmetic.*—The simple rules, and proportion, practice, interest, fractions, and decimals.

Reading, and writing from dictation.

In the case of telegraph operators such technical examination shall be added as the Telegraph Inspector shall think fit.

The candidate having had a sufficient opportunity of looking over the arithmetical examination paper, shall be timed in working it, and shall not be passed unless he obtain such marks as the Examiner may fix upon as the minimum number to be obtained.

### APPRENTICE CLERKS.

Apprentice Clerks will be taken on from 15 to 17 years of age at the following rates:—

15 to 16 years	...	...	...	...	...	£30 per annum.
16 to 17 "	...	...	...	...	...	40 "
17 to 18 "	...	...	...	...	...	50 "
18 to 19 "	...	...	...	...	...	70 "

And subsequently according to merit and the class of work which has to be performed.

### JUNIOR CLERKS IN CHIEF OFFICES.

Candidates for employment in the chief offices and the principal offices of the District Officers will be required to pass a superior examination, and if appointed, to make themselves proficient in Pitman's system of Shorthand within 12 months of entering the service. Failing to do this, they will not be eligible for promotion, and will be liable to be removed from their offices.

The examination paper to be specially prepared and signed by the Secretary, Chief Traffic Manager, Locomotive Engineer, and Engineer for Existing Lines for their respective Departments, and submitted to the Commissioners for approval.

Youths appointed to vacancies in the offices named must not be under the age of 16 years.

The following scale of salaries to be adopted, subject to an annual report of efficiency to the Commissioners:—

1st year	...	...	...	...	...	£60 per annum.
2nd "	...	...	...	...	...	£80 "
3rd "	...	...	...	...	...	£100 "
4th "	...	...	...	...	...	£120 "

Subsequent promotion to be by merit.

Youths who are already in the service, and who are not under 16 years of age, will be allowed to compete for these appointments.

### CLERICAL STAFF.

To be paid according to merit and class of work to be performed.

Minimum salary	...	...	...	...	...	£75 per annum.
Maximum "	...	...	...	...	...	350 "

The following are the conditions for the various Branches:—

### LOCOMOTIVE BRANCH.

#### WORKSHOPS.

Lads will be taken into the shops as required, to learn the trades of fitter, turner, &c. They will not be taken in under the age of 15 years, and will not be out of their apprenticeship until the age of 21 years. They must be of good constitution, and able to read and write with facility; they will not be bound apprentice, but will be able to resign, and will be liable to dismissal, in the same way as the men; they will also be subject to the same rules and regulations as the men. The remuneration for their services will be as follows:—

1st period — or up to 17 years of age	...	...	10d. per day.
2nd " of a year	...	...	1s. 3d. "
3rd "	...	...	2s. "
4th "	...	...	3s. "
5th "	...	...	5s. "

At the end of the term of apprenticeship they will be paid wages proportionate to the value of their services.

## SHOP BOYS.

Boys, other than apprentices, will be taken on to assist workmen in the running sheds and workshops at the following rates of pay:—

14 to 15 years	...	...	...	...	1s. 9d. per day.
15 " 16 "	...	...	...	...	2s. 0d. "
16 " 17 "	...	...	...	...	2s. 3d. "
17 " 18 "	...	...	...	...	2s. 6d. "
18 " 19 "	...	...	...	...	3s. 0d. "
19 " 20 "	...	...	...	...	4s. 0d. "
20 " 21 "	...	...	...	...	5s. 0d. "

The following will be the conditions for acquiring the positions of Cleaner, Fireman, and Engine-driver:—

## CLEANERS.

Only youths between 15 and 18 years of age will be eligible for appointment as Cleaners. Each youth must undergo a medical examination, and produce a certificate from the authorized Medical Officer to the effect that he is free from bodily or mental infirmity, possesses good eyesight and hearing, and is not afflicted with colour blindness either by day or night; he must also produce satisfactory testimonials of character, and be able to read and write.

The rates of wages will be as follows:—

1st year—15 to 16 years	...	...	...	2s. 6d. per day.
2nd " 16 to 17 "	...	...	...	3s. 3d. "
3rd " 17 to 18 "	...	...	...	4s. 0d. "
4th " 18 to 19 "	...	...	...	4s. 9d. "
5th " 19 to 20 "	...	...	...	5s. 6d. "
6th " 20 to 21 "	...	...	...	6s. 0d. "
7th " 21 and over	...	...	...	7s. 0d. "

6d. per night additional will be allowed for night work.

When additional Firemen are required, Cleaners will be promoted according to efficiency and seniority, provided their general conduct has been satisfactory, and that they are eligible in all other respects.

## FIREMEN.

All Firemen must have served as Cleaners, or have acted as Firemen or Drivers on other Railways. Before being appointed as Fireman, each man who has not previously passed a medical examination will have to produce a certificate from the authorized Medical Officer similar to that required from Cleaners when entering the Service. He must also undergo an examination in the Rules and Regulations applicable to Enginemmen, especially those relating to the working of trains, signalling, &c.

The rates of wages will be as follows:—

3rd class—1st 18 months	...	...	...	8s. per day.
2nd " 2nd 18 months	...	...	...	9s. "
1st " after 3 years' service (maximum rate)	...	...	...	10s. "

Firemen must always commence in the 3rd class.

As vacancies for Drivers occur, Firemen who have been not less than twelve months in the 1st class, or Firemen who have previously served as Engine-drivers on other Railways, will be promoted according to efficiency, provided their general conduct has been satisfactory.

## ENGINE-DRIVERS.

No person will be allowed to undertake the duties of Engine-driver unless he has previously served as Fireman on the New South Wales Railways, and is eligible for promotion. Before being appointed as Driver, each man must hold a certificate from the Locomotive Engineer, showing that he has passed the necessary examination, and is competent to take charge of a Locomotive Engine.

The subjects of examination must embrace a knowledge of the road, gradients, approaches to stations and sidings, positions of signals, &c., the examination of engine before joining a train, firing, trimming of syphons, oiling, testing of valves and pistons, and the various modes of uncoupling engines when they fail on the road, and the methods to be adopted to surmount any slight breakdown, &c., &c.

The rates of wages will be as follows:—

Shunting Engines	...	...	...	...	11s. per day.
5th class	...	...	...	...	11s. "
4th " after 1 year's service as Driver of Goods or Passenger trains	...	...	...	...	12s. "
3rd " " 2 " " " " " " " " " " " "	...	...	...	...	13s. "
2nd " " 3 " " " " " " " " " "	...	...	...	...	14s. "
1st " " " " " " " " " " " "	...	...	...	...	15s. "

The position of first-class Driver will only be obtainable as vacancies in that grade occur, and after serving as a Driver at least ten years. The number of Drivers in the first class shall never exceed one-seventh of the whole number of Drivers employed.

Drivers must always commence in the fifth class.

## PERMANENT-WAY BRANCH.

The Permanent-way labourers must be strong able-bodied men, in good health, and capable of performing rough hard work. They must have perfect eyesight and hearing, be of good character, and able to read and write. Promotion and increase of wages will be in accordance with merit.

These

These conditions will not apply to temporary men such as are employed in the flying gangs (except as to their ability to perform the work required of them), but qualified temporary men will be eligible for the permanent staff as vacancies occur.

The rates of wages will be as follows :—

FETTLERS AND LABOURERS.

First 6 months	...	...	...	...	6s. 6d. per day.
From 6 to 18 months	...	...	...	...	7s. "
After 18 months' service	...	...	...	...	7s. 6d. "

GANGERS.

When gangers are required suitable men will be selected from the fettleers or labourers. They must be steady and reliable, thoroughly understand the work, be able to read and write, and be quite competent to undertake all the duties of the position.

GANGERS.

First 6 months	...	...	...	...	8s. 6d. per day.
After 6 "	on certificate of fitness	...	...	...	9s. "

For inspecting their lengths on Sundays Gangers will be allowed one-quarter day's pay.

INSPECTORS AND FOREMEN.

Gangers and Mechanics will be promoted to Foremen and Inspectors as required, in cases where they are qualified to fill such positions.

INSPECTORS AND FOREMEN.

Minimum salary	...	...	...	...	£200 per annum.
Maximum "	...	...	...	...	300 "

CHIEF INSPECTORS.

Minimum salary	...	...	...	...	£300 per annum.
Maximum "	...	...	...	...	400 "

TOOL COLLECTORS.

Youths, from 15 to 17 years of age, will be taken on as Tool Collectors at the following rates of pay :—

15 to 16 years of age	...	...	...	...	2s. per day.
16 to 17 "	...	...	...	...	2s. 6d. "
17 to 18 "	...	...	...	...	3s. "
18 to 19 "	...	...	...	...	4s. "

At the end of the term they will be paid wages proportionate to the value of their services.

TRAFFIC BRANCH.

GENERAL OUT-DOOR STAFF.

The employes comprised in the general out-door staff will be classified and paid as follows :—

PLATFORM INSPECTORS, FOREMEN (GOODS, COACHING, AND SHUNTING).

10s. to 12s. per day; increases of 6d. per day per annum.

SUBURBAN PASSENGER GUARDS.

8s. 6d. per day for 2 years; 9s., 2 to 5 years; 10s., 5 to 10 years.

If promoted to Through Passenger Guards, to take up pay applicable to length of service as Guards.

THROUGH PASSENGER AND GOODS GUARDS.

9s. per day,	first year.
9s. 6d. after 1 year and up to 2 years.	
10s. "	2 " 5 "
10s. 6d. "	5 " 10 "
11s. "	10 years.

COAL TRAIN GUARDS.

8s. per day first 6 months; 8s. 6d. second 6 months; 9s. 1 year to 4 years; 9s. 6d. per day after.

ASSISTANT GOODS GUARDS.

8s. per day for first 6 months, 8s. 6d. per day after.

SHUNTERS.

2nd class, 7s. per day for six months, 7s. 6d. after six months.  
1st class, 8s. to 9s.; increase of 6d. per day per annum.

SIGNALMEN.

4th class (men who do not deal with passenger traffic), 7s. per day first year, 7s. 6d. after one year.  
3rd class, 8s. per day first year; 8s. 6d. after one year's service.  
2nd class, 9s. " " 6d. per day per annum until maximum of 10s. is reached.  
1st class, 10s. 6d. per day for first year; 11s. per day after first year.

All men appointed as Signalmen must have had 12 months railway experience.

PORTERS

## PORTERS (GOODS AND COACHING).

3rd class, 6s. per day for first 6 months; 6s. 6d. for second 6 months; 7s. after 12 months.

2nd class, 7s. 6d. per day.

1st class and Leading Porters, 8s. per day.

Head Porters, 8s. 6d. to 10s. per day; increases of 6d. per day per annum.

## LEAD PORTERS

Will be taken on from 16 to 18 years of age.

2s. 6d. per day up to 18 years of age.

3s. 4d. " 18 to 19 "

4s. 2d. " 19 to 20 "

5s. " 20 to 21 "

Over 21 to be appointed to first vacancy for 3rd class Porters.

Vacancies for Guards will be filled by promoting the most suitable men from the other grades. Every Guard must have had at least two years' railway experience before being allowed to take independent charge of a train. Every man must also pass an examination in the duties, &c., before being appointed Assistant Guard, and also before being promoted to Guard. The chief subjects of the examinations will be as follows:—

## ASSISTANT GUARDS.

Knowledge of Rules and Regulations, especially those relating to train working.

Shunting.

Signalling.

Working of brakes.

Securing of loading.

Single and double line working under the different systems.

Protection of trains.

Steep gradient working.

## GUARDS.

Will be carefully re-examined on the subjects for Assistant Guards.

Knowledge of road, gradients, &c.

positions and description of signals.

approaches to stations and sidings.

station yards.

General railway working.

Men who have not previously undergone a medical examination—such as those who joined the Service before these conditions came into operation—must be examined as to their eye-sight before being allowed to run as Assistant Guard or Guard.

The minimum height for Out-door Staff will be 5 ft. 6 in.

## STATION STAFF.

In all cases the maximum salaries are to be obtained by merit, and the importance of the post filled.

## OFFICERS IN CHARGE.

Minimum salary, £130 per annum, with house, or 10s. per week in lieu thereof.

Maximum " £150 " " " "

## NIGHT OFFICERS IN CHARGE.

Minimum salary ... .. £120 per annum.

Maximum " ... .. \*£140 "

## STATION-MASTERS.

Minimum salary ... .. £150 per annum, with house.

Maximum " ... .. 400 " "

## RELIEVING STATION-MASTERS.

Minimum salary ... .. £180 per annum.

Maximum " ... .. 300 "

## STATION-MASTERS.

Only persons having a thorough Railway experience, and who are able to compile the various returns and accounts required by the Department, will be eligible for promotion to the position of Station-master. The officers must possess a knowledge of all the outside duties, such as signalling, shunting, and general yard work, loading and unloading of all descriptions of traffic, and the working of trains, &c., as well as be able to perform the inside or office work. The position of Station-master is therefore one which any member of the staff can obtain by making himself thoroughly conversant with the duties of the office. A practical acquaintance with Morse telegraphy (which should be acquired by every employé in the Traffic Branch) will also be greatly conducive to such promotion, as some of the positions will only be given to those officers who are conversant with the telegraph. Good conduct will always be indispensable.

The foregoing classification does not include small wayside stations and platforms which are in charge of Porters.

No person will be appointed Station-master until the Chief Traffic Manager and Traffic Auditor have reported to the Commissioners that he is thoroughly conversant with the general working of a Railway, and also with the mode of keeping the accounts.

## TELEGRAPH

\* Subsequently advanced to £150.

## TELEGRAPH OPERATORS.

Lads of not less than 15 years of age will be received into the Service, as required, to learn the duties of Telegraph Operator. Before any lads are appointed, they will be required to pass an examination. While on probation they will receive a nominal salary of 2s. 6d. per week.

## LEAVE.

Every servant, except Salaried Officers, will be entitled to a day's leave on full pay for each proclaimed general public holiday. Those servants who cannot take such leave on the proclaimed holidays, in consequence of being required to work, will, on making application, be allowed the same number of days at a future time, provided the head of the Branch decides that they can be conveniently spared. Should, however, the exigencies of the Service not admit of the whole or any of the holidays being taken before the 31st of July of the year following that for which they are due, an equivalent in money will be paid.

In addition to the above, Engine-drivers, Firemen, Guards, Signalmen, and Gangers of Fettlers may be allowed six days' leave of absence in each year, on full pay, if their general conduct has been satisfactory. This leave will only be granted at times most convenient to the Department, and the Locomotive Engineer, Engineer for Existing Lines, or Chief Traffic Manager will have the power to disallow it altogether, or reduce the time, in cases where it is considered the employé is not entitled to the full leave.

Officers paid by annual salary will, if they can be conveniently spared, be allowed three weeks' leave of absence in each year. Leave not taken when due will lapse.

## FREE PASSES.

Holiday free passes will not be granted to employés who, through misconduct, are not deserving of such indulgence, nor at times when there is likely to be any difficulty in providing sufficient carriage accommodation for the public.

## APPEALS.

In any case where an employé considers he has been unjustly dealt with, he must, in the first instance, appeal to the head of his Branch, and then, if he still consider he has been unfairly treated, after such appeal, he has the right of appealing to the Commissioners, such appeal to pass through his Departmental Head.

The Commissioners will hear any appeal made by an employé against the adoption or confirmation of the advice or decision of the officer at the head of his branch, with regard to his right to promotion, or with respect to any charge made against such employé, or with respect to any penalty imposed by such officer; and will confirm or modify such decision, or make such order as they think fit; and their decision will be final. Every such appeal will be heard within thirty days from the date of the appeal being lodged with the Commissioners.

(L.S.) E. M. G. EDDY, Chief Commissioner.  
W. M. FEHON, Commissioner.  
CHARLES N. J. OLIVER, Commissioner.

The Common Seal of the Railway Commissioners of New South Wales was heretofore affixed this second day of December, in the year of our Lord 1889, in the presence of—

HUGH M'LACHLAN.

Confirmed by the Governor-in-Council on the 10th day of December, 1889,—

ALEX. C. BUDGE,  
Clerk of the Executive Council.

## NEW SOUTH WALES GOVERNMENT RAILWAYS.

## BY-LAW No. 35.

THE Railway Commissioners of New South Wales, in pursuance of the powers conferred by the Government Railways Act of 1888, do hereby make the following By-law regulating the conditions under which persons appointed to the Railway Service must effect insurances on their lives; and all previous regulations conflicting therewith are hereby repealed.

## GENERAL REGULATIONS—LIFE INSURANCE.

REGULATIONS ISSUED IN ACCORDANCE WITH SECTION 64 OF THE GOVERNMENT RAILWAYS ACT OF 1888.

ALL officers or servants appointed or to be appointed after 22nd October, 1888, to the Railway Service, must insure their lives, and shall hold their offices on the express condition that a deduction will be made from their salaries or wages for the payment of the premium on the policy to keep their lives insured, should they fail to pay the necessary premium to the Insurance Company.

The insurance shall be effected with some Life Insurance Company carrying on business in New South Wales approved by the Commissioners, which shall have agreed with the Commissioners, upon a condition, to increase the amount of insurance from time to time according to these Regulations, at the rates specified in the tables of the insurance company forming the basis of the contract, and without any further medical examination beyond that instituted by the said insurance company when the agreement or policy with each officer or servant shall have been taken out; it being the intention of these Regulations that the contract shall continue until the assured shall die or attain the age of sixty, whichever may first happen.

The

The amount of the insurance shall at all times be in accordance with the following scale:—

Salary or Wages.	Amount of Insurance.
Under £100 a year	£100
£100 to £199	£200
£200 to £299	£300
£300 to £399	£400
£400 to £499	£500
£500 and over	£600 as a maximum.

All insurances shall be for a fixed sum and at rates according to tables of the Insurance Companies, which shall be signed by the manager or other accredited officer by order of the Board of Management, and shall be deposited with the Commissioners, and the premiums shall be payable in advance. The contract once entered into with a company shall not be varied, but all succeeding increases are to be made with the same company. The said increases, as hereinbefore provided, shall be made at the rates fixed by the said tables according to the ages of the assured at the time of increased insurance being required consequent upon increased salary or wages according to these Regulations. All promotions shall be advised to the insurance company by the Railway Accountant.

All insurances shall be in the names of the assured; but all policies shall be lodged with the Railway Commissioners, and shall remain in their possession, and shall be unassignable either at law or in equity.

*Provided* that the amount so insured shall be payable to the employé on his leaving the service upon attaining the age of sixty, or to his legal representatives should he die before attaining that age.

*Provided further*, that in case any employé shall be retained in the Railway Service after attaining the age of retirement, the amount then due to such employé under such contract of insurance shall be by him invested in Government stocks or debentures, mortgages, or such other securities as shall be approved by the Commissioners, and the securities shall be handed over to the Commissioners until such employé die or leave the Railway Service, when they shall be handed over to him or to his legal representative in the event of his death.

No company shall be compelled to insure the life of any officer or servant for a larger sum than is provided by these Regulations; but any additional insurance shall be matter of contract between the assurer and the assured, and the policies in such cases shall not be lodged with the Commissioners, or be in anywise subject to these Regulations.

A record of all insurances made in pursuance of these Regulations shall be kept by the Railway Accountant, and shall show the date and amount of the original insurance, and of each successive increase.

The insurance shall be by way of endowment, and shall be payable when the assured attains the age of sixty years, or sooner in the event of earlier death.

The Commissioners may require any persons appointed by them under the 63rd section of the said Act, without examination or probation, to insure their lives as nearly as may be after the method prescribed by these Regulations.

Any employé, whether officer or servant, on resigning, being dismissed, or otherwise leaving the service of the Commissioners, shall have all policies in his name delivered to him, and the Commissioners shall not thereafter have any charge of the policies or liability in respect of the premiums; but the Accountant shall give notice to the insurance company interested, and the said policies shall thereafter cease to be subject to these Regulations, but shall not be otherwise affected as a contract between the insurer and the insured so long as the premiums thereon are paid by the insured.

(L.S.) E. M. G. BDDY, Chief Commissioner.  
W. M. FEHON, Commissioner.  
CHARLES N. J. OLIVER, Commissioner.

The Common Seal of the Railway Commissioners was hereunto affixed this second day of December, in the year of our Lord 1889, in the presence of—

HUGH M'LACHLAN.

Confirmed by the Governor-in-Council this 10th day of December, 1889,—

ALEX. C. BUDGE,  
Clerk of the Executive Council.

## NEW SOUTH WALES GOVERNMENT TRAMWAYS.

### BY-LAW No. 36.

THE Railway Commissioners of New South Wales, in pursuance of the powers conferred by the Government Railways Act of 1888, do hereby make the following By-law in respect of permanent appointments in the Tramway Service; and all previous regulations conflicting therewith are hereby repealed.

### Conditions of Employment of Staff in the various Branches.

#### GENERAL CONDITIONS APPLICABLE TO THE WHOLE STAFF.

All future appointments and promotions will be made under the following regulations;—

No person over the age of 35 years shall be appointed to any grade in the Traffic Branch, or over the age of 40 years in other Branches, except with the special authority of the Board of Commissioners, and no one having once left the Service (except in consequence of reduction of staff) will be readmitted except upon similar authority.

Whenever

Whenever the Commissioners require additional permanent officers, notice thereof will be given three times in a Sydney daily paper; this notice will state the branches for which such additional officers are required, the necessary qualifications, and also the time and place of examination, which will be so arranged that, where it is considered necessary, persons residing in the country districts shall have reasonable facilities for being examined in the district in which they reside.

No person shall be appointed as an additional permanent officer who has not obtained a certificate of fitness from the Examiners.

If a greater number of candidates than are required for appointment obtain certificates from the Examiners, the Commissioners will appoint as many persons as are required, in such grades and to such situations as they may consider best. The persons in excess of the number required will be eligible for appointment for a period of twelve months then next ensuing from the date of such determination, without further examination. If the number of candidates for examination exceed three times the number to be employed, the most eligible candidates for examination will be selected, not exceeding the number specified.

All appointments will be made to the lowest position of the grade in each of the various branches of the Service, and on probation only, for a period of six months. After the period of such probation, and upon production of a certificate of fitness from the officer at the head of the branch in which such probationer was employed, and upon proof to the satisfaction of the Commissioners that all the provisions of the Railway Act have been complied with, such appointments will be confirmed by the Commissioners.

Mr. J. Roberts, Mr. G. Downe, and Mr. Geo. Cowdery, junr., to be the Board of Examiners of candidates for employment.

No probationer shall have his appointment confirmed until he shall have insured his life as provided for in By-law No. 35, of the 12th December, 1889, issued in accordance with section 64 of the Government Railways Act of 1888.

Every person in the Tramway Department will hold his situation conditionally on his being subject to and strictly observing the rules and regulations established from time to time for his guidance, whether published with the General Rules and Regulations or otherwise; and every employé must consider all rules of general application equally as binding upon him as those specially pertaining to his own particular position or duties.

Men who leave the Service in consequence of reduction of staff or slackness of work, and are subsequently re-employed within six months of having left, to be paid at the same rate as they were previously in receipt of, if they are engaged on similar duties.

Promotion and increases of pay in all grades of the several branches will be made, except where scales are in operation, according to merit, and will be considered by the Commissioners on the recommendation of the head of the Branch.

The annual advance of pay, where scales are in operation, will be dependent and continued upon a certificate of efficiency and good conduct being given.

Only competent workmen or labourers will be engaged for service in the workshops; they will be paid the average rates of wages found to be prevailing in private establishments for work similar to that which they are required to perform.

No employé is allowed to engage in any business or employment outside the duties of his office.

All employés in every branch of the Tramway Service, whether the same be officers or servants, shall retire from the Tramway Service at the age of sixty years. *Provided*, however, that the Railway Commissioners may at their discretion, and with consent of the parties, require any of such officers or servants to continue in the said service after the age of sixty years, if it shall appear to the Commissioners that the retention of such officers or servants would be advantageous to the Service.

Before any one is appointed to the Tramway Service he must undergo a medical examination, and produce a certificate from the authorized medical officer that he is free from all bodily and mental infirmity, is physically able to perform the duties of the position he seeks, and that his eyesight and hearing are perfect. He must also produce certificates of good character.

Sons of employés of the Department are not to be employed under their father's charge, except youths receiving salaries under £80 per annum, who are to be removed to some other position when their salaries are £80 per annum or upwards.

## EXAMINATIONS.

### SALARIED STAFF.

The educational examination for clerical apprentices is to be as follows:—

*Arithmetic.*—The simple rules, and proportion, practice, interest, fractions, and decimals.

Reading, and writing from dictation.

The candidate having had a sufficient opportunity of looking over the arithmetical examination paper, shall be timed in working it, and shall not be passed unless he obtain such marks as the Examiner may fix upon as the minimum number to be obtained.

### APPRENTICE CLERKS.

Apprentice Clerks will be taken on from 15 to 17 years of age at the following rates:—

15 to 16 years	...	...	...	...	...	...	£30 per annum.
16 to 17 "	...	...	...	...	...	...	40 "
17 to 18 "	...	...	...	...	...	...	50 "
18 to 19 "	...	...	...	...	...	...	70 "

And subsequently according to merit and the class of work which has to be performed.

## CLERICAL STAFF.

To be paid according to merit and class of work to be performed.

Minimum salary	...	...	...	...	...	...	£75 per annum.
Maximum	„	...	...	...	...	...	350 „

The following are the conditions for the various Branches:—

## LOCOMOTIVE BRANCH.

## WORKSHOPS.

Lads will be taken into the shops as required, to learn the trades of fitter, turner, &c. They will not be taken in under the age of 15 years, and will not be out of their apprenticeship until the age of 21 years. They must be of good constitution, and able to read and write with facility; they will not be bound apprentice, but will be able to resign, and will be liable to dismissal, in the same way as the men; they will also be subject to the same rules and regulations as the men. The remuneration for their services will be as follows:—

1st period—	or up to 17 years of age	...	...	10d. per day.
2nd	„ of a year	...	...	1s. 3d. „
3rd	„	...	...	2s. „
4th	„	...	...	3s. „
5th	„	...	...	5s. „

At the end of the term of apprenticeship they will be paid wages proportionate to the value of their services.

## SHOP BOYS.

Boys, other than apprentices, will be taken on to assist workmen in the running sheds and workshops at the following rates of pay:—

14 to 15 years	...	...	...	1s. 9d. per day.
15 „ 16	„	...	...	2s. 0d. „
16 „ 17	„	...	...	2s. 3d. „
17 „ 18	„	...	...	2s. 6d. „
18 „ 19	„	...	...	3s. 0d. „
19 „ 20	„	...	...	4s. 0d. „
20 „ 21	„	...	...	5s. 0d. „

The following will be the conditions for acquiring the positions of Cleaner, Fireman, and Engine-driver:—

## CLEANERS.

Only youths between 17 and 18 years of age will be eligible for appointment as Cleaners. Each youth must undergo a medical examination, and produce a certificate from the authorized Medical Officer to the effect that he is free from bodily or mental infirmity, possesses good eyesight and hearing, and is not afflicted with colour blindness either by day or night; he must also produce satisfactory testimonials of character, and be able to read and write.

The rates of wages will be as follows:—

1st year—	17 to 18	„	...	4s. 0d. per day.
2nd	„ 18 to 19	„	...	4s. 9d. „
3rd	„ 19 to 20	„	...	5s. 6d. „
4th	„ 20 to 21	„	...	6s. 0d. „
5th	„ 21 and over	„	...	7s. 0d. „

6d. per night additional will be allowed for night work.

When additional Firemen are required, Cleaners will be promoted according to efficiency and seniority, provided their general conduct has been satisfactory, and that they are eligible in all other respects.

## FIREMEN.

All Firemen must have served as Cleaners, or have acted as Firemen or Drivers on other Lines. Before being appointed as Fireman, each man who has not previously passed a medical examination will have to produce a certificate from the authorized Medical Officer similar to that required from Cleaners when entering the Service. He must also undergo an examination in the Rules and Regulations applicable to Enginemen.

The rates of wages will be as follows:—

3rd class—	1st 6 months	...	7s. 6d. per day.
2nd	„ from 6 months to 3 years service	...	8s. 0d. „
1st	„ after 3 years service (maximum rate)	...	9s. 0d. „

Firemen must always commence in the 3rd class.

As vacancies for Drivers occur, Firemen who have not been less than 12 months in the 1st class, or Firemen who have had previous service qualifying them for the position, will be promoted according to efficiency, provided their general conduct has been satisfactory.

## ENGINE-DRIVERS.

## ENGINE-DRIVERS.

No person will be allowed to undertake the duties of driver unless he has previously served as Fireman on the New South Wales Tramways, and is eligible for promotion. Before being appointed as Driver, each man must hold a certificate from the Locomotive Superintendent, showing that he has passed the necessary examination, and is competent to take charge of a motor.

The subject of examination must embrace a knowledge of the road, approaches to stopping places, positions of signals, &c., the examination of engine before joining a train, firing, trimming of syphons, oiling, testing of valves and pistons, and the various modes of uncoupling trams when they fail on the road, and the methods to be adopted to surmount any slight breakdown, derailment, &c., &c.

The rates of wages will be as follows:—

For shunting engines and water-tanks	...	...	11s. per day.
4th class for first year	...	...	11s. "
3rd " from 1 year to 3 years	...	...	12s. "
2nd " after 3 years	...	...	13s. "
1st class	...	...	14s. "

The position of first-class Driver will only be obtainable as vacancies in that grade occur, and after serving as a Driver at least five years. The number of Drivers in the first class shall never exceed one-seventh of the whole number of Drivers employed.

Drivers must always commence in the fourth class.

## PERMANENT-WAY BRANCH.

The Permanent-way labourers must be strong able-bodied men, in good health, and capable of performing rough hard work. They must have perfect eyesight and hearing, be of good character, and able to read and write. Promotion and increase of wages will be in accordance with merit.

These conditions will not apply to temporary men (except as to their ability to perform the work required of them), but qualified temporary men will be eligible for the permanent staff as vacancies occur.

The rates of wages will be as follows:—

## FETTLERS AND LABOURERS.

First 6 months	...	...	6s. 6d. per day.
From 6 " to 18 months	...	...	7s. "
After 18 months' service	...	...	7s. 6d. "

## GANGERS.

When gangers are required suitable men will be selected from the fettlers or labourers. They must be steady and reliable, thoroughly understand the work, be able to read and write, and be quite competent to undertake all the duties of the position.

## GANGERS.

First 6 months	...	...	8s. 6d. per day.
After 6 months, on certificate of fitness	...	...	9s. "

## INSPECTORS AND FOREMEN.

Gangers and Mechanics will be promoted to Foremen and Inspectors as required, in cases where they are qualified to fill such positions.

## INSPECTORS AND FOREMEN.

Minimum salary	...	...	£200 per annum.
Maximum "	...	...	300 "

## TRAFFIC BRANCH.

## GENERAL OUT-DOOR STAFF.

The employes comprised in the general out-door staff will be classified and paid as follows:—

*Inspectors*—Min., 12s. per day; Max., 15s.

*Foremen*—Min., 10s. per day; max., 12s.

*Junior Conductors*—Young men between the ages of 18 and 21 years will be eligible for appointment as Junior Conductors, and will be paid—

1st year	...	...	5s. per day.
2nd "	...	...	6s. "
3rd "	...	...	7s. "
4th "	...	...	8s. "

After 4 years service they will be appointed to the position of Conductors, as vacancies occur.

*Conductors*—8s. 6d. per day first 12 months; after 12 months, 9s.

*Staffmen*—8s. per day.

*Head Pointsmen and Shunters*—8s. 6d. to 10s. per day.

*Pointsmen*—3rd class—7s. per day.

2nd class—7s. 6d. "

1st class—8s. "

*Labourers*—6s. 6d. per day, first 6 months; after 6 months, 7s.

*Watchmen*—£2 2s. to £2 5s. per week.

Every man must pass a satisfactory examination, and hold a certificate from the Tramway Manager that he is competent to perform the duties required of him.

A good address and respectful bearing will be essential qualifications.

LEAVE

## LEAVE.

Every servant, except Salaried Officers, will be entitled to a day's leave on full pay for each proclaimed general public holiday. Those servants who cannot take such leave on the proclaimed holidays, in consequence of being required to work, will, on making application, be allowed the same number of days at a future time, provided the Head of the Branch decides that they can be conveniently spared. Should, however, the exigencies of the Service not admit of the whole or any of the holidays being taken before the 31st of July of the year following that for which they are due, an equivalent in money will be paid.

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Officers paid by annual salary will, if they can be conveniently spared, be allowed three weeks' leave of absence in each year. Leave not taken when due will lapse.

## APPEALS.

In any case where an employé considers he has been unjustly dealt with, he must, in the first instance, appeal to the Head of his Branch, and then, if he still considers he has been unfairly treated, after such appeal, he has the right of appealing to the Commissioners, such appeal to pass through his Departmental Head.

The Commissioners will hear any appeal made by an employé against the adoption or confirmation of the advice or decision of the officer at the head of his branch, with regard to his right to promotion, or with respect to any charge made against such employé, or with respect to any penalty imposed by such officer; and will confirm or modify such decision, or make such order as they think fit; and their decision will be final. Every such appeal will be heard within thirty days from the date of the appeal being lodged with the Commissioners.

(L.S.) E. M. G. EDDY, Chief Commissioner.  
W. M. FEHON, Commissioner.  
CHARLES N. J. OLIVER, Commissioner.

The Common Seal of the Railway Commissioners of New South Wales was hereunto affixed this second day of December, in the year of our Lord 1889, in the presence of—

HUGH M'LACHLAN.

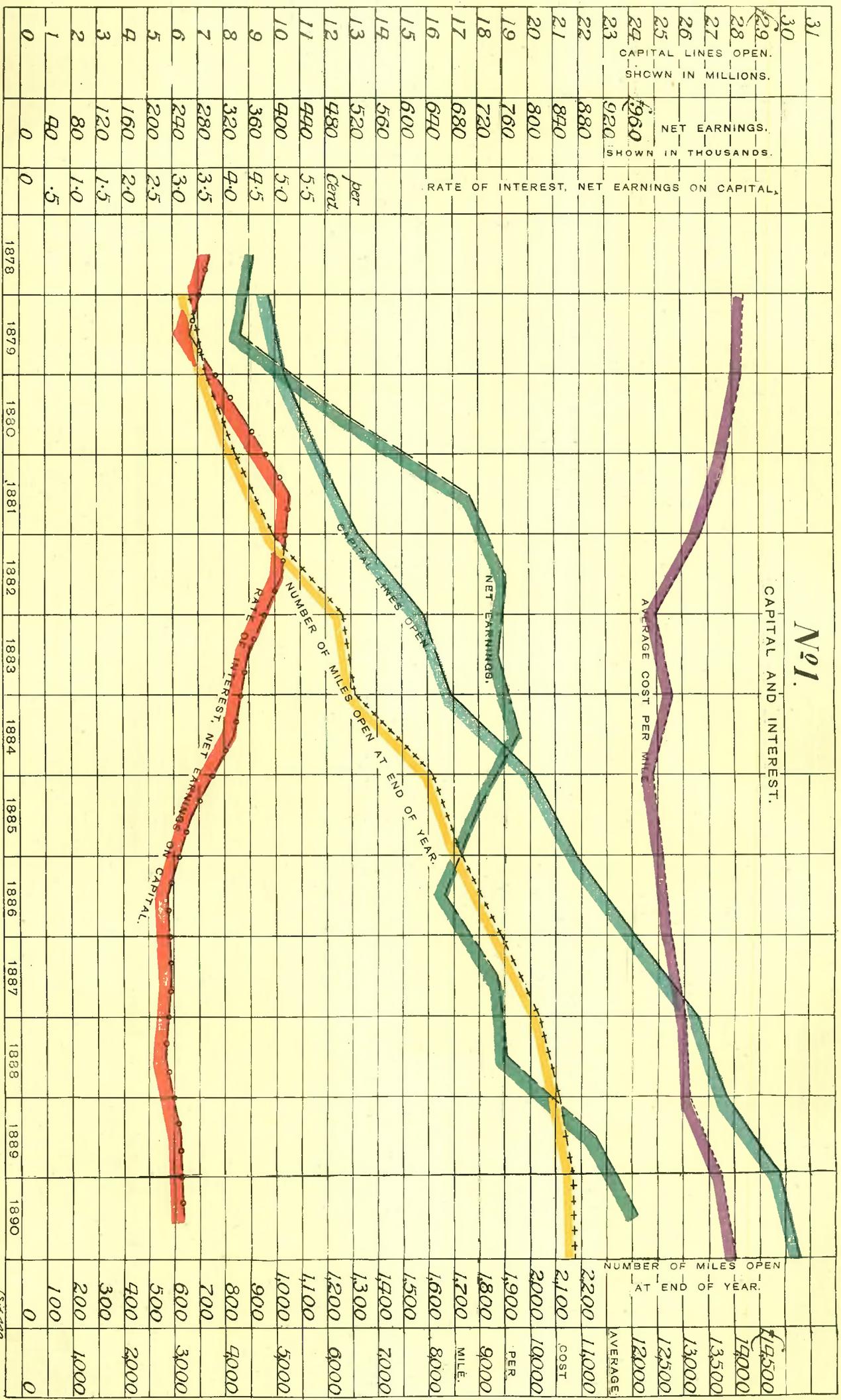
Confirmed by the Governor-in-Council, on the 10th day of December, 1889,—

ALEX. C. BUDGE,  
Clerk of the Executive Council.

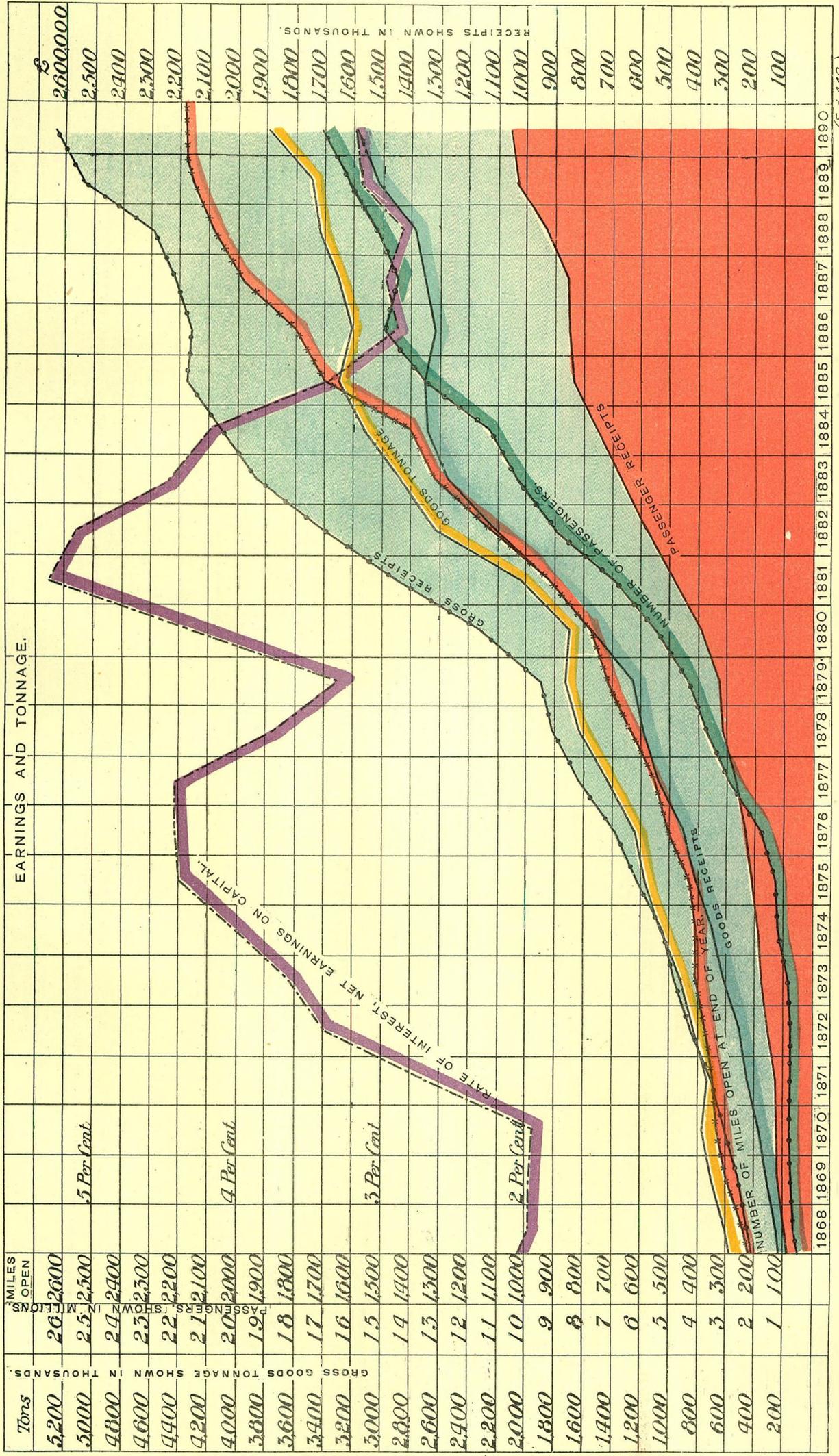
[11 diagrams and 2 maps to follow.]

# No 1.

## CAPITAL AND INTEREST.



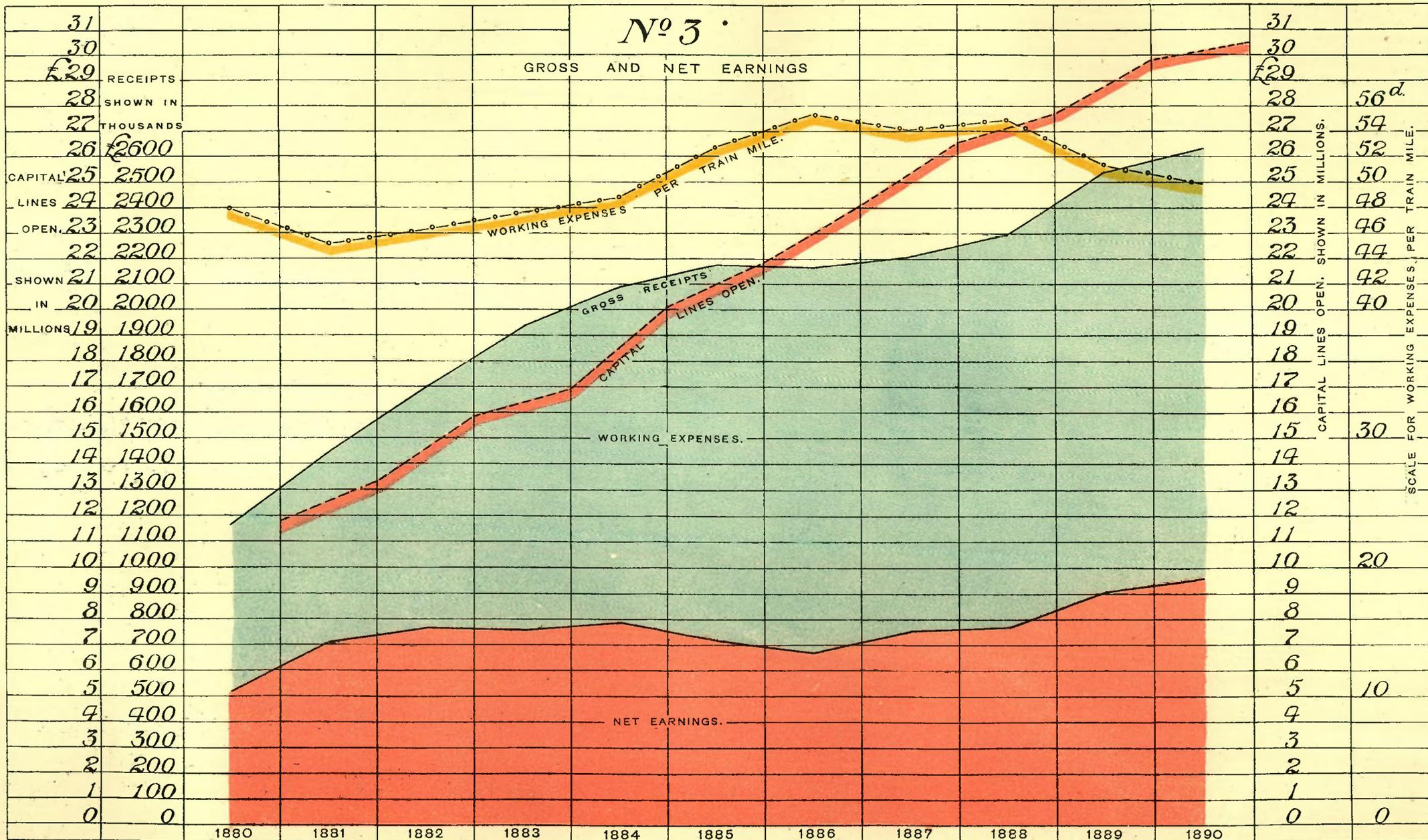
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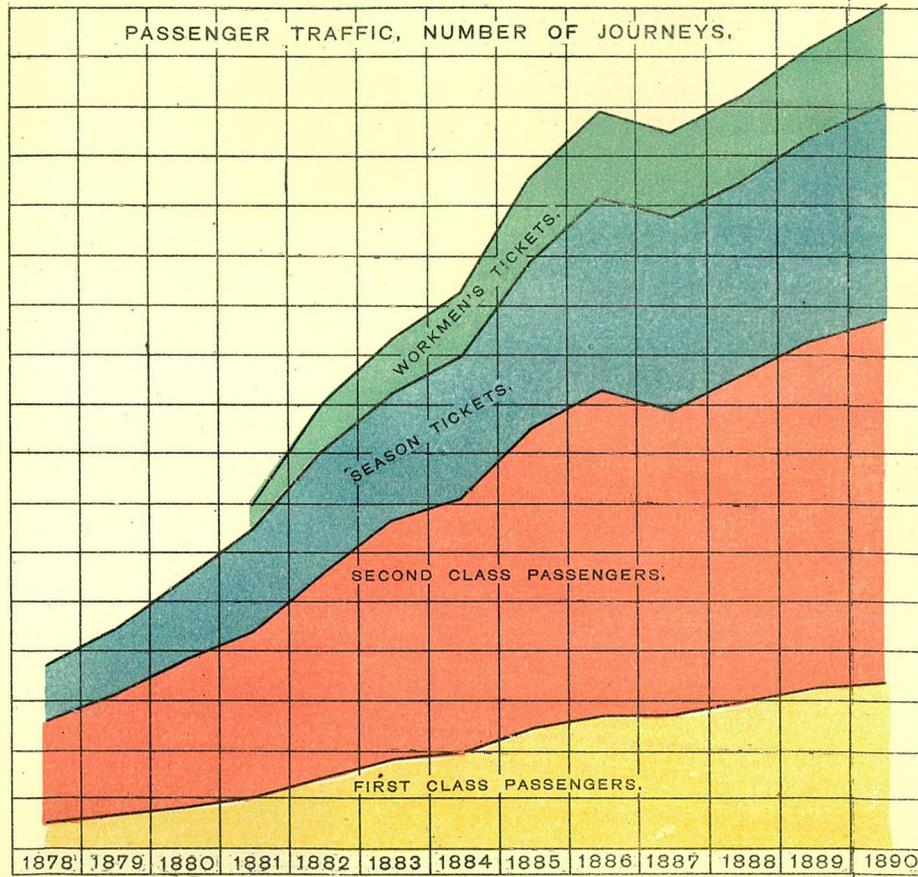
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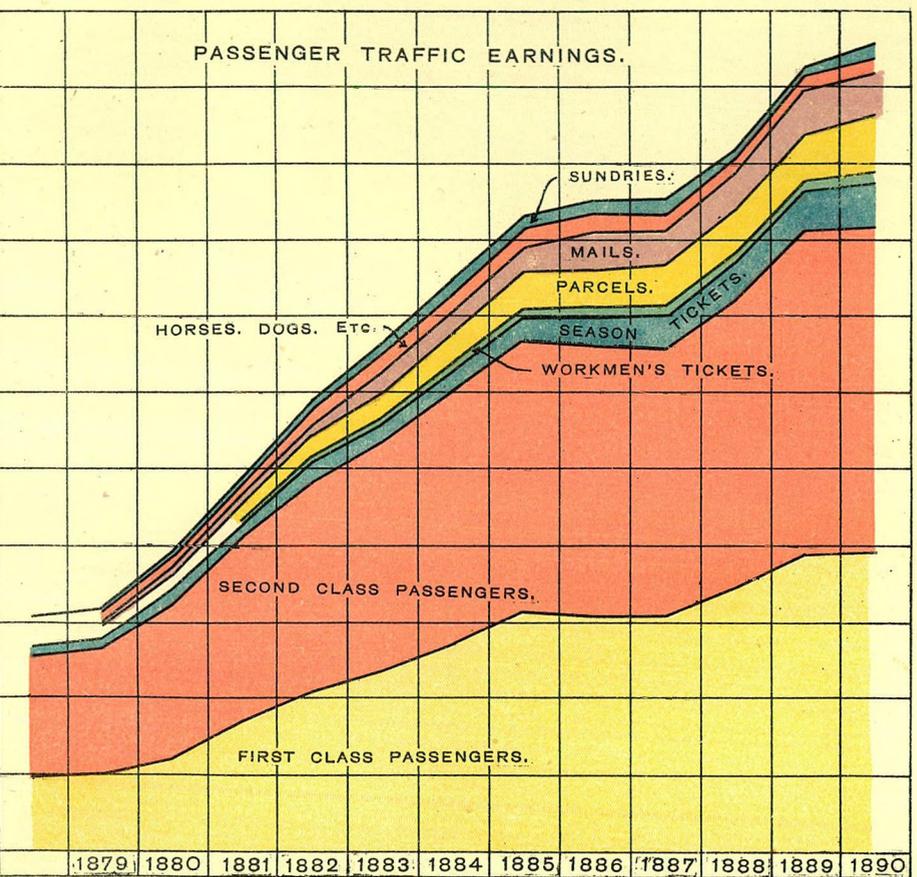
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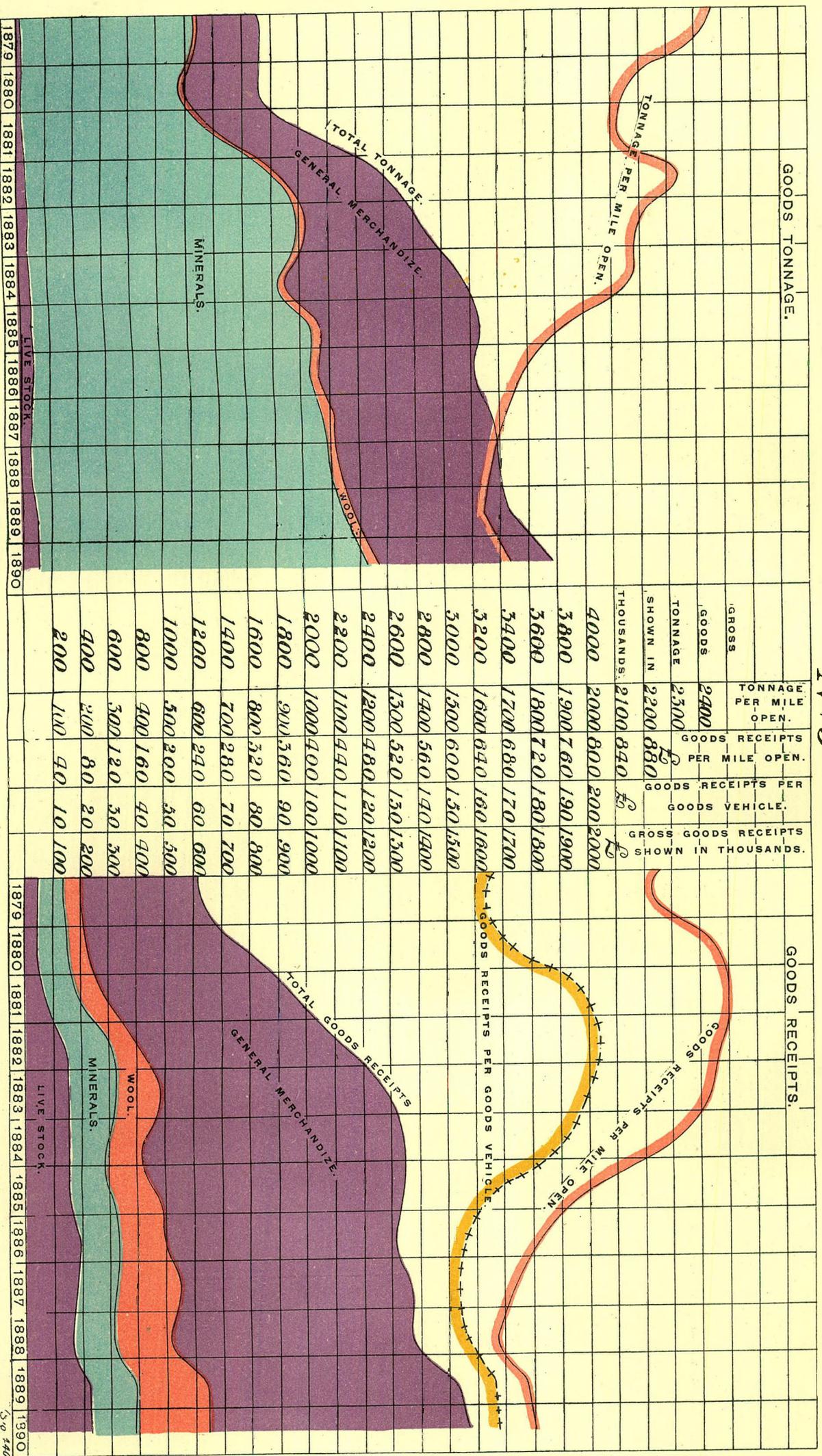
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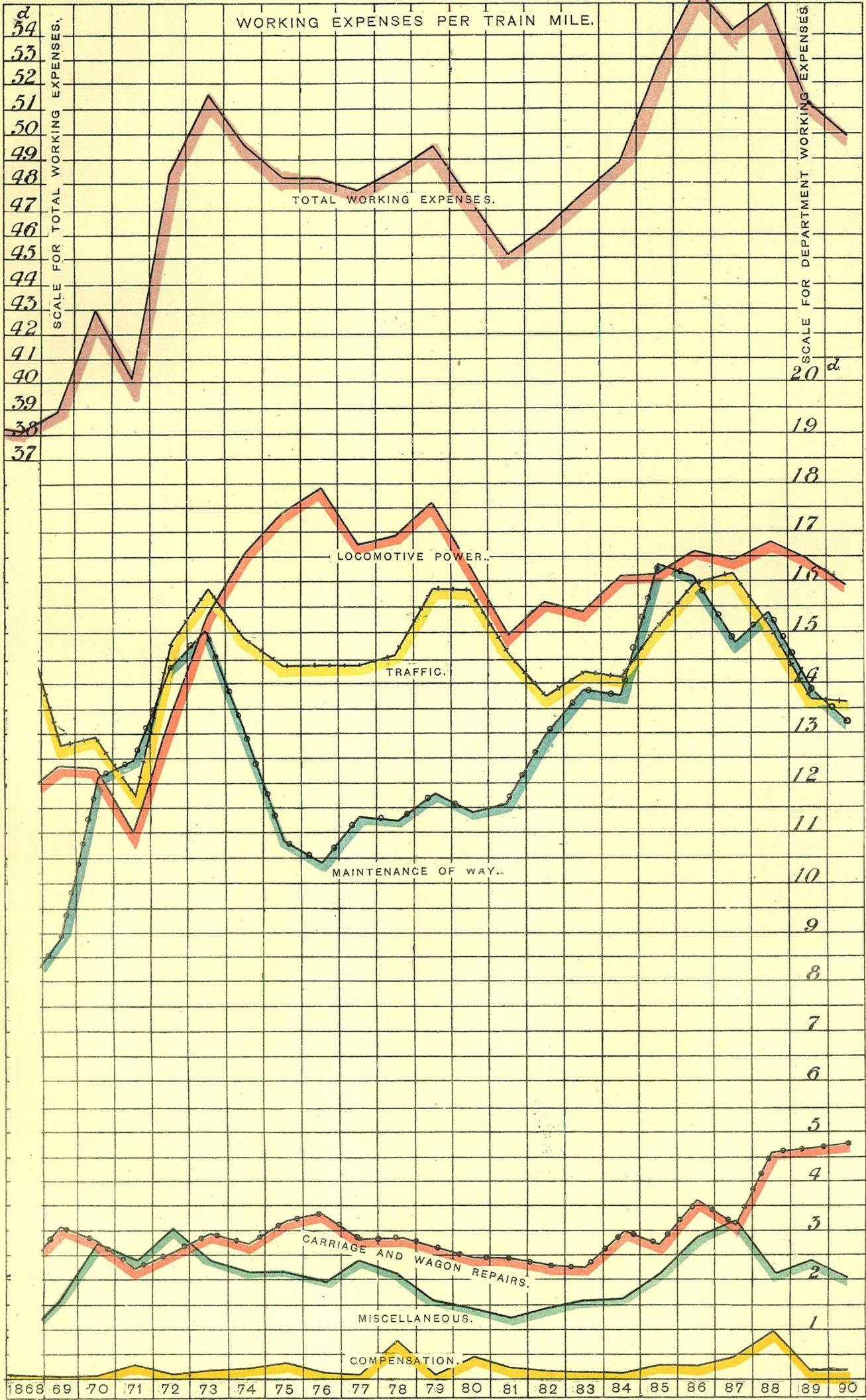


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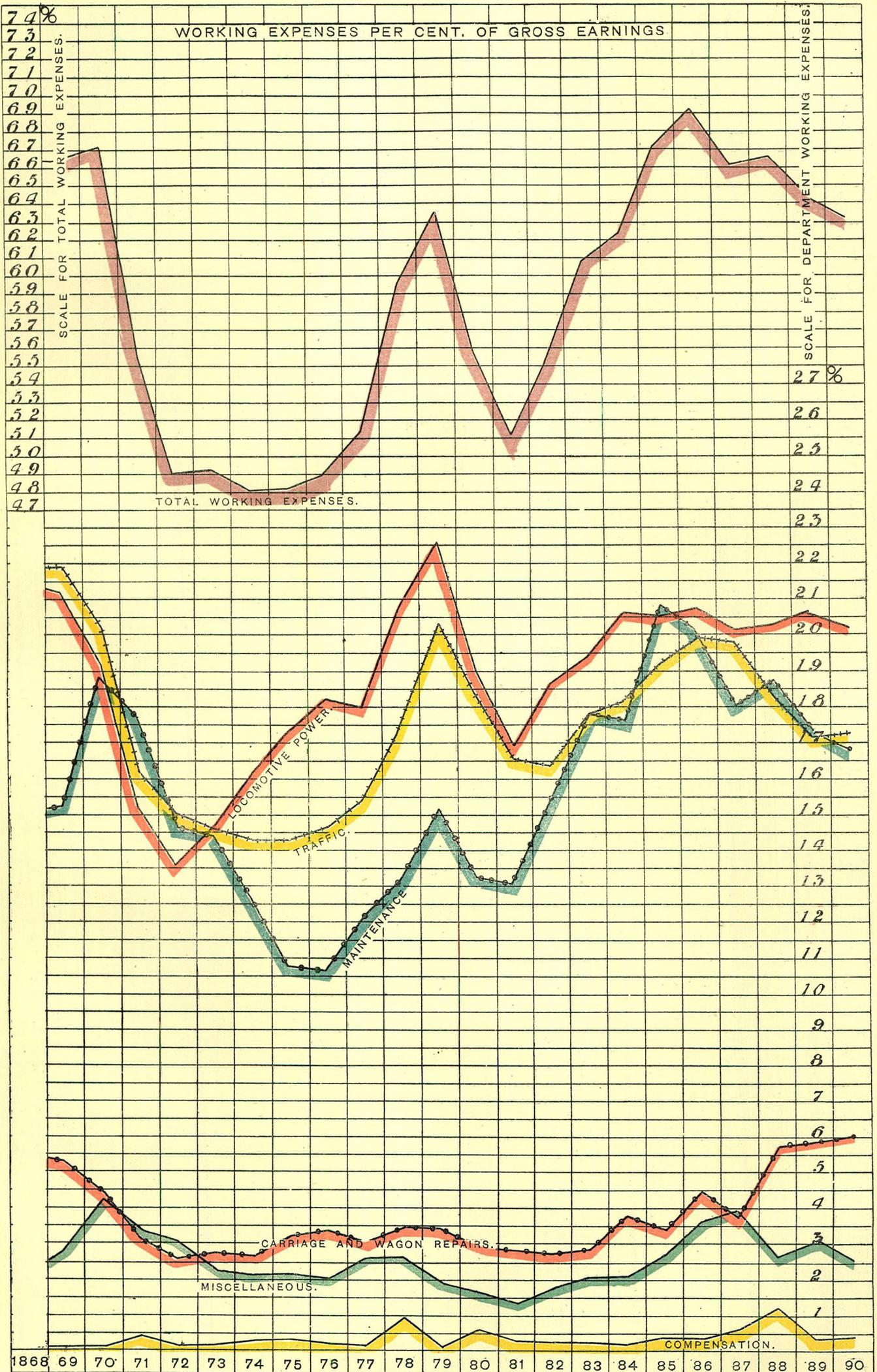


# No 6

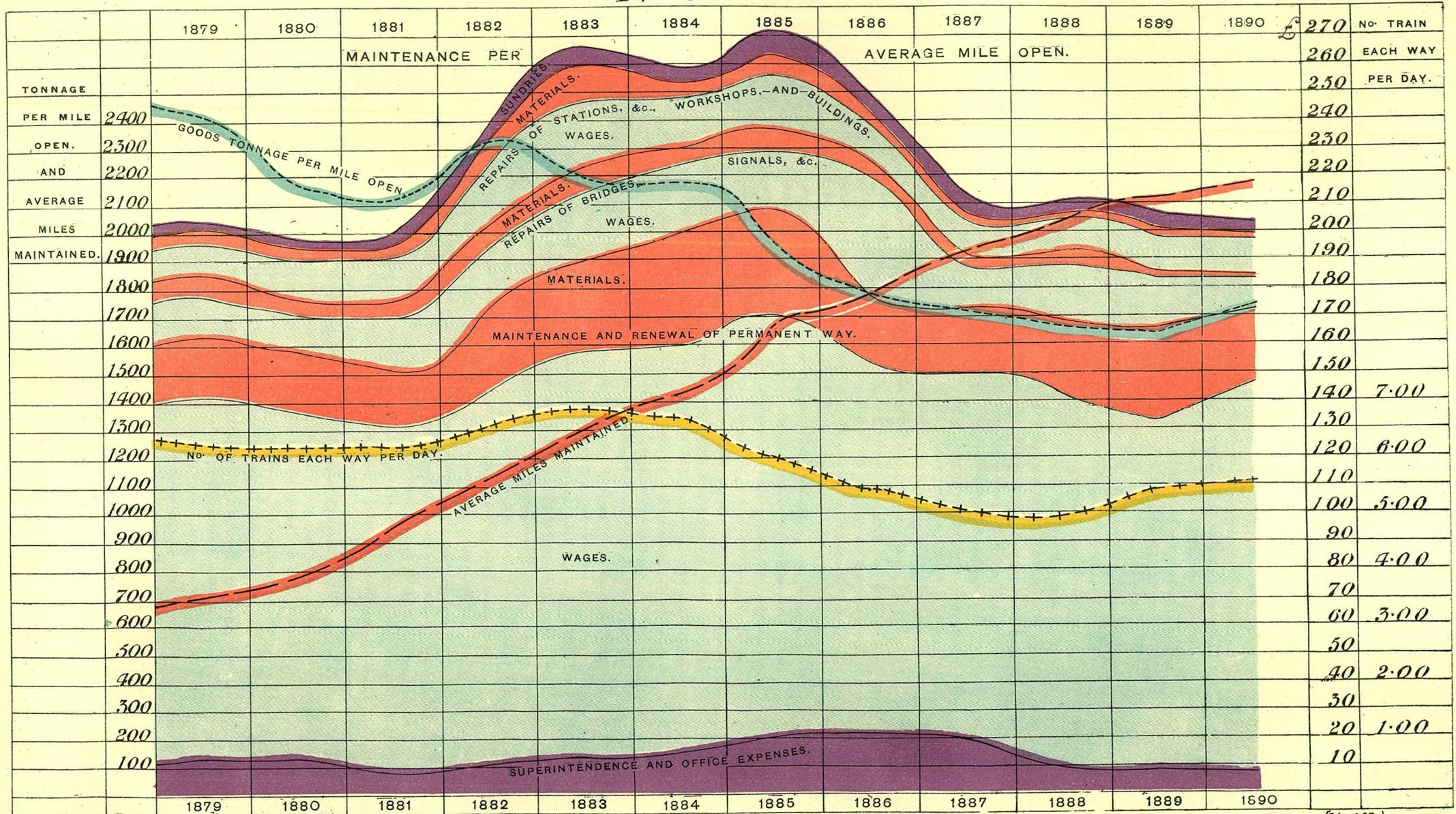
## WORKING EXPENSES PER TRAIN MILE.



# No 7

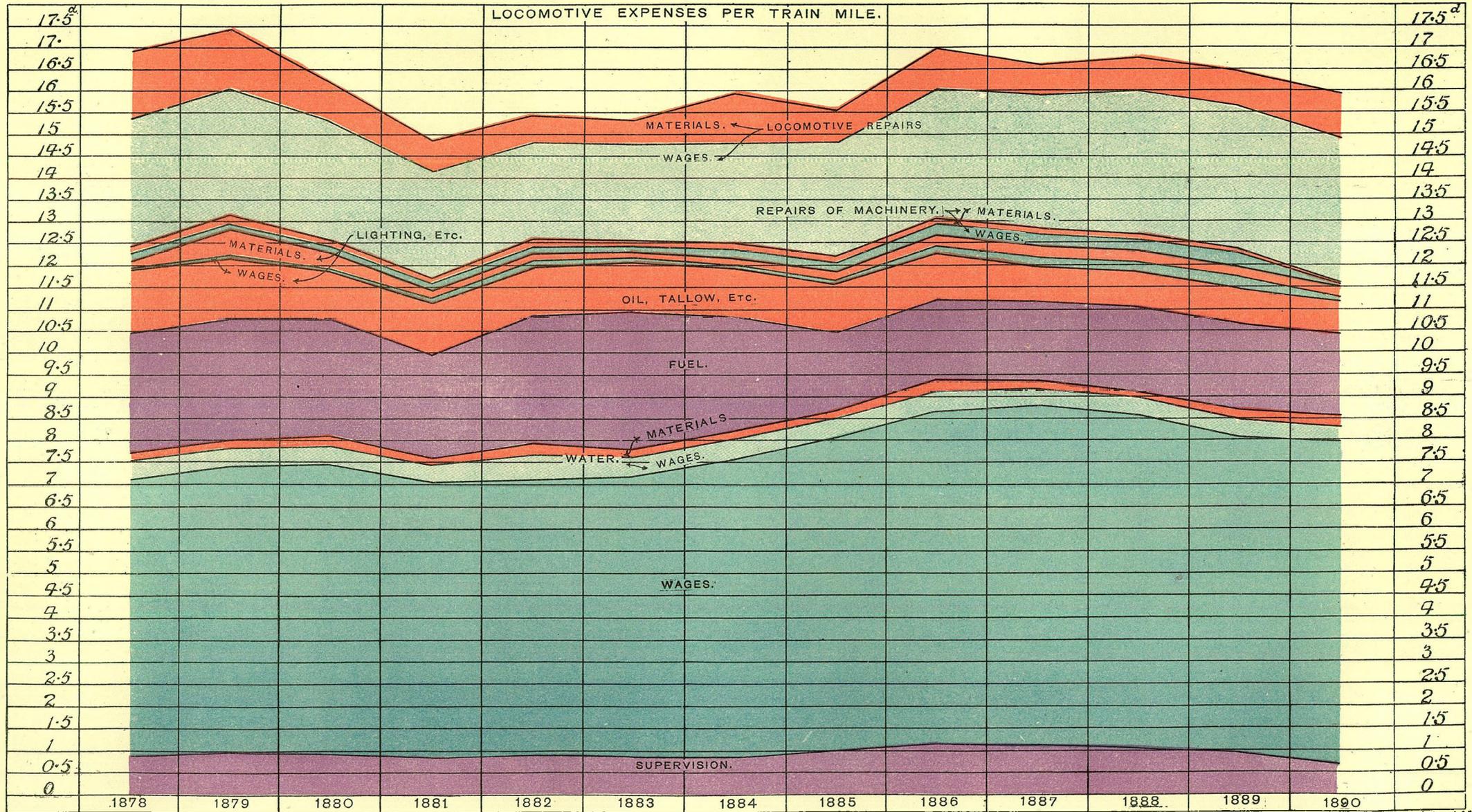


# N<sup>o</sup> 8

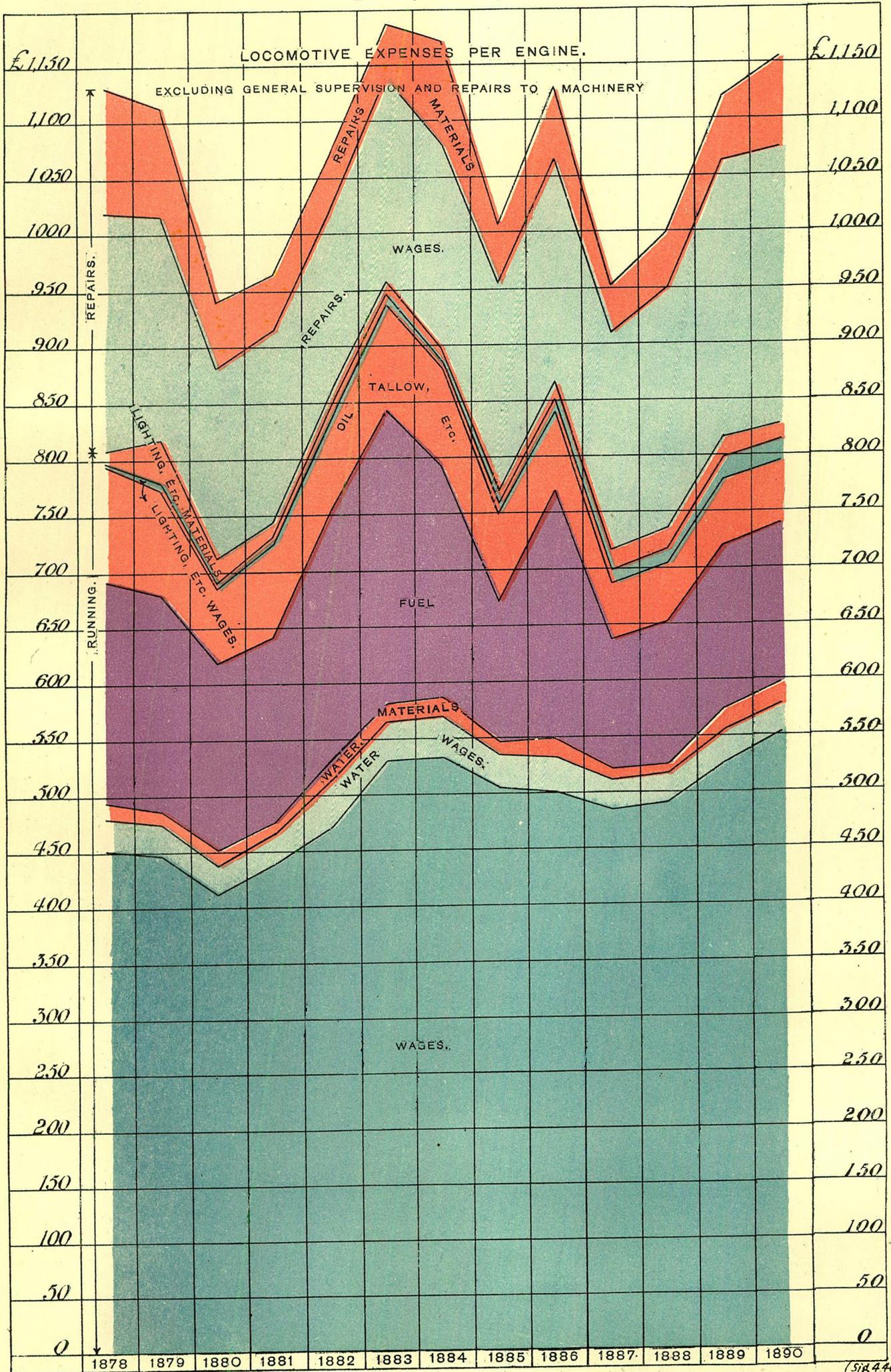


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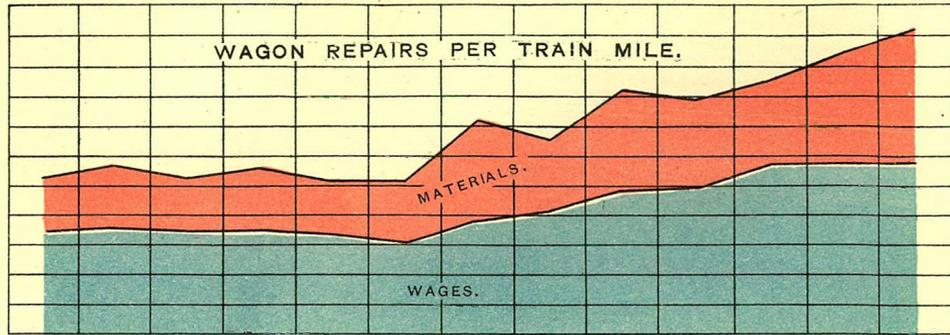
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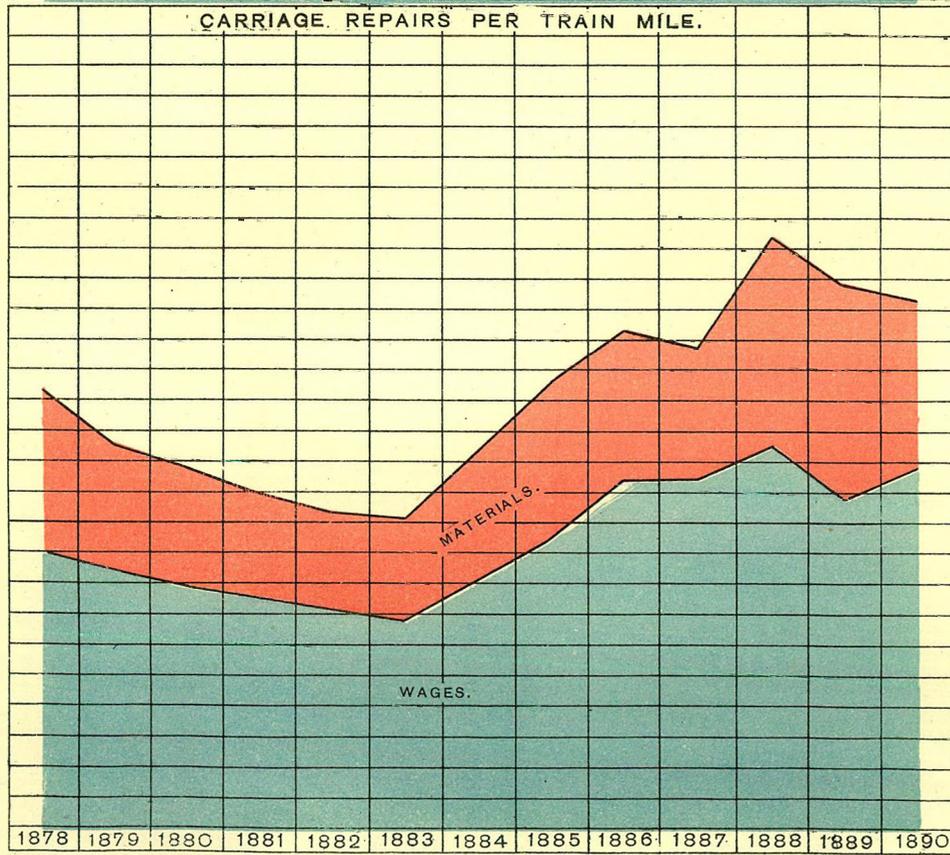
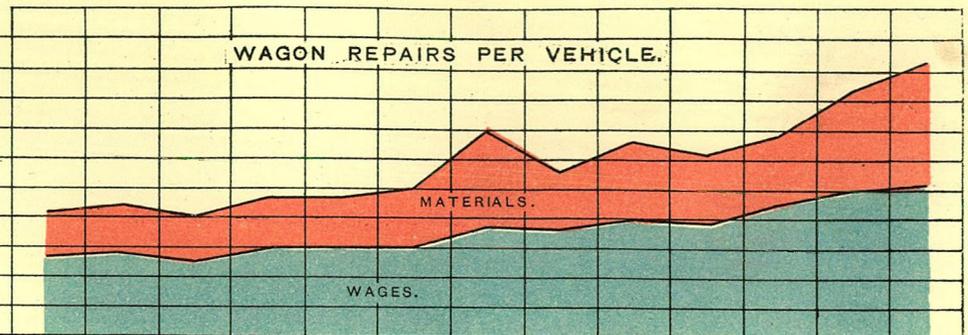
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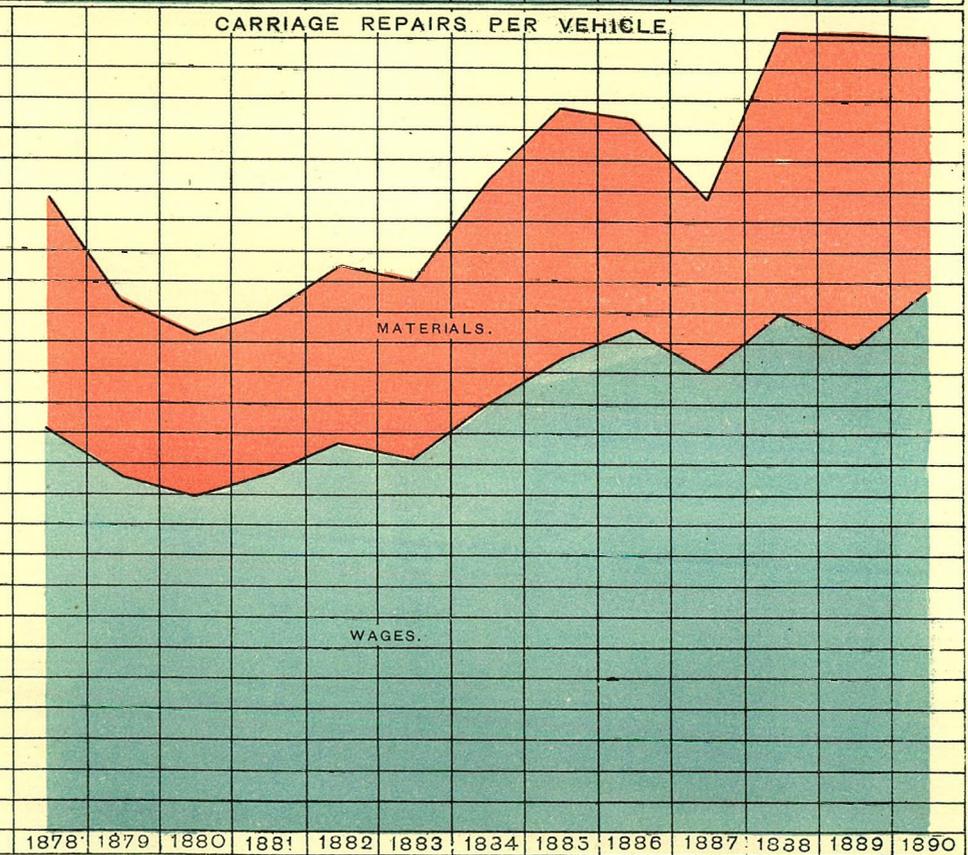
No 11



2.5	10
2.25	£9
2.0	8
1.75	7
1.5	6
1.25	5
1.0	4
.75	3
.5	2
.25	1



2.6 <sup>d</sup>	£52
2.5	50
2.4	48
2.3	46
2.2	44
2.1	42
2.0	40
1.9	38
1.8	36
1.7	34
1.6	32
1.5	30
1.4	28
1.3	26
1.2	24
1.1	22
1.0	20
.9	18
.8	16
.7	14
.6	12
.5	10
.4	8
.3	6
.2	4
.1	2
0.	0



1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890



MAP  
of  
**NEW SOUTH WALES RAILWAYS**  
shewing  
**COACH AND OTHER ROUTES FROM THE VARIOUS STATIONS**

Scale. 60 Miles to an Inch

- Explanation
- Railway lines marked thus
  - Coach routes do do
  - Projected Railways do do

1890



MAP  
SHEWING THE PRINCIPAL  
**RAILWAY SYSTEMS**  
OF  
**AUSTRALIA**  
1890  
SCALE  
STATUTE MILES 0 50 100  
RAILWAY LINES SHOWN IN RED

1890.

NEW SOUTH WALES.

## RAILWAYS AND TRAMWAYS.

(REPORT OF RAILWAY COMMISSIONERS, QUARTER ENDING DECEMBER, 1889.)

Presented to Parliament, pursuant to Act 51 Vic. No. 35, sec. 44.

Offices of the Railway Commissioners of New South Wales,  
31 January, 1890.

TO THE HONORABLE THE MINISTER OF RAILWAYS,—

Sir,

In accordance with the provisions of the 44th clause of the Railway Act of 1888, 51 Vic. No. 35, we have the honor to submit, for the information of Parliament, our Report for the quarter ending 31st December, 1889, upon the subjects specified, viz. :—

- (I.) "The state of the traffic returns, with the approximate cost and earnings of trains, per ton per train mile, in respect of goods and passengers respectively, carried during the past quarter."
- (II.) "The general condition of the lines, and accommodation for the traffic."
- (III.) "The special rates, if any, which have been made, and the reasons for making such rates."
- (IV.) "The appointments and removals, with the circumstances attending each case."

## I.—STATE OF THE TRAFFIC.

Railways.	Quarter ending 31st December, 1888.	Quarter ending 31st December, 1889.
Average number of miles open ... ..	2,126	2,171
Revenue from all sources ... ..	£771,486	£805,160
Expenditure ... ..	£441,602	£445,000
Number of passengers ... ..	4,170,030	4,359,840
Tonnage of goods traffic ... ..	688,150	884,172
Tonnage of live-stock traffic ... ..	29,805	29,734
Train miles run ... ..	2,099,567	2,167,037
Earnings per train mile ... ..	7/4½	7/5¼
Expenditure per train mile ... ..	4/2½	4/1¼
Percentage—Expenditure to earnings ... ..	57.24	55.27

NOTE.—Information as to the cost and earnings of trains per ton per mile cannot be given, as a large proportion of the train mileage is used for carrying both goods and passenger traffic.

\* NOTE.—This column shows adjusted figures after final settlement of accounts for quarter.

Tramways.	Quarter ending 31st Dec., 1888.	Quarter ending 31st Dec., 1889.
Revenue from all sources ... ..	* £62,402	£68,614
Expenditure ... ..	£58,797	£59,900
Number of fares collected ... ..	14,346,102	16,015,250
Train miles run ... ..	377,387	414,597
Earnings per train mile ... ..	3/3¼	3/3¼
Expenditure per train mile ... ..	3/1½	2/10¼
Percentage—Expenditure to Earnings ... ..	94.22	87.30

\* NOTE.—This column shows adjusted figures after final settlement of accounts for quarter.

## II.—CONDITION OF THE LINES.

A report as to the condition of the lines will be found as an Appendix, page 4.

## III.—SPECIAL RATES.

A statement of the special rates, and the reasons for making the same, will be found attached—Appendix, page 4.

## IV.—STAFF.

These returns are given as an Appendix, pages 5 and 6, showing a saving of £9,655 per annum.

## GENERAL REMARKS.

The traffic as a whole shows a satisfactory increase over the corresponding quarter of the preceding year. The improvement shown in the passenger traffic is specially marked, as during the 1888 quarter the Melbourne Exhibition and other attractions existed, which induced an exceptional traffic, while in 1889 there were no special inducements for travellers beyond the facilities offered by the improved train service and cheap Excursion Trips.

In goods traffic a very large increase is shown, arising mainly from wool, 328,078 bales having been carried, as against 234,746 bales during the quarter ending 31st December, 1888, showing an excess of 43,332 bales. Allowing for the quantity short carried during quarter ending 30th September, 1889, as compared with the corresponding quarter of the preceding year, the increased traffic to date reaches 16,625 bales.

### CONDITION OF THE LINES AND ACCOMMODATION FOR THE TRAFFIC.

The condition of the lines is being improved as rapidly as possible, and relaying, &c., is being pushed forward.

The accommodation for the traffic is also being improved as occasion demands.

The various duplication works on the Southern, North Coast, and Illawarra Lines are progressing satisfactorily, and it is hoped that in a few weeks the plans for the quadrupling of the lines from Eveleigh to Homebush will be sufficiently completed to enable tenders to be invited.

TRAMWAYS.

## TRAMWAYS.

The improved facilities given on the tram-lines continue to encourage the traffic, and the quarter's working shows a net increase in revenue of £5,100 after defraying the cost of eleven new tram-cars out of the working expenses for the quarter.

We have the honor to be,  
Sir,  
Your obedient Servants,

E. M. G. EDDY,  
Chief Commissioner.

W. M. FEHON,  
Commissioner.

CHARLES OLIVER,  
Commissioner.

## APPENDICES.

## APPENDIX I.

Minute from The Acting Engineer for Existing Railways to The Secretary to The Railway Commissioners.

New South Wales Government Railways,  
Engineer for Existing Lines Branch, Sydney, 6 January, 1890.

*Subject*:—Report on condition of lines for the quarter ending 31st December, 1889.

I HAVE the honor to report as follows on the condition of the Railways for the quarter ending 31st December, 1889:—

During the last three months considerable progress has been made in the improvement of the lines generally, by resceporing, relaying, and reballasting. There has been some difficulty in getting a sufficient quantity of ballast; but, now that the Kiama quarries have been purchased, we shall have greater facilities for obtaining it.

The new permanent-way materials which were ordered some few months ago are now coming in, and the relaying will be pushed on rapidly.

The station buildings, goods warehouses, bridges, and other works have been well maintained, and the whole of the lines are now in fair running order.

The duplication works have made considerable progress, and a tender has been accepted from Messrs. Angus & Co. for the completion of same.

Plans for suburban widening are well in hand, and I expect that we shall be able to let the work during next month.

J. ANGUS,  
Acting Engineer.

## APPENDIX II.

## NEW SOUTH WALES GOVERNMENT RAILWAYS.

STATEMENT, in accordance with clause No. 44 of the Railway Act, showing the special rates which have been made, and the reasons for making such rates, quarter ending 31st December, 1889.

Article.	Rate.	Reason for such Rates
Members of theatrical companies ...	1½ cwt. of luggage each, free .....	To foster traffic.
Do do ..	Of not less than six to be allowed 1st class tickets at 2nd class rates between Sydney and Brisbane.	do
Tickets from Adelaide to Brisbane ..	To be issued at the following rates:—1st class—single, £10; return, £15. 2nd class—single, £6 10s.; return, £9 15s.	do
Meat hooks on return journey.....	Free .....	do
Pair for plastering purposes .....	A. rate. Minimum, 5 tons; four-wheeled truck ...	do
Circus and theatrical .....	Baggage, horses, &c.; 20 per cent. reduction allowed, also 20 per cent. allowed if part of Company travel, 2nd class.	do
Milk from Wilton's Siding to Darling	10d. per van per mile carried in owners' vans .....	do
Coal.....	Hauled over Government line in owners' trucks and by their engines and men; from Mount Keira to Mount Kembla Jetty, 2d. per ton; from Corrimal to Mount Kembla Jetty, 3½d. per ton.	do
Meat trucks shunted into Mort's Siding at Darling Harbour.	1s. per four-wheeled truck .....	do
Coal, L.V.C. Co. to brick-yard .....	Hauled in Department's vehicles, 5s. per four-wheeled truck, at Lithgow.	do
Fish baskets .....	Empty returns; free. ....	do
Empty jars.....	Sydney to Cooma; to be filled with mineral water, and return by rail; free.	do
Ale and beer .....	Returned to brewers, half rates back journey.....	do
Steam and crane charges .....	Charges at Bullock Island same as at Darling Harbour; 1½d. per ton to be paid to the contractor for shipping general cargo, from 1st January, 1890.	To obtain traffic.
Mineral water .....	Katoomba to Darling Harbour in owner's truck, 1s. per mile.	To foster traffic.
Small quantities of goods, West Maitland to Guyra and stations north.	May be sent to Newcastle or Morpeth to make up truck load, same rate as from Newcastle, viz., £5 5s. per ton for 1st and 2nd class, and £6 for 3rd and 4th class goods; no charge to be made for haulage from West Maitland to Newcastle or Morpeth.	do
Meat, Clarendon to Sydney... ..	Beef, veal, or pork, 2½s. per van; mutton, 18s. per van; minimum, 4 tons.	do
Wool, from Narrabri .....	If 3,000 bales belonging to one owner be sent during present season, rebate 10 per cent. allowed.	do

## APPENDIX II

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Appointments of Employees from 1st October to 31st December, 1889.

Date.	Name.	Position.	Rate.	Remarks.
SECRETARY'S BRANCH.				
Nil.				
ACCOUNTANT'S BRANCH.				
16 Dec.	Seale, Ernest G.	Clerk	£80 per annum	Transferred from Traffic Branch.
TRAFFIC AUDITOR'S BRANCH.				
Nil.				
ENGINEER FOR EXISTING LINES BRANCH.				
20 Sept.	Coulter, William	Watchman	7/6 per day	} Transferred from Stores Branch.
1 Oct.	Laughton, William	Clerk	£155 per annum	
1 "	Higgins, Thomas	Storekeeper	£225 "	
1 "	Birrell, James D.	Clerk	£185 "	
1 "	Bailey, John	Storeman	8/6 per day	
12 "	Innes, Peter	Laborer	7/6 "	} Reinstated, <i>vice</i> Ashwood. Transferred from Secretary's Office.
7 Nov.	Allan, John	Ganger	9/- "	
1 Dec.	Nichols, Alan	Clerk	£200 per annum	
LOCOMOTIVE ENGINEER'S BRANCH.				
1 Oct.	Beattie, William H.	Clerk	£165 per annum	} Transferred from Stores Branch.
28 "	O'Brien, John	Laborer	7/- per day	
28 "	Quayle, Thomas	"	7/- "	} From Existing Lines Branch, Tramways.
5 Nov.	Woolley, William	Cleaner	3/6 per day	
18 "	Pike, Charles	"	5/- "	From Tramways.
29 "	Smith, Albert W.	Assistant Fuelman	6/6 "	Reappointed.
1 Dec.	Wark, John A.	Gas Superintendent	£350 per annum	
CHIEF TRAFFIC MANAGER'S BRANCH.				
10 Oct.	McDonald, Ann	Gatekeeper	2/6 per week and house.	<i>Vice</i> Mrs. Fisher.
12 "	Grantham, Henry	Porter	7/- per day	From Existing Lines Branch, <i>vice</i> Bradshaw.
15 "	Robinson, Mrs.	Gatekeeper	Free house	<i>Vice</i> Mrs. Herbert.
19 "	Holland, Mary	"	2/6 per week and house.	<i>Vice</i> Mrs. Treadwell.
12 Nov.	Robke, Otto	"	10/- per week	<i>Vice</i> Picken.
26 "	Leary, Catherine	"	5/- per week and house.	<i>Vice</i> Mrs. Wood.
12 Dec.	Manson, William	Porter	7/- per day	From Tramways <i>vice</i> C. Mann.
CONTROLLER OF STORES BRANCH.				
Nil.				
SIGNAL AND INTERLOCKING BRANCH.				
12 Nov.	Collins, William H.	Junior Clerk	£78 per annum	Transferred from Traffic Branch.
TRAMWAYS—LOCOMOTIVE BRANCH.				
Nil.				
TRAMWAYS—TRAFFIC BRANCH.				
18 Nov.	Bond, Frank	Conductor	7/- per day	From Railways, <i>vice</i> Searl.
28 "	Mann, Charles	"	7/- "	From Railways, <i>vice</i> Manson.
TRAMWAYS—EXISTING LINES BRANCH.				
Nil.				

## APPENDIX IV.

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Removals of Employees, from 1st October to 31st December, 1889.

Date.	Name.	Position.	Rate.	Remarks.
SECRETARY'S BRANCH.				
1 Dec.	Nicholas, Alan	Clerk	£200 per annum	Transferred to Existing Lines Branch.
ACCOUNTANT'S BRANCH.				
Nil.				
TRAFFIC AUDITOR'S BRANCH.				
Nil.				
ENGINEER FOR EXISTING LINES BRANCH.				
2 Oct.	Hayes, William	Ganger	9/- per day	Resigned.
3 "	Kenny, Edward	"	9/-	Deceased.
3 "	Hall, William	Labourer	7/6	"
8 "	Cockburn, Henry	Fettler	7/6	Resigned.
9 "	Grantham, Henry	Labourer	7/6	Transferred to Traffic Branch.
17 "	Large, John	"	7/6	"
17 "	Pickering, John	"	7/6	"
19 "	Bray, James	"	7/6	Resigned.
26 "	Lewis, James	"	7/6	Transferred to Interlocking Branch.
7 Nov.	Ashwood, James	Ganger	9/-	Resigned.
7 "	Smith, Thomas	Improver	4/-	Transferred to Traffic Branch.
13 "	Reid, John	In charge of Meat Market	£5 per week	Resigned.
13 "	Crisp, Robert	Fettler	7/6 per day	Deceased.
14 "	Wilson, John	"	7/6	Resigned.
14 "	Mitchell, John	Labourer	7/6	"
20 "	Goodwin, Hugh	Striker	7/6	"
22 "	Dwall, George	Fettler	7/6	"
6 Dec.	Cunningham, Peter	Plumber	10/-	"
9 "	Ross, David	Fettler	7/-	Deceased.
10 "	Scanlon, John	Labourer	7/6	Discharged.
12 "	Reidy, Daniel	"	7/-	Resigned.
12 "	Lanyon, Edward	"	7/6	"
13 "	Yeates, Henry	"	7/6	"
21 "	Garbutt, Joseph	Fettler	7/6	"
21 "	Grace, James	Labourer	7/6	Discharged.
24 "	Glen, William	"	6/-	"
LOCOMOTIVE ENGINEER'S BRANCH.				
19 Oct.	Fitzgerald, Arthur	Fireman	8/- per day	Resigned.
26 "	Watkins, William	Carriage-builder	10/6	Deceased.
26 "	Suter, Francis	Waggon-builder	10/-	"
2 Nov.	Gosnell, George	Cleaner	7/-	Discharged.
18 "	Turton, William	Driver	13/-	Resigned.
27 "	Blanchard, William	Oiler	7/-	Discharged.
25 "	Cobb, John	Locomotive Foreman	£430 per annum, £50 per annum house-rent.	Retired.
2 Dec.	Foster, John	Fireman	10/- per day	Left.
6 "	Chisholm, James	Station Engine-driver	7/6	Discharged.
10 "	Dunn, Richard	Striker	7/-	"
10 "	Lawton, George Y.	Labourer	7/6	Resigned.
18 "	Morrison, James	Fitter	11/2	Retrenchment.
23 "	Runge, John	Driver	14/-	Deceased.
23 "	Murphy, James	Labourer	7/6	Discharged.
24 "	Evans, Samuel	Carriage-builder	10/6	Deceased.
31 "	Whitlow, James	Fireman	8/-	Resigned.
31 "	Geekie, Walter	Apprentice	19/3 per week	"
CHIEF TRAFFIC MANAGER'S BRANCH.				
3 Oct.	Ryan, Bridget	Gatekeeper	5/- per week	Discharged.
10 "	Banfield, Mrs.	"	5/-	Resigned.
10 "	Elliott, S. A.	"	7/-	"
10 "	Lewis, Mrs.	"	2/6	"
15 "	Herbert, Mrs.	"	Free house	"
20 "	Treadwell, Mrs.	"	2/6 per week and house.	"
24 "	Roberts, Henry	"	7/- per day	Vale gates at Bathurst closed.
25 "	Symington, James	"	42/- per week	Resigned.
29 "	Elyard, Martha	"	30/-	Vale gates at Bathurst closed.
1 Nov.	Wrightson, Joseph	Telegraph Operator	£80 per annum	Transferred to Queensland Service.
2 "	Currie, Thomas L.	Guard	10/6 per day	Resigned.
7 "	Nash, William	Porter	7/6	"
7 "	Ashwood, Mrs. W.	Gatekeeper	5/- per week	"
7 "	Wood, Mrs.	"	5/-	"
8 "	Irvin, Hugh	Porter	7/6 per day	"
8 "	Darcey, Patrick	"	7/-	Deceased.

Date.	Name.	Position.	Rate.	Remarks.
1889 CHIEF TRAFFIC MANAGER'S BRANCH— <i>continued.</i>				
12 Nov. ...	Collins, W. H. ....	Junior Porter .....	30/- per week ...	Transferred to Interlocking Branch.
18 " ...	Crapp, Albert .....	Telegraph Operator .....	£96 per annum...	Discharged.
28 " ...	Mann, Charles .....	Porter .....	7/- per day .....	Transferred to Tramways.
1 Dec. ...	Carpenter, Abraham .....	Station-master .....	£225 per annum	Retired.
16 " ...	Seale, Ernest G. ....	Junior Porter .....	20/- per week ...	Transferred to Account Branch.
CONTROLLER OF STORES BRANCH.				
19 Sept. ...	Coulter, William .....	Watchman .....	7/- per day .....	} Transferred to Existing Lines Branch.
1 Oct. ...	Laughton, William .....	Clerk .....	£155 per annum	
1 " ...	Higgins, Thomas .....	Overseer .....	£225 " .....	
1 " ...	Birrell, James D. ....	Clerk .....	£185 " .....	
1 " ...	Beattie, William H. ....	" .....	£165 " .....	Transferred to Locomotive Branch.
1 " ...	Linz, Joseph .....	Issuer .....	8/- per day .....	Retrenchment.
4 " ...	Innes, Peter .....	Labourer .....	7/6 " .....	"
SIGNAL AND INTERLOCKING BRANCH.				
14 Oct. ...	Conn, William .....	Signal Fitter .....	9/- per day .....	Discharged.
TRAMWAYS—LOCOMOTIVE BRANCH.				
11 Oct. ...	Heron, James .....	Driver .....	13/- per day .....	Discharged.
13 " ...	Horder, Charles .....	Machinist .....	7/6 " .....	Retrenchment.
19 " ...	Smith, John .....	Driver .....	11/- " .....	Discharged.
23 " ...	Hickey, William .....	Watchman .....	7/- " .....	Left.
31 " ...	Woods, George .....	Foreman .....	£230 per annum.	Retrenchment.
31 " ...	Brown, John A. ....	" .....	£260 " .....	"
31 " ...	Allen, William .....	" .....	£270 " .....	"
5 Nov. ...	Maxton, William .....	Blocksmith .....	11/4 per day .....	Deceased.
8 " ...	Musto, William .....	Labourer .....	7/- " .....	Resigned.
11 " ...	Burchmore, George .....	Machinist .....	8/8 " .....	Retrenchment.
12 " ...	White, William .....	Station Engine Driver .....	11/- " .....	Left.
18 " ...	Pike, Charles .....	Cleaner .....	5/6 " .....	Transferred to Railways.
11 Dec. ...	Hendy, G. ....	Driver .....	11/- " .....	Retrenchment.
19 " ...	Cusey, John .....	Labourer .....	7/- " .....	Resigned.
21 " ...	Taylor, Arthur .....	" .....	7/- " .....	"
24 " ...	Cornwall, William .....	Machinist .....	8/8 " .....	"
24 " ...	Hewitt, John .....	Apprentice .....	1/9 " .....	Discharged.
25 " ...	Scott, Robert .....	Driver .....	11/- " .....	"
TRAMWAYS—TRAFFIC BRANCH.				
9 Oct. ...	Rodgers, Samuel .....	Conductor .....	7/6 per day .....	Discharged.
31 " ...	Searl, Reuben .....	" .....	8/6 " .....	Deceased.
14 Nov. ...	Whyte, George .....	" .....	7/6 " .....	Discharged.
14 " ...	Yeomans, Joseph .....	" .....	7/6 " .....	"
16 " ...	Lane, John W. ....	Car-cleaner .....	7/- " .....	"
12 Dec. ...	Manson, William .....	Conductor .....	8/- " .....	Transferred to Railways, vice C. Mann.
28 " ...	Steel, Thomas .....	" .....	9/- " .....	Discharged.
TRAMWAYS—EXISTING LINES BRANCH.				
12 Dec. ...	Baxter, James .....	Labourer .....	7/6 " .....	Retired.



1890.

## NEW SOUTH WALES.

## RAILWAYS AND TRAMWAYS.

(REPORT OF RAILWAY COMMISSIONERS FOR QUARTER ENDING MARCH 31, 1890.)

Presented to Parliament, pursuant to Act 51 Vic. No. 35, sec. 44.

Offices of the Railway Commissioners of New South Wales,  
29 April, 1890.

THE HONORABLE THE MINISTER OF RAILWAYS,—

Sir,

In accordance with the provisions of the 44th clause of the Railway Act of 1888, 51 Vic. No. 35, we have the honor to submit, for the information of Parliament, our Report for the quarter ending the 31st of March, 1890, upon the subjects specified, viz. :—

- (I.) "The state of the traffic returns, with the approximate cost and earnings of trains, per ton per train mile, in respect of goods and passengers respectively, carried during the past quarter."
- (II.) "The general condition of the lines, and accommodation for the traffic."
- (III.) "The special rates, if any, which have been made, and the reasons for making such rates."
- (IV.) "The appointments and removals, with the circumstances attending each case."

## I.—STATE OF THE TRAFFIC.

Railways.	Quarter ending 31st March, 1889.	Quarter ending 31st March, 1890.
Miles open ... ..	* 2,126	2,182
Revenue from all sources ... ..	£587,985	£615,512
Expenditure ... ..	£388,563	£388,324
Train miles run ... ..	1,780,194	1,896,027
Earnings per train mile ... ..	6s. 7½d.	6s. 6d.
Expenditure per train mile ... ..	4s. 4½d.	4s. 1½d.
Percentage—Expenditure to earnings ... ..	66·08	63·09
Number of passengers ... ..	3,975,581	4,164,998
Tonnage of goods traffic ... ..	949,671	820,586
Tonnage of live stock traffic ... ..	26,342	23,621

NOTE—Information as to the cost and earnings of trains, per ton per mile, cannot be given for goods and passengers separately, as a large proportion of the train mileage is used for carrying both goods and passenger traffic.

\* This column shows the adjusted figures after final settlement of accounts for the quarter.

144—

[1,403 copies—Approximate cost of printing (labour and material), £11 6s. 3d.]

Tramways.	Quarter ending 31st March, 1889.	Quarter ending 31st March, 1890.
Miles open ... ..	* 38½	39½
Revenue from all sources ... ..	£62,120	£68,509
Expenditure ... ..	£52,307	£53,553
Train miles run ... ..	380,996	411,425
Earnings per train mile ... ..	3s. 3d.	3s. 4d.
Expenditure per train mile ... ..	2s. 9d.	2s. 7½d.
Percentage—Expenditure to earnings ... ..	84.20	78.17
Number of fares collected ... ..	15,211,755	15,599,802

\* This column shows the adjusted figures after final settlement of accounts for the quarter.

## II.—CONDITION OF THE LINES.

A report as to the condition of the lines will be found as an Appendix, page 4.

## III.—SPECIAL RATES.

A Statement of the Special Rates, and the reasons for making the same, will be found attached, Appendix, page 4.

## IV.—STAFF.

These Returns are given as an Appendix, pages 5 to 8.

## GENERAL REMARKS.

The Passenger Traffic shows an increase both in numbers and revenue.

The tonnage of Goods Traffic shows a decrease of 129,085 tons. This arises in consequence of the great impetus given to the shipment of coal in the Newcastle district after the "strike" in the latter part of 1888, which made the quarter ending March, 1889, an exceptionally heavy one.

The general Goods Traffic, however, shows a large increase both in tonnage and revenue.

It is satisfactory to find that the revenue has improved, when it is borne in mind that the grain and other agricultural produce rates have been reduced by 20 per cent.

The economies effected in various ways have enabled us to provide for the carrying on of the largely increased traffic without increasing the working expenses, although heavy additional expenditure has been incurred on the Permanent Way in consequence of the unusual floods, and also in pushing forward with the work of repairing and renovating the locomotive and carriage and waggon stock.

The branch line between Hornsby and St. Leonards was opened for traffic on the 1st January last, but we regret to say the traffic does not provide for the working expenses, and we would call attention to the following extract from our report, dated January, 1889, upon the proposed line of railway to connect this branch with the waters of Port Jackson :—

The construction of the line is, however, essential in connection with the line of railway from Hornsby to Pierce's Corner, now almost complete, as without the extension to the waters of Port Jackson the former line can prove of but limited commercial value, having no outlet.

The line from Pierce's Corner passes through country admirably adapted for residential purposes, and will probably at no distant date become, with the aid of railway communication, an attractive suburb, capable of furnishing a traffic which will make the line a profitable one.

CONDITION OF THE LINES AND ACCOMMODATION FOR THE TRAFFIC.

The condition of the lines has, during the quarter, been a source of considerable anxiety, as the exceptional rainfall seriously affected the condition of the roads, and rendered it necessary to run the trains at considerably reduced speed so as to ensure safety.

The bad state of the bush roads also prevented the contractors from bringing in sleepers for relaying, and consequently retarded this important work very materially.

The accommodation for the traffic is being improved at various places.

TRAMWAYS.

The working of the tramways continues to show improved results. The expenses of the quarter have been debited with the cost of six new cars, and we fully expect to show a surplus for the year ending 30th June next, after paying working expenses and interest on the capital outlay.

We have the honor to be,

Sir,

Your most obedient Servants,

E. M. G. EDDY,

Chief Commissioner.

W. M. FEHON,

Commissioner.

CHARLES OLIVER,

Commissioner.

## APPENDICES.

## APPENDIX I.

Minute from The Acting Engineer for Existing Lines to The Secretary to the Railway Commissioners.

New South Wales Government Railways,  
Engineer for Existing Lines Branch, Sydney, 18 April, 1890.

*Subject* :—Report on Condition of Lines for the quarter ending the 31st March, 1890.

I HAVE the honor to report as follows on the condition of the Railways for the quarter ending the 31st of March, 1890 :—

During the last three months the work of maintenance has been considerably affected by the heavy rains, especially on the Metropolitan, Northern, and Western Divisions.

Several heavy slips have taken place, more particularly at Katoomba and Bell, on the Western Line, Ben Lomond on the Northern Line, Clifton on the Illawarra Line, and on the Mudgee Branch, and it has been found necessary to lay in short deviations at the two places first named, and it would be advisable to consider the question of deviating several portions of the Mudgee Line, to prevent delays to traffic in consequence of slips.

The continued wet weather has, to a great extent, prevented any large quantity of stone being taken out at Bombo Quarries, and consequently retarded the work of reballasting. The new machines for these quarries will shortly arrive, when we shall be able to turn out a much larger quantity than at present.

The Up Line, Eveleigh to Petersham, and the Down Line, Eveleigh to Newtown, have been lifted, reballasted, and drained. Instructions have been given for the relaying and fencing to be pushed on as rapidly as possible, but in consequence of the very wet weather we have had, the contractors have been unable to deliver either sleepers or fencing materials.

The station buildings, goods warehouses, and bridges, have been well maintained.

Good progress has been made with the duplication works, and the portions Hurstville to George's River and Sutherland to Loftus Junction, are nearly completed.

Plans for widening the suburban line are nearly completed, and I expect tenders for this work may be invited in a very short time.

The extension, Hornsby to St. Leonards, a length of 10 miles 37 chains, was opened for public traffic on 1st of January last. During the late heavy rains the embankments have suffered considerably, and several slips have taken place.

J. ANGUS,  
Acting Engineer.

## APPENDIX II.

New South Wales Government Railways.

STATEMENT, in accordance with clause No. 44 of the Railway Act, showing the special rates which have been made, and the reasons for making such rates, quarter ending 31st March, 1890.

Article.	Rate.	Reason for such Rate.
Scrap tin .....	Same as scrap zinc. "B" rate. ....	To equalize rates.
Iron and steel .....	For manufacture by Messrs. Ball & Co., of Goulburn, of 100 railway waggons. "M" rate.	To encourage inland manufactures.
Old sleepers .....	From Kiama to Darling Harbour and Rookwood. "M" rate.	To obtain traffic.
Wool .....	Greasy, from Tarago, Bungendore, and Goulburn to Queanbeyan; then scoured and sent to Darling Harbour. To be charged actual mileage proportion only, without the additional 2s. 6d. per ton previously charged.	To encourage industry in the interior.
Graphite or plumbago .....	"M" rate, and conditions .....	To foster traffic.
Grapes .....	Albury to Sydney by mail train, at goods rates .....	do.
Contractors' material .....	2s. 6d. per 4-wheeled truck, from Rookwood to head of contractor's private lines. (Subject to usual demurrage charges.)	To increase revenue.
Do .....	Penrith Station; 5s. per truck for trucks loaded locally, and 1s. for those arriving by train.	To obtain traffic.
Live-stock .....	10s. for every ten or part of ten trucks conveyed from Penrith to Kingswood, in addition to ordinary mileage rates.	To obtain revenue.
Coal .....	½d. per ton per mile for haulage over the Government line, from Illawarra Coal Company's Mine to Mount Kembla Jetty, in owner's trucks, and hauled by colliery engines. Empty waggon trains free of toll.	To increase revenue.
Phosphorized wheat for extermination of rabbits.	"A" rate .....	To foster traffic.
Coal .....	Coal carried between Greta and Newcastle in excess of 150,000 tons per year to be allowed a reduction of 1d. per ton on the whole quantity, if conveyed in full train loads.	To encourage traffic.

## APPENDIX III.

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Appointments of Employees from the 1st of January to the 31st of March, 1890.

Date.	Name.	Position.	Rate.	Remarks.
<b>HEAD-QUARTERS' STAFF.</b>				
1889. 1 Dec. ...	Corns, J. G. S. ....	Traffic Officer .....	£500 per annum.	
1890. 1 Jan. ...	Hodgson, C. A. ....	" .....	£500 " .....	
<b>SECRETARY'S BRANCH.</b>				
20 " ...	Williamson, D. C. ....	Clerk .....	£150 per annum	Shorthand and Typewriting.
17 Feb. ...	Easterling, W. G. ....	" .....	£110 " .....	
<b>CHIEF ACCOUNTANT'S BRANCH.</b>				
1 Jan. ...	Hall, Thomas .....	Chief Accountant .....	£1,000 per annum	
16 " ...	Watts, F. W. ....	Clerk .....	£75 " .....	Transferred from Traffic Branch.
17 Mar. ...	Butler, J. ....	" .....	£52 " .....	Exchanged with John Oag.
<b>TRAFFIC AUDITOR'S BRANCH.</b>				
Nil.				
<b>ENGINEER FOR EXISTING LINES' BRANCH.</b>				
1889. 1 Oct. ...	Tryndall, H. J. ....	Store Clerk .....	£150 per annum	Re-employed.
30 " ...	Cusack, James .....	Fettler .....	7/6 per day .....	From Tramways. Exchanged with W. Botts.
1890. 1 Jan. ...	Foxlee, W. ....	Deputy Engineer .....	£700 per annum	To fill vacancy.
16 " ...	Cochran, John .....	Clerk .....	£150 " .....	Shorthand and Typewriting.
31 " ...	Oliver, William .....	Messenger .....	8/- per day .....	Transferred from Secretary's Branch.
13 Feb. ...	Lough, William .....	Labourer .....	7/6 " .....	Re-employed.
3 Mar. ...	Gambill, Frank L. ....	Junior Clerk .....	£50 per annum...	
7 " ...	M'Kander, John .....	Labourer .....	7/6 per day .....	Reinstated.
17 " ...	Cross, John .....	Inspector and Adjuster of Weighing-machines.	£250 per annum	
<b>LOCOMOTIVE ENGINEER'S BRANCH.</b>				
2 Jan. ...	Denison, George .....	Clerk .....	£150 per annum	Transferred from Supernumerary Staff.
13 " ...	Muir, W. ....	Cleaner .....	6/- per day .....	Vice C. Langham.
15 " ...	Lovell, Henry .....	Striker .....	7/- " .....	Vice B. Howe.
16 " ...	Almond, Peter .....	Blacksmith .....	10/8 " .....	Vice D. Scarth.
29 " ...	Gerrard, James .....	File-cutter .....	8/6 " .....	Vice S. Wheatley.
14 Feb. ...	Hayes, John D. ....	Clerk .....	£30 per annum	
14 " ...	Fischer, John G. ....	" .....	£150 " .....	
15 " ...	Broadhurst, Joseph .....	" .....	£75 " .....	
15 " ...	Wales, Edward L. ....	" .....	£30 " .....	
15 " ...	Beardsmore, Chas. E. ....	" .....	£30 " .....	
17 " ...	Gray, Alexander M. ....	" .....	£110 " .....	
17 " ...	Gilder, George A. ....	" .....	£150 " .....	
17 " ...	Wenman, William .....	Boilermakers' Helper .....	7/- per day .....	Vice M. Burke.
18 " ...	Franck, H. J. ....	Clerk .....	£170 per annum	Transferred from Secretary's Branch.
22 " ...	Haswell, John F. ....	Draftsman .....	£325 " .....	Increased work.
24 " ...	Schubert, Robert .....	Storeman .....	7/6 per day .....	Vice Henderson.
25 " ...	Buchanan, Arthur W. ....	Clerk .....	£30 per annum	Vice E. Wales, transferred to Interlocking Branch.
27 " ...	Whitpaine, Charles .....	Striker .....	7/6 per day .....	Vice B. Lloyd.
27 " ...	Jordan, George E. ....	Clerk .....	£30 per annum	New System of Accounts.
27 " ...	Roberts, William .....	Painter .....	10/- per day .....	Vice Thompson.
28 " ...	Mountain, R. ....	Cleaner .....	6/- " .....	Vice G. Wray.
3 Mar. ...	Hill, Henry E. ....	Draftsman .....	£235 per annum	Increased work.
4 " ...	Burridge, C. ....	Cleaner .....	6/- per day .....	Vice M'Bridge.
5 " ...	Hallett, William .....	Labourer .....	6/6 " .....	Vice M'Gregor.
21 " ...	Hampton, Thomas .....	Coppersmith .....	9/- " .....	Re-employed, vice Maxwell.
28 " ...	Mortimer, James .....	Labourer .....	7/6 " .....	Reinstated.
31 " ...	Gulliford, Chas. E. ....	Clerk .....	£30 per annum	New System of Accounts.
<b>CHIEF TRAFFIC MANAGER'S BRANCH.</b>				
1889. 3 Dec. ...	Millican, Joseph .....	Clerk .....	10/- per day .....	
1890. 3 Jan. ...	Holborne, Eliza .....	Gatekeeper .....	2/6 per week .....	
22 " ...	Brown, Charles .....	Porter .....	5/6 per day .....	Transferred from Ex. Lines Branch.
24 " ...	Levy, Harriett .....	Gatekeeper .....	2/6 per week .....	Vice Mrs. Hart.
1 Feb. ...	Ledger, W. ....	Junior Porter .....	20/- " .....	Vice Arrowsmith.
11 " ...	Burns, Mrs. ....	Gatekeeper .....	Free house .....	Vice H. Twyford.
12 " ...	Patfield, George .....	Operator .....	£95 per annum	Reinstated.

Date.	Name.	Position.	Rate.	Remarks.
1890. CHIEF TRAFFIC MANAGER'S BRANCH— <i>continued.</i>				
20 Feb.	Smith, E. L. G.	Porter	7/- per day	Reinstated.
21 "	M'Donald, Francis	Gatekeeper	5/- per week	<i>Vice</i> Mary Mawdsley.
21 "	Binkley, J.	Junior Porter	2/6 per day	<i>Vice</i> Lightfoot.
5 Mar.	Ross, John M.	Porter	7/- per day	Transferred from Ex. Lines Branch.
10 "	West, Julia	Gatekeeper	Free house	<i>Vice</i> Mrs. Heathcote.
13 Mar.	Young, Thomas	Probationer	2/6 per week	<i>Vice</i> Robert Wilkinson.
14 "	Milligan, Mrs.	Gatekeeper	15/- "	<i>Vice</i> W. Irwin.
18 "	Smith, Mary	"	Free house	<i>Vice</i> L. Wilbow.
21 "	Newell, Angelina	"	7/- per week	<i>Vice</i> Ann Appleby.
21 "	Bendall, Emily	"	7/- "	<i>Vice</i> Fanny Cameron.
28 "	Fitzgerald, Annie	"	5/- "	<i>Vice</i> S. Upton.
31 "	Donohue, Patrick	Porter	7/- per day	<i>Vice</i> J. McNutt.
CONTROLLER OF STORES' BRANCH.				
1 Feb.	Kingsmill, C.	Sheet Overseer	8/- per day	Transferred from Traffic Branch.
10 March	Thompson, Thomas	Timber Inspector	10/- "	Transferred from Existing Lines Branch.
PROPERTY AND ESTATE BRANCH.				
1 Feb.	Vernon, John	Property and Estate Agent	£650 per annum	Promoted from Assistant Accountant.
SIGNAL AND INTERLOCKING BRANCH.				
22 Feb.	Wailes, Edward L.	Clerk	£30 per annum	Transferred from Locomotive Branch.
TRAMWAYS—LOCOMOTIVE BRANCH.				
1889.	Barker, Charles H.	Messenger	2/6 per day	} Transferred from Super-numerary Staff.
6 "	O'Maley, William	Cleaner	5/6 "	
6 "	Dolan, Daniel	"	5/6 "	
1890.	Knight, Wm. J.	Labourer	7/- "	<i>Vice</i> J. Tyrell.
5 Feb.	Nimmo, M.	Assistant Foreman	£255 per annum	Transferred from Locomotive Branch, Railways.
11 March	Adshad, Joseph H.	Blacksmith	10/- per day	<i>Vice</i> J. Clarke.
13 "	Coffey, Edward	Cleaner	4/6 "	<i>Vice</i> G. Wilson.
14 "	Walsh, Charles E.	"	4/6 "	<i>Vice</i> G. Bradley.
19 "	Ewan, Albert H.	"	4/6 "	<i>Vice</i> R. Mangnall.
21 "	Walker, John	"	4/6 "	<i>Vice</i> A. Alexander.
28 "	Jones, Albert	Plumber	9/6 "	<i>Vice</i> T. Christie.
TRAMWAYS—TRAFFIC BRANCH.				
24 Jan.	Furlong, Mrs.	Waiting-room Attendant	Rent free	<i>Vice</i> Mrs. Almen.
26 Feb.	M'Sweeny, M.	Conductor	7/- per day	From Railways, exchanged with W. T. Gorton.
6 March	Reid, Henry	Flagman	7/- "	From Railways.
15 "	Haesall, Samuel	Car Cleaner	6/- "	<i>Vice</i> F. Hinton.
TRAMWAYS—MAINTENANCE BRANCH.				
Nil.				

## APPENDIX IV.

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Removals of Employees, from 1st January to 31st March, 1890.

Date.	Name.	Position.	Rate.	Remarks.
SECRETARIES' BRANCH.				
31 Jan.	Oliver, William	Messenger	8/- per day	Transferred to Existing Lines Branch.
15 Feb.	Frank, H. J.	Clerk	£170 per annum	Transferred to Locomotive Branch.
CHIEF ACCOUNTANT'S BRANCH.				
1889.	Thompson, Fred. C.	Pay Clerk	£250 per annum	Retired.
1890.	Vernon, John	Assistant Accountant	£520 "	Promoted to Property and Estate Agent.
17 Mar.	Oag, John	Clerk	£75 "	Exchanged with J. Butler of Traffic Branch.
TRAFFIC AUDITOR'S BRANCH.				
Nil.				

Date.	Name.	Position.	Rate.	Remarks.
1890. ENGINEER FOR EXISTING LINES' BRANCH.				
8 Jan.	Gorman, Michael	Labourer	7/6 per day	Deceased.
9 "	Duffell, William	"	7/6 "	Resigned.
10 "	Botts, William	Fettler	7/6 "	Exchanged with Jas. Cusack of Tramways.
12 "	Fitzpatrick, Francis	Labourer	7/6 "	Deceased.
17 "	Cahill, Jerry	"	7/6 "	Resigned.
20 "	Brown, Charles	Bricklayer's Improver	4/6 "	Transferred to Traffic Branch
31 "	Hassett, Richard	Messenger	£125 per annum	Retired.
13 Feb.	Riddle, William	Labourer	7/6 per day	Resigned.
14 "	Gilligan, John	"	7/6 "	"
16 "	Hilzinger, W. J.	Inspector	£310 per annum	Retrenchment.
22 "	Schubert, Robert	Labourer	7/6 per day	Resigned.
25 "	Williams, George	Fettler	7/6 "	"
26 "	Sherman, James	"	7/6 "	"
26 "	South, William	Labourer	7/6 "	"
28 "	Ross, John M.	Fettler	7/6 "	Transferred to Traffic Branch
7 Mar.	Rowlands, J. T.	Sub-Inspector	£230 per annum	Retrenchment.
10 "	Thompson, Thomas	Carpenter	10/- per day	Transferred to Stores Branch
13 "	Wilson, William	Labourer	7/6 "	Resigned.
13 "	Francis, James	"	7/6 "	"
31 "	Chapman, George	Carpenter	9/- "	Discharged.
LOCOMOTIVE ENGINEER'S BRANCH.				
1889.				
16 Nov.	Sutton, William	Carriage and Wheel Examiner	12/- per day	Retrenchment.
9 Dec.	Gillard, James	Driver	14/- "	Discharged.
9 "	Mason, Thomas	Fireman	9/- "	"
1890.				
7 Jan.	Richards, Arthur	Driver	12/- "	Deceased.
8 "	Walsh, Edward	Labourer	7/- "	Resigned.
9 "	Farquhar, James	Carriaker	7/- "	Retired.
13 "	Whentley, Samuel	Grinder	12/- "	Deceased.
13 "	Langham, C.	Fireman	10/- "	Discharged.
14 "	Kissel, Joseph	Turner	11/2 "	"
15 "	Howe, Benjamin	Striker	7/- "	Resigned.
16 "	Searth, Dawson	Blacksmith	12/2 "	"
17 "	Henderson, James	Storeman	8/- "	Discharged.
18 "	Dawn, John	Cleaner	7/- "	Deceased.
31 "	Fitzpatrick, Denis	General Foreman	£350 per annum	Retrenchment.
31 "	Taylor, James	Labourer	7/6 per day	Retired.
31 "	Rowles, George	"	7/6 "	"
31 "	Asplet, George	Blacksmith's Assistant	7/6 "	"
31 "	Lloyd, Benjamin	Striker	7/6 "	"
31 "	Riley, John	Carpenter	10/8 "	"
31 "	Gill, C.	Boilermaker	10/8 "	"
31 "	Hopkins, Evan	Blacksmith	11/8 "	"
31 "	Davis, Edward	"	12/2 "	"
31 "	Whyte, William	Brass-finisher	10/6 "	"
31 "	Thompson, Joseph	Car Painter	10/- "	"
31 "	Burrows, Joseph	Labourer	7/6 "	"
31 "	Crewes, Richard	Machinist	9/2 "	"
31 "	Richardson, Thomas	Coppersmith	12/4 "	"
31 "	Woodon, Leonard	Boilermaker's Assistant	7/- "	"
5 Feb.	Niumo, M.	Assistant Foreman	£255 per annum	Transferred to Locomotive Tramways.
8 "	Hand, John	Boilermaker	10/6 per day	Deceased.
8 "	Maxwell, Henry	Coppersmith	10/8 "	Resigned.
12 "	Grisdale, Charles	Painter's Assistant	5/- "	Discharged.
17 "	Burke, Michael	Boilermaker's Helper	7/- "	Resigned.
20 "	Cameron, James	Carriage & Wheel Examiner	10/8 "	"
22 "	Wailes, Edward	Clerk	£30 per annum	Transferred to Interlocking Branch.
23 "	Wemy, George	Fireman	10/- per day	Retired.
4 Mar.	M'Bride, Patrick	"	9/- "	Discharged.
5 "	M'Gregor, George	Labourer	7/6 "	Deceased.
6 "	Reid, Henry	"	7/- "	Transferred to Tramways.
8 "	Mortimer, James	"	7/6 "	Discharged.
11 "	Heron, David	Driver	14/- "	Deceased.
26 "	Baker, Thomas	Fireman	8/- "	Resigned.
31 "	Phillips, Richard	Clerk	£150 per annum	Retrenchment.
31 "	Evans, John	Carriage & Wheel Examiner	14/8 per day	"
31 "	Baker, John	"	12/- "	"
CHIEF TRAFFIC MANAGER'S BRANCH.				
1 Jan.	Currin, John	Officer-in-charge	£140 per annum	Discharged.
7 "	Dwyer, Patrick	Station-master	£225 "	Retrenchment.
14 "	Irwin, William	Porter	7/6 per day	Deceased.
14 "	Wilkinson, Robert	Station-master	£200 per annum	"
16 "	Watts, F. W.	Junior Porter	20/- per week	Transferred to Account Branch.
30 "	Johnstone, Sarah	Gatekeeper	5/- "	Retrenchment.
20 "	Hart, Caroline	"	2/6 per week	Resigned.
31 "	Buras, James	Station-master	£255 per annum	Retrenchment.
1 Feb.	Smith, E. L. G.	Porter	7/- per day	Discharged.
1 "	Hartigan, James	Gatekeeper	30/- per week	Retrenchment.
1 "	Arrowsmith, J. T.	Junior Porter	20/- "	Resigned.
2 "	Mitchell, Francis J.	Telegraph Probationer	2/6 "	Discharged.

Date.	Name.	Position.	Rate.	Remarks.
CHIEF TRAFFIC MANAGER'S BRANCH—continued.				
1890.				
2 Feb.	Kingsmill, C.	Sheet repairer	7/- per day	Transferred to Stores Branch.
12 "	Wheeler, E.	Operator	£130 per annum.	Retrenchment.
17 "	Twford, Harriett	Gatekeeper	30/- per week	Discharged.
20 "	Mawdeley, Mary	"	5/- "	Resigned.
22 "	Lightfoot, Robert	Porter	7/- per day	Discharged.
26 "	M'Sweeney, M.	"	7/- "	Transferred to Tramways.
1 Mar.	Muir, John	Station-master	£225 per annum.	Retrenchment.
1 "	Hussey, Robert J.	Gatekeeper	10/- per week	"
10 "	Heathcote, Mrs.	"	Free house	Discharged.
11 "	M'Intosh, James	Foreman	11/- per day	Retrenchment.
14 "	Collingwood, Edgar	Porter	7/6 "	Deceased.
15 "	Went, William H.	Inspector	13/- "	Retrenchment.
16 "	Hickey, Louisa	Gatekeeper	5/- per week	Discharged.
17 "	Butler, J.	Clerk	£52 per annum.	Exchanged with J. Oag of Account Branch.
20 "	Appleby, Ann	Gatekeeper	7/- per week	Resigned.
20 "	Cameron, Fanny	"	7/- "	"
26 "	Upton, Selma	"	5/- "	Left.
29 "	Wilbow, Louisa	"	Free house	Resigned.
31 "	Johnstone, Mrs.	"	5/- per week	"
31 "	Johnstone, John	In charge of siding at Doodle Cooma.	7/- "	"
31 "	M'Nutt, John	Porter	7/- per day	Retired.
COMPTROLLER OF STORES' BRANCH.				
Nil.				
PROPERTY AND ESTATE BRANCH.				
Nil.				
SIGNAL AND INTERBLOCKING BRANCH.				
8 Mar.	Branch, William	Slat. engine-driver	10/- per day	Deceased.
TRAMWAYS—LOCOMOTIVE BRANCH.				
1889.				
11 Dec.	Wilson, George B.	Driver	12/- per day	Discharged.
27 "	Mungnall, Robert	Fireman	8/- "	Left.
1890.				
3 Jan.	Clarke, James	Blacksmith	11/- "	Resigned.
11 "	Tyrell, John R.	Labourer	7/- "	"
11 "	Christie, Thomas	Plumber	10/8 "	Discharged.
28 "	Madden, James	Labourer	7/- "	Resigned.
30 "	Bradley, George	Cleaner	6/6 "	"
31 "	Brausch, Bruno	Fireman	9/- "	Discharged.
1 Feb.	Sunner, Napoleon	Boilermaker	10/8 "	Resigned.
6 "	Logan, James	Driver	13/- "	Retrenchment.
17 "	Alexander, Andrew	Cleaner	6/6 "	Left.
TRAMWAYS—TRAFFIC BRANCH.				
1889.				
7 Dec.	Hinton, F. J.	Car cleaner	7/- per day	Discharged.
1890.				
23 Jan.	Ahnen, Mrs.	Waiting room attendant	9/- per week	Dispensed with.
25 "	O'Connell, Martin	Staffman	8/- per day	Discharged.
26 Feb.	Gorton, W. T.	Conductor	8/- "	Exchanged with M'Sweeney of Railways.
2 Mar.	Menary, William	"	9/- "	Retrenchment.
TRAMWAYS—MAINTENANCE BRANCH.				
28 Mar.	Gordon, John	Labourer	7/6 per day	Retrenchment.

1890.

## NEW SOUTH WALES.

**RAILWAYS AND TRAMWAYS.**

(REPORT OF RAILWAY COMMISSIONERS FOR QUARTER ENDING 30 JUNE, 1890.)

Presented to Parliament, pursuant to Act 51 Vic. No. 35, sec. 44.

Offices of the Railway Commissioners of New South Wales,  
Sydney, 29 July, 1890.

TO THE HONORABLE THE MINISTER OF RAILWAYS,—

Sir,

In accordance with the provisions of the 44th clause of the Railway Act of 1888, 51 Vic. No. 35, we have the honor to submit, for the information of Parliament, our Report for the quarter ending the 30th of June, 1890, upon the subjects specified, viz. :—

- (I.) "The state of the traffic returns, with the approximate cost and earnings of trains per ton per train mile, in respect of goods and passengers, respectively, carried during the past quarter."
- (II.) "The general condition of the lines, and accommodation for the traffic."
- (III.) "The special rates (if any) which have been made, and the reasons for making such rates."
- (IV.) "The appointments and removals, with the circumstances attending each case."

## I.—STATE OF THE TRAFFIC.

Railways.	Quarter ending 30th June, 1889.	Quarter ending 30th June, 1890.
Miles open ... ..	*	
	2,171	2,182
Revenue from all sources ... ..	£545,962	£583,584
Expenditure ... ..	£411,514	£485,612
Train miles run ... ..	1,834,579	1,925,313
Earnings per train mile ... ..	5s. 11½d.	6s. 0½d.
Expenditure per train mile ... ..	4s. 6d.	4s. 6½d.
Percentage—Expenditure to earnings ... ..	75·37	74·64
Number of passengers ... ..	4,100,577	4,420,107
Tonnage of goods traffic ... ..	914,955	978,525
Tonnage of live stock traffic ... ..	23,946	26,441

NOTE—Information as to the cost and earnings of trains per ton per mile cannot be given for goods and passengers separately, as a large proportion of the train mileage is used for carrying both goods and passenger traffic.

\* This column shows the adjusted figures after final settlement of accounts for the quarter.

471—

[1,403 copies—Approximate Cost of Printing (labour and material), £12 11s. 3d.]

Tramways.	Quarter ending 30th June, 1890.	Quarter ending 30th June, 1890.
	*	
Miles open ... ..	38½	39½
Revenue from all sources ... ..	£63,595	£67,476
Expenditure ... ..	£59,075	£58,573
Train miles run ... ..	384,447	416,761
Earnings per train mile ... ..	3s. 3¼d.	3s. 3d.
Expenditure per train mile ... ..	3s. 1d.	2s. 9¼d.
Percentage—Expenditure to earnings ... ..	92.89	86.81
Number of fares collected ... ..	14,148,862	15,841,187

\* This column shows the adjusted figures after final settlement of accounts for the quarter.

## II.—CONDITION OF THE LINES.

A report as to the condition of the lines will be found as an Appendix, page 4.

## III.—SPECIAL RATES.

A statement of the Special Rates, and the reasons for making the same, will be found attached, Appendix, page 4.

## IV.—STAFF.

These Returns are given as an Appendix, pages 5 to 8.

## GENERAL REMARKS.

The revenue for the quarter shows an increase of £37,622 over the corresponding period in 1889, all descriptions of traffic (except coal) having contributed to the improvement. This is a satisfactory state of things, having in view the continuous wet weather experienced throughout the quarter, and the consequent bad state of the country roads in all directions.

The increase in goods, live-stock, and other traffic amounts to 66,065 tons.

## ROLLING STOCK.

The contractors are beginning to deliver the new rolling stock more rapidly, and shortly all the fast trains will be composed of carriages of the new description.

Several new Suburban Trains are also in work, and others are approaching completion.

Special efforts continue to be made in improving the condition of the locomotives and waggons, and also in renovating the best of the existing carriage stock.

CONDITION

## CONDITION OF THE LINES AND ACCOMMODATION FOR THE TRAFFIC.

The rainfall during the quarter amounted to 21·69 inches, making a total for the 14 months ending June of 108·48 inches. For the corresponding periods of 14 months for the years ending—

June, 1889	...	...	...	49·49 inches.
„ 1888	...	...	...	46·08 „
„ 1887	...	...	...	62·90 „
„ 1886	...	...	...	47·78 „

This continued exceptional rainfall has been the cause of great anxiety in connection with the Railways, and has called for the greatest vigilance and care on the part of the officers and men, to keep the lines open for traffic in some places, and in fair running order generally.

A large additional staff has been employed, and it has been necessary to run the trains at reduced speed in many places. This has materially interfered with punctual working, and little improvement can be expected in this respect until more favourable weather is experienced.

The work of relaying, draining, and reballasting of the lines has been pushed forward as expeditiously as possible, but progress has been much retarded by the almost incessant rainfall, and also by the inability of the contractors to deliver sleepers, in consequence of the all but impassable state of the bush roads.

The heavy floods in the Darling River caused serious damage to the railway line approaching Bourke, and an expenditure in repairing the line was incurred in the current quarter of £13,300, and this expense is still continuing. When the waters have completely receded, a large expenditure will have to be incurred in dealing with the bridges and waterways, and providing more flood openings.

Unremunerated services were also rendered to the Bourke people, in various ways, amounting in value to £4,000.

## TRAMWAYS.

The working of the Tramways continues to show improved results. The receipts exhibit an increase of £3,871, and the expenses show a slight decrease.

Four (4) new cars have been debited to working expenses during the quarter, making a total of thirty-one (31) during the current financial year.

A water-tank waggon has also been provided out of revenue.

We have the honor to be,

Sir,

Your most obedient Servants,

E. M. G. EDDY,

Chief Commissioner.

W. M. FEHON,

Commissioner.

CHARLES OLIVER,

Commissioner.

## APPENDICES.

## APPENDIX I.

Minute from The Acting Engineer for Existing Lines to The Secretary to the Railway Commissioners.

New South Wales Government Railways,  
Engineer for Existing Lines Branch, Sydney, 24 July, 1890.

*Subject* :—Report on Condition of Lines for the quarter ending the 30th June, 1890.

I HAVE the honor to report as follows on the condition of the Railways for the quarter ending the 30th of June, 1890 :—

The continued wet weather has rendered the maintenance of the road both difficult and expensive, especially on the Northern and Western Divisions.

The heavy floods in the Darling caused immense damage at Bourke, where several miles of line were entirely destroyed. The work of reconstruction was pushed forward as energetically as possible ; but although the line was speedily opened for traffic, the complete repairs have, on account of the slow subsidence of water, taken longer than could be wished.

Several slips have taken place on the Mudgee Line.

The work of relaying and reballasting the Suburban Line has been seriously retarded by the heavy rains, but has been completed to Summer Hill on the down, and Ashfield on the up, line.

Fair progress has been made with the duplication works. The portions between Sutherland and Loftus Junction, and between Mustville and Oakley's, were completed before Easter, and the other portions are being energetically pushed forward. The section which composes the Darling Harbour widening, from Redfern to Eveleigh Junction, has been let, and the contractor is making good progress. The plans for the other portions will be completed without delay, and it is hoped that tenders may be invited in a month.

The bridges and buildings have been carefully looked after, and at many stations additional accommodation has been provided.

J. ANGUS,  
Acting Engineer.

## APPENDIX II.

New South Wales Government Railways.

STATEMENT, in accordance with clause No. 44 of the Railway Act, showing the special rates which have been made, and the reasons for making such rates, quarter ending 30th June, 1890.

Article.	Rate.	Reason for such Rate.
Coal.....	Corrimal to Australian Coal Company's Siding, 1s. per ton loaded in Commissioners' trucks, but hauled by owners' engines.	To create revenue.
Roburite, Non-.....	Third class .....	To encourage manufacture
Bones of deceased Chinamen .....	Fourth class.	
Butter.....	From Mudgee to stations west of Wallerawang by mail-train, goods rates.	To foster traffic.
Meat .....	In refrigerating car, Tenterfield to Sydney, 1½d. per ton per mile.	do
Chicory .....	Grain rate.....	To encourage traffic.
Marble dust .....	" M " rate. ....	To foster traffic.
Gravel.....	Coolabah to Bourke, 8s. 9d. per ton. ....	To obtain traffic.
Specimens for the Technological Museum.	Free .....	For educational purposes.
Leather .....	Reduced from first-class to " B " rate for 6-ton loads .	To encourage traffic.

## APPENDIX III.

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Appointments of Employees from the 1st of April to the 30th of June, 1890.

Date.	Name.	Position.	Rate.	Remarks.
<b>SECRETARY'S BRANCH.</b>				
30 June	Tyrer, Walter H.	Clerk	£52 per annum	From Tramways, <i>vice</i> F. Martin.
14 April	Garlick, John	"	£30 "	
<b>CHIEF ACCOUNTANT'S BRANCH.</b>				
Nil.				
<b>TRAFFIC AUDITOR'S BRANCH.</b>				
30 June	Holt, Arthur B.	Junior Clerk	£30 per annum	<i>Vice</i> Henry Thornton.
<b>ENGINEER FOR EXISTING LINES BRANCH.</b>				
1 June	Dilow, Thomas	Labourer	6/6 per day	<i>Vice</i> Langford.
9 "	Wood, Thomas	Draftsman	£140 per annum	
10 "	Watson, John H.	Clerk	£150 "	
16 "	Vegan, Harold S.	Draftsman	£200 "	
<b>LOCOMOTIVE ENGINEER'S BRANCH.</b>				
15 April	Hadley, Nicholas W.	Fitter	10/- per day	From Supernumerary Staff <i>vice</i> Hickey.
10 "	Wright, Robert	Labourer	6/6 "	<i>Vice</i> M'Gregor.
24 "	Halpin, James	Boilermakers' Assistant	7/- "	<i>Vice</i> Burke.
9 May	Butlerworth, Herbert	Cleaner	2/6 "	From Permanent Way Branch
12 "	Kavanagh, Joseph	Office Boy	12/6 per week	<i>Vice</i> Doody.
19 "	York, Samuel W.	Apprentice	10d. per day	<i>Vice</i> Poole.
3 June	Nicholls, Robert G.	Storeman	7/- "	Reinstated.
5 "	Smith, Thomas	Fitter	9/4 "	From Supernumerary Staff, <i>vice</i> Hearn.
6 "	Wilson, James	Cleaner	4/- "	From Tramways.
9 "	Dawson, Herbert	Apprentice	10d. "	<i>Vice</i> Ceeke.
9 "	Westlake, William	Striker	7/- "	<i>Vice</i> Morrison.
9 "	King, Robert	Labourer	6/6 "	<i>Vice</i> Mills.
16 "	Tonkin, Ernest	Apprentice	4/- "	From Permanent Way Branch,
23 "	Kitching, William	Fitter	10/- "	From Supernumerary Staff, <i>vice</i> Nightingale.
27 "	Cameron, Donald	Cleaner	6/- "	From Traffic Branch.
17 Mar.	Allway, Henry	Blacksmith	9/- "	From Supernumerary Staff, <i>vice</i> Hopkins.
14 May	Allen, R.	Turner	9/4 "	From Traffic Branch.
<b>CHIEF TRAFFIC MANAGER'S BRANCH.</b>				
2 April	Hunt, Thomas	Looking after Siding	7/6 per week	<i>Vice</i> Johnstone.
2 "	Kenny, Mary	Gatekeeper	15/- "	<i>Vice</i> Graham.
7 "	Waple, Alfred	Porter	6/- per day	<i>Vice</i> G. Jones.
7 "	Dewhurst, Elizabeth	Gatekeeper	7/- per week	<i>Vice</i> Regan.
7 "	Dewhurst, Sarah Ann	"	7/- "	<i>Vice</i> Regan.
7 "	Higgins, Ellen	"	Free house	<i>Vice</i> Wrightson.
11 "	Adams, Jennie	"	Free house	<i>Vice</i> Costello.
11 "	Costello, Ada	"	7/- per week	<i>Vice</i> Richards.
14 "	Hopking, Henry	Porter	7/- per day	From Permanent Way Branch.
15 "	Roberts, Sarah	Gatekeeper	Free house	
18 "	Leman, Mrs.	"	10/- per week	<i>Vice</i> Campcy.
19 "	Ferguson, Mrs. E.	"	25/- per week and free house.	<i>Vice</i> Lidden.
21 "	May, Charles	"	10/- per week and free house.	<i>Vice</i> Whitely.
9 May	Sheperd, Annie	"	7/- per week	<i>Vice</i> F. Ross.
1 "	Winter, Matilda	"	Free house	<i>Vice</i> Larkin.
3 "	Dwyer, Walter	Porter	6/- per day	<i>Vice</i> Carroll.
10 "	Wybourne, Mary Ann	Gatekeeper	5/- per week and free house.	<i>Vice</i> Drake.
10 "	Fulton, John	Porter	6/- per day	From Supernumerary Staff, <i>vice</i> Cracknell.
15 "	Driscoll, Mary	Gatekeeper	Free house	<i>Vice</i> Gallimore.
15 "	Driscoll, Thomas	Porter	7/- per day	From Permanent Way Branch, <i>vice</i> Gallimore.
16 "	Baker, Mary Ann	Gatekeeper	7/- per week and free house.	<i>Vice</i> May.
19 "	Daley, Thomas	Porter	6/- per day	From Supernumerary Staff, <i>vice</i> Brown.
19 "	Lithgow, William	"	6/6 per day	<i>Vice</i> Hart.
22 "	Kiss, John A.	Telegraph Probationer	2/6 per week	<i>Vice</i> Arrowsmith.
26 "	Furby, William	Gatekeeper	2/6 per day	<i>Vice</i> Butlerworth.
4 June	Coll, Edward	Porter	7/- per day	From Permanent Way Branch.
3 "	Webb, Arthur	"	6/6 "	<i>Vice</i> Hancock.
6 "	Cole, Charles	Junior Porter	3/4 "	<i>Vice</i> Morgan.
7 "	Roberts, Sophia	Gatekeeper	7/- per week	<i>Vice</i> Wythe.
9 "	Wasson, William	Porter	7/- per day	From Permanent Way Branch.

Date.	Name.	Position.	Rate.	Remarks.
1890. CHIEF TRAFFIC MANAGER'S BRANCH—continued.				
9 June	Bellington, Emily	Gatekeeper	Free house	Vice Anderson.
12 "	Ongley, J. H.	Porter	3/4 per day	Vice Downey.
1 "	Langford, Henry	"	7/-	From Permanent Way Branch.
13 "	Fairbanks, Ernest	"	7/-	" "
13 "	Woodward, William	Gatekeeper	25/- per week	Vice Kenny.
14 "	Payne, Eli	Porter	7/- per day	From Permanent Way Branch.
16 "	Hunter, William	"	6/-	Vice Whalan.
19 "	Jeffries, Alice	Gatekeeper	Free house	Vice Lamb.
20 "	Bull, John	Porter	6/- per day	Vice Cameron.
20 "	Trives, Margaret	Gatekeeper	25/- per week	Vice Adair.
22 "	Taylor, John	Porter	7/- per day	From Permanent-Way Branch.
23 "	M'Carthy, James	"	7/-	" "
23 "	Harvey, James	"	6/-	Vice Stafford.
26 "	Ford, Walter	Shunter	7/-	From Supernumerary Staff, vice Carlyle.
25 "	Gehan, Herbert	Gatekeeper	15/- per week	Vice Brazil.
27 "	Hines, Bridget	"	Free house	Vice Richardson.
27 "	Marshall, Henry	"	7/- per week	Vice Doughan.
29 "	Bult, Lavina	"	7/-	Vice Scholes.
30 "	M'Kay, James	"	10/-	Vice Kent.
30 "	Martin, F. R.	Clerk	£75 per annum	From Secretary's Office.
25 Jan.	Puckett, Catherine	Gatekeeper	7/- per week	
18 Feb.	Bond, Frank	Porter	7/- per day	From Tramways.
COMPTROLLER OF STORES' BRANCH.				
27 May	Dwyer, John	Labourer	6/- per day	Re-employed.
12 June	Hanson, Eustace H.	Clerk	£30 per annum.	
27 "	M'Auley, George H.	"	£30	
ESTATE AND PROPERTY BRANCH.				
Nil.				
SIGNAL AND INTERLOCKING BRANCH.				
Nil.				
TRAMWAYS—LOCOMOTIVE BRANCH.				
24 April	Russell, Thomas	Cleaner	4/- per day	Vice M'Ginley.
26 "	Williams, Charles	Apprentice	10d.	Vice Cullen.
20 May	Faireloff, Ernest J.	Cleaner	4/-	Vice Logan.
5 June	Pert, Alexander	Labourer	6/6	Vice R. Scott.
5 "	Luig, Walter	Cleaner	4/-	Vice Wilson.
14 "	Clarke, Archibald	Carpenter	9/6	Vice C. Ford.
23 "	Roe, John	Watchman	7/-	Vice Bristowe.
24 "	Fletcher, Herbert	Assistant Oiler	3/-	Vice Boden.
27 "	Young, Chas. P.	Cleaner	2/-	From Supernumerary Staff.
27 "	Quirk, John	"	2/-	" "
27 "	Richardson, Walter	"	4/-	" "
27 "	Fleming, William J.	Shop Boy	2/3	" "
27 "	Walsh, Chas. E.	"	4/-	" "
27 "	Jones, Albert	Plumber	9/6	" "
27 "	O'Maley, William	"	6/-	" "
27 "	O'Keefe, Henry W.	"	4/-	" "
27 "	Ewan, Alfred H.	"	4/-	" "
27 "	Walker, John T.	"	4/-	" "
27 "	Smith, Thomas W.	"	2/6	" "
28 "	Toby, Albert E.	"	4/-	" "
28 "	Horsfield, William	Cleaner	4/-	" "
28 "	White, Henry	"	4/-	" "
30 "	Ware, Albert S.	"	2/-	" "
TRAMWAYS—TRAFFIC BRANCH.				
Nil.				
TRAMWAYS—MAINTENANCE BRANCH.				
27 June	Beckett, Henry W.	Labourer	6/6 per day	From Supernumerary Staff.
27 "	Kirchner, John	"	6/6	" "
27 "	Boulton, William	"	6/6	" "

## APPENDIX IV.

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Removals of Employees, from the 1st of April to the 30th of June, 1890.

Date.	Name.	Position.	Rate.	Remarks.
1890.				
SECRETARYS' BRANCH.				
1 June	Martin, F. R.	Clerk	£75 per annum	Transferred to Traffic Branch
CHIEF ACCOUNTANT'S BRANCH.				
Nil.				
TRAFFIC AUDITOR'S BRANCH.				
23 June	Thornton, Henry	Clerk	£10 per annum	Resigned.
ENGINEER FOR EXISTING LINES' BRANCH.				
2 April	Rickards, Charles	Fettler	7/6 per day	Resigned.
4 "	Richards, Thomas	Ganger	9/-	Deceased.
5 "	Bowen, William	Labourer	6/6	Resigned.
8 "	Boddington, Isaac	"	7/6	"
10 "	Johnson, John	Fettler	9/-	"
10 "	Johnstone, Alfred	"	7/6	"
11 "	New, Alfred	"	9/-	"
14 "	Hopkin, Henry	Labourer	7/6	Transferred to Traffic Branch
22 "	Russell, Peter	Fettler	7/6	Discharged.
29 "	Nelson, Thomas	Ganger	9/-	"
30 "	Daniells, Geo.	Carpenter	8/-	Deceased.
7 Feb.	Crossingham, James	Labourer	7/-	"
20 Mar.	Clifford, John	"	7/-	Resigned.
8 May	Driscoll, Thomas	"	7/6	Transferred to Traffic Branch
9 "	Doylo, A.	"	7/-	Resigned.
15 "	Turner, W.	"	7/6	"
16 "	Lawrence, Fred.	"	7/6	"
20 "	Madden, Daniel	"	7/6	"
22 "	Woodlands, James	"	7/6	Deceased.
28 "	Coll, Edward	"	7/6	Transferred to Traffic Branch
31 "	McKay, James	"	7/6	Discharged.
1 June	Langford, Henry	Ganger	9/-	Transferred to Traffic Branch
4 "	Heltor, John	Labourer	7/6	Deceased.
7 "	Wasson, William	"	7/6	Transferred to Traffic Branch
9 "	Martin, David	"	7/6	Deceased.
10 "	Tonkin, Ernest	Improver	4/-	Transferred to Locomotive Branch.
12 "	Bigwood, George	Striker	7/6	Resigned.
13 "	Fairbanks, Ernest	Labourer	7/-	Transferred to Traffic Branch
14 "	Payne, Eli	"	7/6	"
14 "	Harvey, James	"	7/6	"
16 "	Fielding, James	"	7/6	Discharged.
16 "	Taylor, John	"	7/6	Transferred to Traffic Branch
17 "	McCarthy, James	"	7/6	"
LOCOMOTIVE ENGINEER'S BRANCH.				
1 April	Perrau, Maurice	Clerk	£125 per annum	Retired.
15 "	Hickson, John	Fitter	10/8 per day	Incapacitated.
23 "	Nichols, Robert G.	Storeman	7/-	Discharged.
28 "	Poole, Frank	Apprentice	5/-	Deceased.
10 May	Doody, Joseph	Office Boy	12/6 per week	Discharged.
10 "	Morrison, George	Striker	7/- per day	"
13 "	Buchanan, John	Fireman	10/-	"
13 "	Farnham, John	Driver	14/-	"
13 "	Hearn, Samuel	Fitter	12/4	Resigned.
13 "	Nightingale, David	"	10/2	"
15 "	Madden, William	"	10/-	Discharged.
16 "	Munroe, David	Labourer	7/-	"
28 "	Ashbury, Thomas	Fireman	10/-	Deceased.
1 June	Broad, Albert E.	Draftsman	£110 per annum	Resigned.
4 "	Cook, James	Labourer	7/6 per day	Deceased.
12 "	McVie, Thomas	Pumper	8/-	Resigned.
17 "	North, John	Globe-cleaner	3/6	Discharged.
25 "	Mays, Robert	Fireman	8/-	"
26 "	Day, Percy	"	8/-	"
22 May	Mills, James H.	Labourer	7/-	Resigned.
CHIEF TRAFFIC MANAGER'S BRANCH.				
16 Mar.	Richards, Mrs.	Gatekeeper	7/ per week	Resigned.
2 April	Graham, Bridget	"	15/-	"
5 "	Davies, Isaac	Head Shunter	10/- per day	"
6 "	Regan, William	Gatekeeper	5/-	Discharged.
8 "	Colquhoun, William	"	45/- per week	"
12 "	Dymond, Thomas	Night Officer	£120 per annum	"
13 "	Berkeley, Mrs.	Gatekeeper	Free house	Retrenchment.
13 "	Costello, Jennie	"	"	Resigned.
16 "	Abbott, John T.	Operator	£125 per annum	Discharged.
16 "	Gallimore, Frank	Porter	7/- per day	Resigned.
16 "	Gallimore, Lillian	Gatekeeper	Free house	"
18 "	Lidden, Mrs.	"	25/- per week and free house.	Discharged.

Date.	Name.	Position.	Rate.	Remarks.
CHIEF TRAFFIC MANAGER'S BRANCH—continued.				
20 April	Whitely, Grace	Gatekeeper	Free house	Resigned.
21 "	Phelan, Samuel	Guard	12/- per day	Retired.
23 "	Jones, George	Porter	7/- "	Discharged.
25 "	Adair, John	Gatekeeper	30/- per week	Retired.
30 "	Larkin, Margaret	"	2/6 " and free house.	Resigned.
1 May	Allen, Richard	Clerk	£125 per annum	Transferred to Locomotive Branch.
6 "	Morgan, Charles	Night Officer	£130 "	Discharged.
9 "	Butterworth, Herbert	Gatekeeper	2/6 per day	Transferred to Locomotive Branch.
10 "	Cracknell, Edward C.	Night Officer	£120 per annum	Discharged.
10 "	Drake, Catherino	Gatekeeper	5/- per week and free house.	Resigned.
10 "	Thompson, Samuel	Shunter	7/6 per day	Discharged.
12 "	Carroll, James	Porter	6/- "	"
12 "	Hart, William	"	7/- "	"
15 "	May, Charles	Gatekeeper	10/- per week and free house.	"
19 "	Brown, Samuel	Porter	7/- per day	"
27 "	Carlisle, J.	Foreman	£200 per annum	Deceased.
28 "	Stafford, Edwin	Porter	7/- per day	"
6 June	Irwin, George	Assistant Guard	8/6 "	Discharged.
6 "	Wythe, Jane	Gatekeeper	7/- per week	Resigned.
7 "	Anderson, Caroline	"	Free house	"
10 "	Richards, Thomas	Porter	7/- per day	Deceased.
11 "	White, John	"	7/- "	"
12 "	Kenny, Mary	Gatekeeper	15/- per week	Resigned.
13 "	Whalan, F.	Porter	7/- per day	Discharged.
13 "	Downey, John	Junior Porter	30/- per week	Resigned.
20 "	Parsons, John A.	Acting Night Officer	6/- per day	Discharged.
25 "	Brazil, Patrick	Gatekeeper	30/- per week	"
26 "	Richardson, Mary Ann	"	Free house	Resigned.
26 "	Cameron, Donald	Porter	5/- per day	Transferred to Locomotive Branch.
27 "	Doughan, Mrs.	Gatekeeper	Free house	Resigned.
29 "	Scholes, Ellen	"	7/- per week	Discharged.
30 "	Kent, Sophia	"	10/- "	Resigned.
7 April	Wrightson, Jane	"	2/6 per week and free house.	"
18 "	Campey, Mrs. J.	"	Free house	"
8 May	Ross, Fanny	"	7/- per week	"
27 "	Hancock, Herbert	Junior Porter	5/- per day	Discharged.
31 "	Fletcher, James	Officer-in-charge	£140 per annum	"
31 "	Langford, Henry	Porter	7/- per day	"
2 June	Hilder, H.	Signalman	8/- "	Deceased.
12 "	Cromack, Mrs.	Gatekeeper	7/- per week	Discharged.
16 "	Greig, James	"	7/- per day	"
17 "	Griffiths, John	Clerk	£110 per annum	"
19 "	Lamb, Rose	Gatekeeper	Free house	Resigned.
19 "	Ryan, J. J.	Porter	7/- per day	Discharged.
19 "	Maloney, James	Gatekeeper	30/- per week	"
26 "	Carlyle, George	Shunter	7/6 per day	"
COMPTROLLER OF STORES BRANCH. Nil.				
ESTATE AND PROPERTY BRANCH. Nil.				
SIGNAL AND INTERLOCKING BRANCH.				
9 June	Coburn, William	Blacksmith	9/- per day	Resigned.
28 "	Whalley, Charles	Labourer	7/6 "	"
TRAMWAYS—LOCOMOTIVE BRANCH.				
7 April	McGinley, Neil	Cleaner	6/- per day	Left.
12 "	Williams, Thomas	Labourer	7/- "	Discharged.
19 "	Cullen, Robert J.	Apprentice	2/6 "	Resigned.
13 "	Boden, Samuel	Fireman	9/- "	Left.
27 "	McCaffery, Henry	Fitter	10/2 "	Deceased.
3 June	Ford, Charles	Car Builder	10/6 "	Discharged.
12 "	Whittaker, Joshua	Car Examiner	13/4 "	Resigned.
19 "	Pedrotta, Hugh	Cleaner	6/6 "	Discharged.
20 "	Bristowe, George	Watchman	7/- "	Resigned.
24 "	Watsford, William	Apprentice	1/0 "	"
TRAMWAYS—TRAFFIC BRANCH.				
18 Feb.	Bond, Frank	Assistant conductor	7/- per day	Transferred to railways.
8 April	Scott, Ambrose	"	8/- "	Discharged.
30 June	Tyrer, W. H.	Clerk	£52 per annum	Transferred to Secretary's Office.
TRAMWAYS—MAINTENANCE BRANCH. Nil.				

1890.

## NEW SOUTH WALES.

**RAILWAYS AND TRAMWAYS.**

(REPORT OF RAILWAY COMMISSIONERS FOR QUARTER ENDING 30 SEPTEMBER, 1890.)

Presented to Parliament, pursuant to Act 51 Vic. No. 35, sec. 44.

Offices of the Railway Commissioners of New South Wales,  
Sydney, 28 October, 1890.

TO THE HONORABLE THE MINISTER OF RAILWAYS,—

Sir,

In accordance with the provisions of the 44th clause of the Railway Act of 1888, 51 Vic. No. 35, we have the honor to submit, for the information of Parliament, our Report for the quarter ending the 30th of September, 1890, upon the subjects specified, viz. :—

- (I.) "The state of the traffic returns, with the approximate cost and earnings of trains per ton per train mile, in respect of goods and passengers, respectively, carried during the past quarter."
- (II.) "The general condition of the lines, and accommodation for the traffic."
- (III.) "The special rates (if any) which have been made, and the reasons for making such rates."
- (IV.) "The appointments and removals, with the circumstances attending each case."

## I.—STATE OF THE TRAFFIC.

Railways.	Quarter ending 30th September, 1889.	Quarter ending 30th September, 1890.
Miles open ... ..	*	2,182
Revenue from all sources ... ..	£629,464	£655,172
Expenditure ... ..	£405,111	£430,437
Train miles run ... ..	2,020,449	2,054,340
Earnings per train mile ... ..	74.77	76.54
Expenditure per train mile ... ..	48.12	50.29
Percentage—Expenditure to earnings ... ..	64.36	65.70
Number of passengers ... ..	4,126,915	4,458,478
Tonnage of goods traffic ... ..	997,424	881,384
Tonnage of live stock traffic ... ..	28,388	30,471

NOTE.—Information as to the cost and earnings of trains per ton per mile cannot be given for goods and passengers separately, as a large proportion of the train mileage is used for carrying both goods and passenger traffic.

\* This column shows the adjusted figures after final settlement of accounts for the quarter.

772—A

[1,453 copies—Approximate cost of printing (labour and material), £15 10s. 0d.]

Tranways.	Quarter ending 30th September, 1889.	Quarter ending 30th September, 1890.
Miles open ... ..	* 39½	39½
Revenue from all sources ... ..	£65,111	£67,597
Expenditure ... ..	£51,880	£52,094
Train miles run ... ..	403,183	421,249
Earnings per train mile ... ..	38·75	38·51
Expenditure per train mile ... ..	30·88	29·68
Percentage—Expenditure to earnings ... ..	79·68	77·06
Number of fares collected ... ..	14,701,282	15,556,749

\* This column shows the adjusted figures after final settlement of accounts for the quarter.

## II.—CONDITION OF THE LINES.

A report as to the condition of the lines will be found as an Appendix, page 4.

## III.—SPECIAL RATES.

A statement of the Special Rates, and the reasons for making the same, will be found attached, Appendix, page 5.

## IV.—STAFF.

These Returns are given as an Appendix, pages 5 to 10.

## GENERAL REMARKS.

The traffic for the quarter shows an increase of £25,708, the passenger branch contributing £22,690 towards this result, 331,563 additional passengers having been carried.

The Maritime Strike, which began on the 15th of August, and which was soon after followed by the stoppage of work at the collieries in the Newcastle, South Coast and Lithgow Districts, has seriously interfered with the revenue from the Goods Department, the mineral traffic showing a decrease of 168,765 tons, whilst in wool only 62,395 bales were carried during the quarter to Darling Harbour, Newcastle, and Morpeth, a decrease of 25,086 bales.

Extra work on the permanent-way in repairing the damage done by the floods during the winter season has increased the working expenses in that Department for the current quarter by over £15,000.

The traffic expenses also show a considerable increase in consequence of additional staff employed owing to the extension of the absolute-block, tablet, and interlocking systems, and concessions granted to the staff.

CONDITION

CONDITION OF THE LINES AND ACCOMMODATION FOR THE TRAFFIC.

Special steps continue to be taken in improving the condition of the lines, and a considerable amount of relaying and reballasting has been done.

The accommodation for traffic has been improved in various directions.

TRAMWAYS.

The working of the Tramways continues to show improved results.

We have the honor to be,

Sir,

Your most obedient Servants,

E. M. G. EDDY,  
Chief Commissioner.

W. M. FEHON,  
Commissioner.

CHARLES OLIVER,  
Commissioner.

## APPENDICES.

## APPENDIX I.

## Minute from the Acting Engineer for Existing Lines to the Secretary to the Railway Commissioners.

New South Wales Government Railways,  
Engineer for Existing Lines Branch, Sydney, 23 October, 1890.

*Subject* :—Report on Condition of Lines for the quarter ending the 30th September, 1890.

I HAVE the honor to report as follows on the condition of the Railways for the quarter ending the 30th of September, 1890 :—

During the quarter many portions of the Permanent-way, which had become defective in consequence of continuous heavy rains, have been repaired, and I hope, if the weather will permit, to dispense with all notices for the reduction of speed on that account, in a very short time.

The work of reconstructing the Western Line, near Bourke, will now be pushed on rapidly, and more waterway openings provided.

The heavy slips on the Mudgee, Northern, and Illawarra Lines have received every attention, and, to prevent stoppages from slips on the Mudgee Line, the work of deviating the worst portions has been commenced. The Illawarra Line has also received special attention with respect to slips, particularly at Stanwell Park and Clifton.

Considerable progress has been made in re-ballasting and draining the Suburban Lines, which have been completed on both up and down lines to Burwood, as also the Northern Line, between Strathfield and Ryde.

Relaying and resleepering have also made considerable progress generally, but the work is still delayed through slow delivery of sleepers, caused by the contractors being unable to get them from the bush.

The duplication works are making rapid progress especially on the Illawarra section. The portion from Oatley's to Como Station, as also from Sutherland to Heathcote will be open for traffic in the course of a few weeks.

The Southern Line from Granville Junction to Picton is also in a forward condition, the whole of the earthwork in the cuttings having been completed, a considerable portion of ballasting done, and a large number of bridges and platform walls built. Owing to the difficulty in procuring sleepers the laying down of permanent-way has been retarded.

The duplication between Teralba and Adamstown has also progressed in a satisfactory manner, and the work of ballasting and laying permanent-way, which is in hand, only remains to complete the section.

The duplication from Strathfield to Ryde is also in an advanced state.

The quadruplication of the line from Eveleigh to Macdonaldtown is being carried out with considerable energy by the contractor.

The contract for connecting the Northern and Southern Lines by a curve at Homebush, as also the quadruplication of the line to Strathfield, has been let and is progressing satisfactorily.

Tenders have also been invited for quadrupling the line from Macdonaldtown to Lewisham to include the Petersham Viaduct.

The deviations necessary for improving the mountain curves between Springwood and Katoomba are also well in hand.

Several buildings have been completed and a large number of others are progressing satisfactorily.

J. ANGUS,  
Acting Engineer.

APPENDIX

## APPENDIX II.

## New South Wales Government Railways.

STATEMENT, in accordance with clause No. 44 of the Railway Act, showing the special rates which have been made, and the reasons for making such rates, quarter ending 30th September, 1890.

Article.	Rate.	Reason for such Rate.
"Eureka" (Meal) .....	"A" rate and conditions. A new article of consumption.	To provide rate.
Grass Rops.....	First-class rate and conditions .....	To secure traffic.
Haulage of goods (mostly gravel) in 4-wheeled trucks on the Greenwood Tram-line.	1s. per truck, subject to usual demurrage charges .....	do
Coal, from Greta Colliery to Newcastle.	1s. 8½d. per ton if less than 150,000 tons is sent per year, and 1s. 7½d. per ton if over that quantity. The company to haul by their own locomotive the coal between the pit and railway junction.	To increase traffic.
Coal.....	Hauled over the branch line of the Centennial Coal and Coke Company at Curlewis, other than for Railway Department. The Curlewis distance plus 2 miles.	To provide charge for new service.
Coal for shipment, carried in Commissioners' hopper trucks to Bullock Island or Darling Harbour.	Ordinary rates to be charged as per classification, and a charge of 3d. per ton to be added for the use of the cranes.	
Coal.....	Hauled over the branch line of the Centennial Coal and Coke Company for the Railway Department. From the pit to Curlewis, 1s. per truck; minimum, 6 tons; empty trucks, free.	do do
Gravel.....	Coolabah to Bourke, 3s. 9d. per ton.....	To facilitate repair of damage to public roads caused by floods.
Biscuits, Newcastle to Sydney .....	1st class, 35s. 5d. per ton in 4-wheeled trucks; minimum, 5 tons; and loaded by senders.	To secure traffic.
Oysters .....	Wallangarra to Sydney, £24 per truck of 6 tons; and proportionate rate from Sydney to Albury.	do
Milk .....	In owner's vans, 10d. per mile; minimum, 30s. per truck.	To increase traffic.
Fresh Fruit and Flour .....	From Sydney to Brisbane, 45s. per ton; minimum of 2 tons.	To secure traffic.
Wood Blocks (rough) .....	For Municipal Council, Waterloo, from Kingswood to Alexandria Siding, "M" rates.	To increase traffic.
1st, 2nd, and 3rd Class Goods.....	From Sydney to Melbourne, and <i>vice versa</i> , £7 per ton, or £29 per 4-wheeled truck load of 6 tons. Freight to be apportioned on mileage basis, and each Colony to Way-bill the goods according to its own classification.	do
Woolpacks and Bags.....	Going into the country to be filled. Actual weight, "B" rate.	Continuation of concessions to agriculturists.

## APPENDIX III.

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Appointments of Employees from 1st of July to 30th September, 1890.

Date.	Name.	Position.	Rate.	Remarks.
SECRETARY'S BRANCH.				
25 Aug. ...	Burbidge, Alfred J. ....	Shorthand Clerk .....	£156 per annum	Vice W. Azzoni.
28 July ...	Moore, G. M. ....	" .....	£225 "	
28 " ...	Bray, J. V. ....	" .....	£200 "	
CHIEF ACCOUNTANT'S BRANCH.				
Nil.				
TRAFFIC AUDITOR'S BRANCH.				
17 Sept. ...	Crawford W. ....	Apprentice Clerk.....	£80 per annum...	
19 " ...	Jobson, A. ....	" .....	£30 "	
ENGINEER FOR EXISTING LINES BRANCH.				
14 July ...	Burnett, Jackson .....	Ballast Guard .....	8/6 per day .....	From Traffic Branch.
7 Aug. ...	Patterson, Walter .....	Clerk.....	£150 per annum	From Interlocking Branch.
19 " ...	Taylor, John .....	Labourer .....	7/6 per day .....	From Traffic Branch.
1 Sept. ...	Deans, Peter .....	Chief Inspector .....	£280 per annum	From Tramways.
15 Sept. ...	Azzoni, Walter .....	Clerk.....	£180 "	From Secretary's Branch.

Date.	Name.	Position.	Rate.	Remarks.
LOCOMOTIVE ENGINEER'S BRANCH.				
4 July	M'Gregor, A.	Labourer	6/6 per day	Vice Munroe.
4 "	Robins, Chris.	Boy Labourer	2/6 "	" Cook
7 "	Black, John	Globe Cleaner	5/- "	" North.
8 "	Cook, George	Storeman	8/- "	From Permanent Way Branch.
9 "	Lovett, Walter	Plumber	10/8 "	" "
9 "	Cotterill, William	"	10/8 "	" "
10 "	Mays, Robert	Fuelman	8/- "	Re-employed.
11 "	Watson, John	Plumber	10/8 "	From Permanent Way Branch.
11 "	West, John	"	10/8 "	" "
11 "	Wright, Stephen	"	10/8 "	" "
11 "	Youl, John	Labourer	7/6 "	" "
11 "	Boylan James	Plumber	10/8 "	" "
11 "	Lynch, Thomas	"	10/8 "	" "
11 "	McLean, Malcolm	"	10/- "	" "
11 "	Williams, Phillip	"	12/- "	" "
11 "	Cordy, John	"	9/6 "	" "
11 "	Nogus, Henry	Assistant	6/- "	" "
11 "	Emmett, Frederick	"	4/- "	" "
11 "	Seymour, William	Labourer	7/6 "	" "
11 "	Armstrong, William	"	7/6 "	" "
11 "	Frost William	Boy Labourer	4/- "	" "
11 "	Fuller, Henry	Labourer	7/6 "	" "
14 "	Dowling, John	Cleaner	4/9 "	" "
15 "	Grills, Richard	Labourer	7/- "	" "
16 "	Buchanan, J.	Fireman	8/- "	Reinstated.
16 "	Farnham, J.	"	9/- "	" "
25 "	Carpenter, Ralph	Labourer	7/- "	From Permanent Way Branch.
31 "	Irwin, Peter	"	7/- "	" "
1 Aug.	Cundy William	"	7/6 "	" "
4 "	O'Brien, John	"	6/6 "	Vice Winter.
9 "	Knight, William J.	Painter	10/- "	From Tramways, vice Roberts.
11 "	Nevison, William	Gland Packer	8/- "	Reinstated.
11 "	Pattie, David	Tinsmith	10/8 "	From Permanent Way Branch.
11 "	Wright, Thomas	"	10/8 "	" "
12 "	Christie, Alexander	Fitter	10/- "	Vice Carson.
19 "	Rogers, James	Fuelman	6/6 "	" Holland.
20 "	Homer, Charles	"	6/6 "	" Ryan.
22 "	Rungo, Mrs.	Caretaker	20/- per week	To clean Driver's Barracks.
29 "	Genge, Samuel	Plumber	10/6 per day	From Permanent Way Branch.
29 "	Hampton, Aaron	Assistant Plumber	8/- "	" "
29 "	Way, Alfred	Tinsmith	10/- "	" "
17 Sept.	Chalmers, George	Fitter	10/- "	Vice Lander.
17 "	Fox, Edward P.	Junior Clerk	£120 per annum	From Stores Branch.
26 "	Cox, James	Tinsmith	10/6 per day	From Permanent Way Branch.
26 "	Ellwood, Charles	"	10/6 "	" "
CHIEF TRAFFIC MANAGER'S BRANCH.				
2 July	Carroll James	Porter	6/- per day	Vice Ryan.
5 "	McCormack, William	"	7/- "	From Permanent Way Branch.
5 "	Kelly, E.	"	7/- "	" "
7 "	Adams, F. L.	Apprentice Clerk	£50 per annum	From Tramways.
8 "	Parish, Mary	Gatekeeper	7/- per week	Vice Hamil.
9 "	Witt, William	Porter	7/- per day	From Permanent Way Branch.
11 "	Keane, James	Flagman	7/6 "	From Interlocking Branch.
11 "	Reid, George	Porter	7/- "	From Permanent Way Branch.
15 "	Irwin, George	Assistant Guard	8/6 "	Re-employed.
15 "	Dwyer, John	Line Inspector	£180 per annum	From Telegraph Department
20 "	Meehan, Lizzie	Gatekeeper	7/6 per week and house	Vice Mrs. Meehan.
21 "	Denshire, Percy	"	7/- per week	New Gates.
28 "	Coombes, Ephraim	Porter	6/- per day	Vice M'Cartie.
28 "	Wheeler, Edwin	Operator	£125 per annum	Re-employed.
29 "	Bolton, William	Porter	7/- per day	From Permanent Way Branch.
30 "	Gow, Arthur	"	6/- "	Vice Harvey.
31 "	Fleming, John	Shunter	7/6 "	From Locomotive Branch.
1 Aug.	Farmer, George	Porter	7/- "	From Permanent Way Branch.
8 "	Devine, Mary	Gatekeeper	7/- per week	Vice Taylor.
4 "	Rowland, William E.	Porter	7/- per day	From Permanent Way Branch.
7 "	Heathcote, Maria	Gatekeeper	7/- per week	Vice Pearce.
12 "	Barton, Jane	"	Free house	"
20 "	Holland, Frederick	Shunter	7/6 per day	From Locomotive Branch.
21 "	Fisher, George	Porter	7/- "	From Permanent Way Branch.

Date.	Name.	Position.	Rate.	Remarks.
<b>CHIEF TRAFFIC MANAGER'S BRANCH—continued.</b>				
23 Aug. ...	White, Theresa .....	Gatekeeper .....	7/- per week .....	Vice Seery.
25 " ...	M'Ghee, Robert .....	Porter .....	7/- per day .....	From Permanent Way Branch.
26 " ...	Bult, Elizabeth .....	Gatekeeper .....	Free house .....	Vice M'Mahon.
1 Sept. ...	Townley, John W. ....	Clerk .....	£165 per annum .....	From Locomotive Branch.
2 " ...	Green, James .....	Porter .....	7/- per day .....	From Permanent Way Branch.
4 " ...	Stevenson, J. H. ....	Shunter .....	7/-6 " .....	Vice Nulty.
13 " ...	Walker, Sarah Ann .....	Gatekeeper .....	Free house .....	
20 " ...	Forrest, Percy W. ....	" .....	6/- per day .....	Vice Watson.
25 " ...	Pully, Mary Jane .....	" .....	7/- per week .....	" Lodge.
<b>COMPTROLLER OF STORES BRANCH.</b>				
16 Sept. ...	Barr, Thomas H. ....	Apprentice Clerk .....	£30 per annum .....	Vice E. Fox.
16 " ...	Hogg, William .....	" .....	£30 " .....	"
<b>SIGNAL AND INTERLOCKING BRANCH.</b>				
4 July ...	Martin, Benjamin .....	Patternmaker .....	11/- per day .....	From Permanent Way Branch.
15 " ...	Hewitt, John .....	Labourer .....	7/- " .....	From Traffic Branch.
7 Aug. ...	Donges, Henry .....	Clerk .....	£150 per annum .....	From Supernumerary Staff, vice Patterson.
1 Sept. ...	Coburn, William .....	Labourer .....	9/- per day .....	Re-employed.
<b>PROPERTY AND ESTATE BRANCH.</b>				
Nil.				
<b>TRAMWAYS—LOCOMOTIVE BRANCH.</b>				
1 July ...	Bonfield, F. G. ....	Cleaner .....	3/- per day .....	From Supernumerary Staff.
1 " ...	Hunt, Percy .....	" .....	3/- " .....	" "
1 " ...	Boxall, Charles .....	" .....	3/- " .....	" "
1 " ...	Chambers, Thomas .....	" .....	4/6 " .....	" "
11 " ...	Stokoe, John .....	" .....	3/- " .....	" "
11 " ...	Hippett, Jesse .....	" .....	4/6 " .....	" "
17 " ...	Vargen, Herbert .....	Fitter .....	10/- " .....	Vice M'Caffery.
25 " ...	Outridge, George .....	Cleaner .....	4/6 " .....	From Supernumerary Staff.
25 " ...	Hinson, R. ....	" .....	4/6 " .....	" "
25 " ...	Beckhouse, F. ....	" .....	3/- " .....	" "
25 " ...	Boyd, James .....	" .....	7/- " .....	" "
10 Sept. ...	Luker, George .....	Fitter .....	10/- " .....	From Loco., Railways.
29 " ...	Moon, Arthur .....	Apprentice Clerk .....	£30 per annum .....	Vice Adams.
<b>TRAMWAYS—TRAFFIC BRANCH.</b>				
1 Aug. ...	Collins, Noah .....	Car Cleaner .....	6/6 per day .....	Re-employed.
2 Sept. ...	O'Leary, Herbert .....	Pointsman .....	7/6 " .....	Vice Williams.
2 " ...	Dawce, William C. ....	Car Cleaner .....	6/6 " .....	" Cook.
<b>TRAMWAYS—MAINTENANCE BRANCH.</b>				
1 Sept. ...	Silcocks, Edward .....	Inspector .....	£250 per annum .....	From Railways, vice Deans.

## APPENDIX IV.

## NEW SOUTH WALES GOVERNMENT RAILWAYS AND TRAMWAYS.

RETURN, in accordance with clause No. 44 of the Railway Act, showing the Removals of Employees, from the 1st of July to the 30th of September, 1890.

Date.	Name.	Position.	Rate.	Remarks.
1890.				
<b>SECRETARY'S BRANCH.</b>				
15 Sept. ...	Azzoni, Walter .....	Clerk .....	£180 per annum .....	Transferred to Permanent Way Branch.
<b>CHIEF ACCOUNTANT'S BRANCH.</b>				
Nil.				
<b>TRAFFIC AUDITOR'S BRANCH.</b>				
20 Sept. ...	Rush, T. F. ....	Junior Clerk .....	£105 per annum .....	Deceased.
<b>ENGINEER FOR EXISTING LINES BRANCH.</b>				
3 July ...	Dodd, Thomas .....	Ganger .....	9/- per day .....	Resigned.
4 " ...	Martin, Benjamin .....	Carpenter .....	11/- " .....	Transferred to Interlocking Branch.
6 " ...	M'Cormack, William .....	Labourer .....	7/6 " .....	Transferred to Traffic Branch
5 " ...	Kelly, Thomas .....	" .....	7/6 " .....	Deceased.
5 " ...	Kelly, Edward .....	" .....	7/6 " .....	Transferred to Traffic Branch
7 " ...	Robins, Frederick .....	" .....	7/6 " .....	Discharged.
8 " ...	Witt, William .....	" .....	7/6 " .....	Transferred to Traffic Branch
8 " ...	Ross, David .....	Fettler .....	7/6 " .....	Resigned.

Date.	Name.	Position.	Rate.	Remarks.
ENGINEER FOR EXISTING LINES BRANCH—continued.				
9 July	Cook, George	Striker	7/6 per day	Transferred to Locomotive Branch.
9 "	Cotterill, William	Plumber	10/8 "	" "
9 "	Lovett, Walter	"	10/8 "	" "
11 "	Williams, Phillip	"	12/- "	" "
11 "	Watson, John	"	10/8 "	" "
11 "	West, John	"	10/8 "	" "
11 "	Lynch, Thomas	"	10/8 "	" "
11 "	Boylan, James	"	10/8 "	" "
11 "	Cordy, John	"	9/6 "	" "
11 "	M'Lean, Malcolm	"	10/- "	" "
11 "	Negus, Henry	" Assistant	6/- "	" "
11 "	Emmett, Frederick	"	4/- "	" "
11 "	Armstrong, William	Labourer	7/6 "	" "
11 "	Seymour, William	"	7/6 "	" "
11 "	Youl, John	"	7/6 "	" "
11 "	Reid, George	"	7/6 "	Transferred to Traffic Branch
11 "	Dowling, John	Boy	3/- "	Transferred to Locomotive Branch.
12 "	Russell, Peter	Labourer	7/6 "	Discharged.
12 "	Grills, Richard	"	7/6 "	Transferred to Locomotive Branch.
12 "	Allen, John	Ganger	9/- "	Resigned.
19 "	Joyce, Peter	Labourer	7/6 "	"
19 "	M'Glyn, Frederick	Fettler	7/6 "	"
25 "	Carpenter, Ralph	Labourer	7/- "	Transferred to Locomotive Branch.
26 "	Innes, Jacob	"	7/- "	Discharged.
26 "	Boulton, William	"	7/6 "	Transferred to Traffic Branch.
30 "	Irwin, Peter	"	7/6 "	Transferred to Locomotive Branch.
31 "	Lough, William	"	7/6 "	Discharged.
1 Aug.	M'Gregor, John	Fettler	7/6 "	Resigned.
2 "	Farmer, George	Carpenter	9/- "	Transferred to Traffic Branch.
2 "	Cundy, William	Labourer	7/6 "	Transferred to Locomotive Branch.
2 "	Keating, Michael	"	7/- "	Discharged.
11 "	Pattie, David	Tinsmith	10/8 "	Transferred to Locomotive Branch.
11 "	Wright, Thomas	"	10/8 "	" "
14 "	Courtaey, Edward	Labourer	7/- "	" "
14 "	Staunton, Thomas	"	7/6 "	Resigned.
15 "	Proctor, Samuel	Fettler	7/6 "	Deceased.
16 "	Rose, James	Sub-Inspector	£230 per annum	Retired.
18 "	Murphy, Daniel	Labourer	7/6 per day	Resigned.
20 "	Harris, Joseph	"	7/6 "	Deceased.
20 "	Fisher, George	"	7/- "	Transferred to Traffic Branch.
21 "	Lyons, E.	"	7/6 "	Resigned.
23 "	Merrifield, Arthur	Boy Labourer	4/- "	"
26 "	M'Ghee, Robert	Asphalter	8/6 "	Transferred to Traffic Branch.
28 "	Way, Alfred	Tinsmith	10/- "	Transferred to Locomotive Branch.
28 "	Genge, Samuel	Plumber	10/6 "	" "
28 "	Hampton, Anron	Assistant Plumber	8/- "	" "
28 "	Muldoon, Thomas	Labourer	7/6 "	Discharged.
28 "	Forrester, Peter	"	7/6 "	"
28 "	Neill, Thomas	"	7/- "	"
28 "	White, Frederick	"	7/- "	"
1 Sept.	Silcocks, Edward	Acting Chief Inspector	15/- "	Transferred to Tramways.
2 "	Green, James	Labourer	7/6 "	Transferred to Traffic Branch.
5 "	Griffiths, John	"	7/6 "	Deceased.
6 "	Cooney, John	"	7/6 "	Resigned.
11 "	Butler, Joseph	Ganger	9/- "	Discharged.
11 "	M'Phillips, Cornelius	Labourer	7/6 "	"
21 "	Phillips, Edward	"	7/6 "	Resigned.
26 "	Cox, James	Tinsmith	10/6 "	Transferred to Locomotive Branch.
26 "	Ellwood, Charles	"	10/6 "	" "
29 "	Duggan, Hugh	Ganger	8/6 "	Transferred to Contractors.
30 "	Bannard, Edward	Labourer	7/6 "	" "
30 "	Bourke, John	"	7/6 "	" "
30 "	Barrett, Thomas	"	7/6 "	" "
30 "	Byrnes, George	"	7/6 "	" "
30 "	Byrnes, Henry	"	7/6 "	" "
30 "	Pyrnes, Patrick	"	7/6 "	" "
30 "	Burton, Arthur	"	7/6 "	" "
30 "	Cook, Henry	"	7/6 "	" "
30 "	Croker, John	"	7/6 "	" "
30 "	Charlesworth, R.	"	7/6 "	" "
30 "	Collins, John	"	7/6 "	" "
30 "	Donnelly, Charles	"	7/6 "	" "
30 "	Eade, Joseph	"	7/6 "	" "
30 "	Jennie, William	"	7/6 "	" "
30 "	Jager, Jacob	"	7/6 "	" "
30 "	Laluff, Thomas	"	7/6 "	" "
30 "	Lynch, James	"	7/6 "	" "
30 "	Lynch, Michael	"	7/6 "	" "
30 "	Meloney, Michael	"	7/6 "	" "

Date.	Name.	Position.	Rate.	Remarks.
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## ENGINEER FOR EXISTING LINES BRANCH—continued.

30 Sept.	Murphy, Alexander	Labourer	7/6 per day	Transferred to Contractors,
30 "	Moore, John	"	7/6 "	" "
30 "	Nolan, Edward	"	7/6 "	" "
30 "	Noonan John	"	7/6 "	" "
30 "	O'Loughlan, John	"	7/6 "	" "
30 "	Robertson, Peter	"	7/6 "	" "
30 "	Reddan, John	"	7/6 "	" "
30 "	Rustin, John	"	7/6 "	" "
30 "	Roberts, Richard	"	7/6 "	" "
30 "	Walsh, John	"	7/6 "	" "
30 "	Conlon, John	"	7/- "	" "
30 "	Dege, Alfred	"	7/- "	" "
30 "	Coppock, Joseph	Carter	12/- "	Left Service.
30 "	Cahill, Michael	Labourer	7/6 "	" "
30 "	Davinett, George	"	7/6 "	" "
30 "	Guilfoyle, Martin	"	7/6 "	" "
30 "	Gorman, James	"	7/6 "	" "
30 "	Howe, George	"	7/6 "	" "
30 "	Hammond, Richard	"	7/6 "	" "
30 "	Hammond, Joseph	"	7/6 "	Discharged.
30 "	Harvey, Bernard	"	7/6 "	" "
30 "	M'Donald, William	"	7/6 "	" "
30 "	O'Donnell, Frank	"	7/6 "	" "
30 "	Bunyan, John	"	7/6 "	" "
30 "	Ryan, John	"	7/- "	" "
30 "	Eckersley, John	Boy	2/- "	" "
30 "	Grenan, John	Labourer	7/6 "	Resigned.
30 "	Mayhew, Thomas	"	7/6 "	" "

## LOCOMOTIVE ENGINEER'S BRANCH.

21 June	Power, James	Fitter	10/- per day	Discharged.
2 July	Nevison, William	Gland Packer	8/- "	" "
5 "	Gordon, John	Driver	15/- "	Resigned.
7 "	Hunter Robert	Fireman	8/- "	Discharged.
9 "	Holliday, Charles	Labourer	7/6 "	" "
9 "	Winter, John	Assistant Car and Waggon Examiner.	9/6 "	" "
16 "	Primrose, Frederick	Fitter's Improver	7/- "	" "
17 "	Rowlands, Samuel	Pumper	7/8 "	Resigned.
17 "	M'Guffin, Alfred	Fireman	8/- "	Discharged.
18 "	Carson, James	Fitter	10/- "	" "
23 "	Somers, John T.	Gasfitter's Assistant	5/- "	" "
25 "	Quelch, William	Fireman	10/- "	Deceased.
28 "	Roberts, James	Painter	9/8 "	" "
30 "	Lynch, David	Cleaner	6/6 "	Discharged.
30 "	Fleming, John	Brake Examiner	7/6 "	Transferred to Traffic Branch.
5 Aug.	Townley, John W.	Clerk	£165 per annum.	" "
16 "	Hankin, John	Fitter	10/- per day	Resigned.
19 "	Holland, Frederick	Fuelman	7/6 "	Transferred to Traffic Branch.
21 "	Berg, Frank O.	Labourer	7/- "	Deceased.
1 Sept.	Hughes, E.	Turner	10/- "	" "
1 "	Caunter, Robert	Clerk	£220 per annum.	Resigned.
3 "	Guerin, Denis	Striker	7/- per day	Discharged.
4 "	Lander, James	Fitter	10/- "	Deceased.
4 "	Morales, Henry	Boilermaker's Helper	7/- "	Resigned.
5 "	Ryan, John	Fuelman	7/6 "	Discharged.
9 "	Luker, George	Turner	10/- "	Transferred to Tramways.
15 "	Waterworth, Frank	Cleaner	6/6 "	Deceased.

## CHIEF TRAFFIC MANAGER'S BRANCH.

2 June	Tobin, Nicholas	Clerk	£200 per annum.	Discharged.
10 "	Fox, Thomas	"	£165 "	" "
30 "	Pridham, Walter	Probationer	2/6 per week	Resigned.
7 July	Hamil, Ann	Gatekeeper	7/- "	" "
12 "	Hewitt, John	Porter	7/- per day	Transferred to Interlocking Branch.
14 "	Burnett, Jackson	Ballast Guard	8/6 "	Transferred to Permanent Way Branch.
16 "	Curran, Thomas	Operator	£110 per annum.	Discharged.
19 "	M'Callum, Mrs.	Gatekeeper	Free house	Resigned.
20 "	Meelan, Mary	"	7/6 per week and house.	Deceased.
31 "	Rynehart, George W.	Operator	£95 per annum.	Discharged.
31 "	M'Cartie, Joseph	Porter	7/- per day	" "
31 "	Harvey, James	"	7/- "	" "
3 Aug.	Taylor, Mary	Gatekeeper	7/- per week	Resigned.
5 "	Donaldson, Frederick	Officer-in-charge	£130 per annum	Discharged.
6 "	Pearce, Annie	Gatekeeper	7/- per week	Resigned.
8 "	Nash, Mary	"	7/- "	" "
12 "	Le Messurier, Henry	Officer-in-charge.	£140 per annum	Deceased.
13 "	Burns, Mary	Gatekeeper	7/- per week	Resigned.
17 "	Skene, Henry	Porter	7/6 per day	Discharged.
19 "	Taylor, John	"	7/- "	Transferred to Permanent Way Branch.
22 "	Seery, Ellen	Gatekeeper	7/- per week	Resigned.
25 "	M'Mahon, Mrs.	"	Free house	" "
27 "	Titterton, William J.	Station-master	£270 per annum	" "

Date.	Name.	Position.	Rate.	Remarks.
<b>CHIEF TRAFFIC MANAGER'S BRANCH—continued.</b>				
31 Aug. ...	Johnson, George.....	Porter .....	7/- per day .....	Resigned.
1 Sept. ...	Armstrong, Alex. ....	Clerk .....	£200 per annum .....	Discharged.
6 " ...	Minch, Ignatius .....	Porter .....	9/- per day .....	Resigned.
12 " ...	Luxford, Mary .....	Gatekeeper .....	5/- per week and house.	"
13 " ...	Selmes, Charles .....	" .....	25/- per week .....	Retired.
15 " ...	Fullalore, John .....	Porter .....	7/- per day .....	Resigned.
18 " ...	Anthers, Louis .....	" .....	7/- " .....	Discharged.
19 " ...	Nulty, John.....	Shunter .....	7/6 " .....	"
22 " ...	Watson, M. A. ....	Gatekeeper .....	Free house .....	Resigned.
23 " ...	Bullen, E. ....	Porter .....	7/- per day .....	"
24 " ...	Lodge, Martha .....	Gatekeeper .....	7/- per week .....	"
30 " ...	Smith, Annie .....	" .....	7/- " .....	Discharged.
30 " ...	Owen, John.....	Clerk .....	£120 per annum .....	Resigned.
<b>CONTROLLER OF STORES BRANCH.</b>				
25 July ...	Meaney, Michael .....	Storeman .....	9/- per day .....	Discharged.
11 Sept. ...	Kingsmill, Charles.....	Shoe-dresser .....	8/- " .....	Retrenchment.
17 " ...	Fox, E.....	Junior Clerk.....	£100 per annum .....	Transferred to Locomotive Branch.
<b>SIGNAL AND INTERLOCKING BRANCH.</b>				
10 July ...	Kcane, James .....	Labourer .....	7/6 per day .....	Transferred to Traffic Branch.
7 Aug. ...	Patterson, Walter .....	Clerk.....	£150 per annum .....	Transferred to Permanent Way Branch.
<b>PROPERTY AND ESTATE BRANCH.</b>				
Nil.				
<b>TRAMWAYS—LOCOMOTIVE BRANCH.</b>				
7 July ...	Adams, F. L. ....	Apprentice Clerk.....	£50 per annum .....	Transferred to Railways.
27 " ...	Russell, John H.....	Cleaner .....	4/6 per day .....	Resigned.
7 Aug. ...	Knight, William J. ....	Labourer .....	7/- " .....	Transferred to Railways.
16 " ...	Cummins, Thomas J.....	Fitter .....	10/2 " .....	Resigned.
21 " ...	Branch, William .....	Driver .....	13/- " .....	Deceased.
13 Sept. ...	Crowe, Thomas .....	Labourer .....	7/- " .....	Left.
20 " ...	M'Cauley Patrick .....	Fuelman .....	7/- " .....	Discharged.
<b>TRAMWAYS—TRAFFIC BRANCH.</b>				
31 July ...	Campbell, William.....	Assistant Conductor .....	8/- per day .....	Discharged.
31 " ...	Blanch, William.....	" .....	7/6 " .....	"
21 Aug. ...	Williams, Joseph .....	Pointsman .....	7/6 " .....	"
23 " ...	Cook, James .....	Conductor .....	9/- " .....	"
30 " ...	Huxman, George .....	Car Cleaner .....	7/- " .....	"
27 Sept. ...	Pollock, W. A. ....	Assistant Conductor .....	8/- " .....	"
<b>TRAMWAYS—MAINTENANCE BRANCH.</b>				
1 Sept. ...	Deans, Peter .....	Inspector .....	£250 per annum..	Transferred to Railways.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAYS.

(REPORT OF BOARD OF INQUIRY ON ACCIDENT AT BATHURST.)

*Ordered by the Legislative Assembly to be printed, 21 May, 1890.*  
(In substitution for paper laid on Table 14 May, 1890.)

REPORT of the Board of Inquiry appointed under the 51st section of the "Government Railways Act of 1888," together with the remarks of the Railway Commissioners thereon.

Accident to No. 26 Up Mixed Train at Bathurst, at 143 miles 62 $\frac{1}{2}$  chains from Sydney, on 25th April, 1890.

THE Report of the Board of Inquiry appointed, in accordance with the provisions of section 51 of the "Government Railways Act of 1888," to inquire into the recent accident at Bathurst, is forwarded for the information of the Minister.

The draw-bar which broke, and caused the unfortunate accident, was one of the light description which was referred to when the condition of the rolling-stock was under discussion in Parliament on the 15th August last. So far back as 1884 it appears to have been decided to replace the then existing draw gear by gear of a stronger description,—(the reasons which prompted this decision cannot, however, be stated by us, as the papers are, unfortunately, not now obtainable) and, although the defect was recognized so far back as 1884, at the close of the year 1888 only 500 waggons had been dealt with. During the year 1889 and that part of the current year which has expired the draw-gear has been changed in 627 waggons; at the present time the work is progressing at the rate of about 100 waggons per month, and the progress will shortly be accelerated, over 3,000 waggons still remaining to be done.

While forwarding this Report, we deem it necessary to allude to an attempt made at the Coroner's inquiry into the accident, to divert attention from the main point into side issues, with the evident desire to attack the present Railway management. One of the points raised was in respect to an order said to have been issued prohibiting the use of side-chains, which order has had no existence; and another point in regard to assistant guards not being run on the through goods trains.

As

As to the first question, it is well to give an extract from the official records of our action on the subject of side-chains, and also the result of a reconsideration of the whole question in September last.

The first minute was passed on a tour of inspection of the Northern lines in January, 1889, when the question of the utility of side-chains was discussed with the Officers, and the Commissioners decided that side-chains should be discontinued on all vehicles *fitted with the strongest draw-gear. Chains to remain in those vehicles having the light draw-gear until such gear was replaced.*

In August last, some members of the Amalgamated Railway and Tramway Service Association waited upon the Commissioners on various subjects regarding pay and other concessions, and the subject of side-chains was referred to as follows :—

“The deputation drew attention to a circular which had recently been issued by the Traffic Branch, instructing the men, even when side-chains were provided, that they were not to be used. The centre coupling might at any time snap, and they thought that the side-chains should be used for the protection of the men, particularly as in many cases the trains running in the distant districts were mixed trains. They had several instances, one particularly, of a train arriving at Harden where the trucks were held in three places by the side-chains only.”

The Commissioners stated in reply that they were unaware of the order referred to, but would look into the question.

The Commissioners on the 9th September last had a meeting with the Chief Traffic Manager and Locomotive Engineer, and it was found that no order of the kind referred to had been issued. The whole question of the use of side-chains was then reconsidered, and it was agreed—

“That the present description of side-chains was of little value, and if they were to be continued and looked to as an element of security, the arrangement and strengthening of same would have to be reconsidered, and that it was unnecessary to do this in view of the proposed early adoption of continuous automatic brakes on the goods stock.”

It will therefore be seen that no order has been given which in the slightest degree justifies the allegation made that something had been done by the Commissioners to reduce the security of the traffic. The *order No. 221*, dated 2nd July, 1889, issued by the Chief Traffic Manager, referred to, is a reproduction of the following order, viz. :—

“The staff are hereby informed that all vehicles fitted with the strong draw-gear are being marked with a cross (thus X), on the buffer beam on each side of the draw-bar on each end of the vehicle.

“Waggons marked in this manner are only to be single coupled.

“In cases where strong and weak couplings come together, vehicles are to be attached by the strong couplings only.

“Please acknowledge receipt.

“W. V. READ,

“Traffic Manager’s Office,

“Traffic Manager.

“Sydney, 10th February, 1888.”

This

This order was issued, as will be observed from the date, before this present administration came into office, and we fail to see any objections to its provisions.

The order that the vehicles should be attached by means of the strong coupling when a waggon so fitted came next to a waggon with weak couplings, referred to the non-user of both sets of coupling-chains, as illustrated by diagram attached hereto, and had no reference whatever to the side-chains;—this system of coupling is from experience found to be the best.

The side chains of the vehicles of which the draw-bar broke should have been hooked into the main connecting chain (the strong coupling referred to in the order quoted) of the vehicle in rear, but we quite concur with the Board of Inquiry, that had this been done the result would have been the same, the staff however, has been warned to invariably do this in future as required by rule No. 235, which is as follows:—

“COUPLING OF VEHICLES.

“Rule 235.

“Carriages or waggons must be properly coupled by the side-chains as well as the centre couplings—no side chains or couplings to be left hanging down, and no one is to pass between buffers of vehicles, but must get over or stoop under them. The lamps must be lighted, or removed when not required.”

Side-chains in goods waggons are a source of danger to the working staff, as they necessitate the shunters and guards going between the waggons to couple and uncouple, and for years past railway companies have been discontinuing their use. When the whole of the waggons are fitted with the strong draw-gear without side-chains this work can be accomplished from the side of the waggon by means of a properly constructed pole and hook. This question of risk to the working staff has occupied great attention in other parts of the world, and the English Board of Trade has pressed the subject strongly upon the railway companies; this led to the introduction of the shunting-poles, and, from returns just received from the Board of Trade, it would appear that the mode of working we are anxious to introduce, and so ensure greater safety to our men, is now almost universal in England, Wales, and Scotland, as out of a total of 15,192 guards, brakemen, and shunters employed, 13,156 are supplied with these poles.

With regard to the question of assistant guards, it was also raised without any justification. It will be seen from the Chief Traffic Manager's Report appended hereto that no change has been made in this respect for years past, and unless two brakes are run (except with local shunting trains with which two men are on duty, the object of sending the second man being solely to assist in the shunting operations at stations without reference to the brake question) there would be no advantage gained. Our stock of vans is so deficient that, if we wished, we could not supply two vans to through trains.

The stock of brake-vans is being increased as rapidly as possible, and a number of exceptionally heavy vans have recently been ordered for trains running on the heaviest parts of the lines.

In connection with the break-away at the Raglan Station, it is proper to point out that the station is situated on a very severe grade (1 in 50), and is unguarded with the security of runaway points, which would have effectually prevented the accident  
which

which occurred, as the trucks would have only been able to run a few yards before being arrested. With regard to this very important matter, we have given directions for the station to be removed a short distance nearer Sydney, where it can be placed on an easier grade, and for a double line to be provided through the station with throw-off points, as provided for by the regulations of the English Board of Trade.

We shall deal with all similar stations on the lines as speedily as possible; but so much has to be done in all Departments that time must necessarily be occupied in bringing the lines and stock up to a proper standard.

The adoption of an automatic continuous brake on the goods rolling stock is a most important matter. Had such a brake been on the train which met with the accident, the separated section would at once have been arrested. The importance of this subject was referred to as under in our last annual report, dated 31st October, 1889:—

“Looking at the severe grades upon our lines, it is very desirable to provide continuous brakes for the goods trains. The following statement, showing grades steeper than 1 in 150, and the total length of same, will show how necessary it is to have the maximum amount of controlling power upon the trains. This subject of brakes has, previously to our taking office, received special attention, and a Board reported upon the subject in May, 1887. We propose to gradually introduce a continuous automatic brake on all the goods stock.”

Since that date the South Australian Government decided to have some brake trials before settling the form of brake for use in that Colony, and, in view of the desirability of having an uniform continuous brake for Australia, as interchanging of rolling stock must come about in a few years, we endeavoured, through the Government, to get these experiments conducted by an Intercolonial Board. This, however, the South Australian Government were unable to agree to, and we then decided to carry out experiments on our own account, and the Westinghouse and Vacuum Brake Companies undertook in February last to each fit up a train, and their experiments will, we trust, be made on an early date, the Westinghouse Co. having their materials on hand, and those of the Vacuum Co. are upon a steamer which will arrive before the end of the month. When the trials are over we purpose asking that Parliament be moved to vote the needful money to fit up all the stock with this great security.

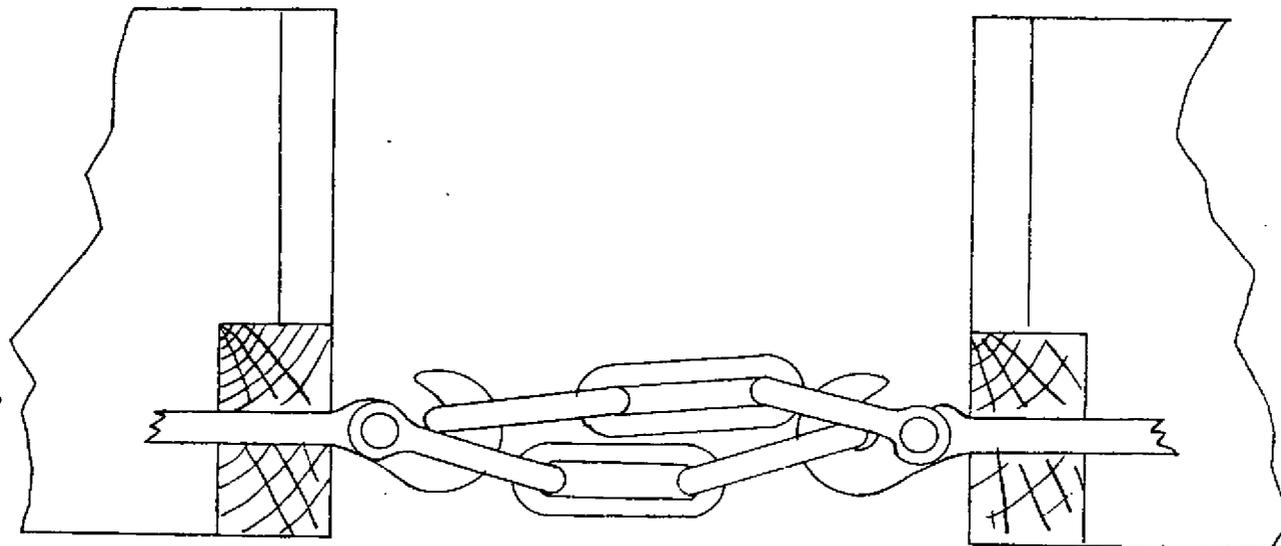
E. M. G. EDDY,  
Chief Commissioner.

W. M. FEHON,  
Commissioner.

CHARLES OLIVER,  
Commissioner.

Office of the Railway Commissioners,  
Sydney, 12th May, 1890.

*STRONG DRAW GEAR*

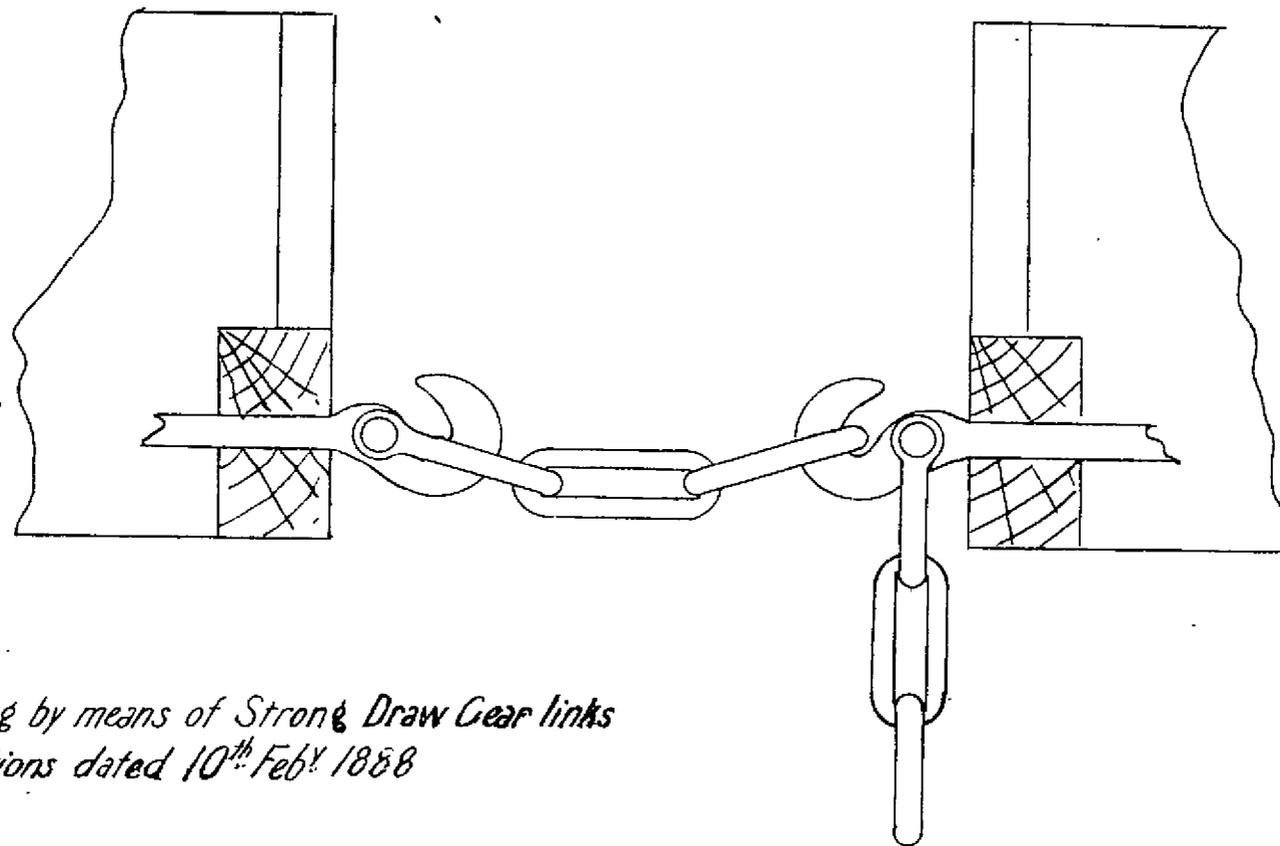


*LIGHT DRAW GEAR*

*Double Coupling in vogue prior to issue of order  
dated 10<sup>th</sup> Feb. 1888*

(166-)

*STRONG DRAW GEAR*



*LIGHT DRAW GEAR*

*Mode of Single Coupling by means of Strong Draw Gear links  
as ordered by instructions dated 10<sup>th</sup> Feb<sup>y</sup> 1888*

Chief Traffic Manager's Office, Sydney, 6 May, 1890.

I BEG to report for the information of the Commissioners that no order has ever been issued, or even contemplated, authorizing the disuse of side-chains on vehicles of any description where they are provided. And the general practice has been that where waggons with the old or light description of draw-gear have been attached to the new vehicles, which are provided with strong centre draw-gear and without side-chains, to place the coupling of the strong on the draw-hook of the light draw-gear, and to place the hooks of the side-chains on the latter in the centre chain of the other or strong gear.

With respect to the assistant guard question, I am in a position to state that no alteration has been made in the practice for the last ten years at least. Except between Penrith and Katoomba, where the gradient is of an exceptionally long and severe character, it has not been customary to provide assistant guards for through goods trains.

Where assistants have been employed on through trains, it has been simply to utilise the services of men returning to their homes, after having run either as head or assistant guards in the opposite direction, or when on their way to a station to take charge of a train.

The practice has been to provide assistant guards only on local or "pick up" trains which have a considerable amount of work to do at stations in transit.

The Secretary for Railways.

DAVID KIRKCALDIE,  
Chief Traffic Manager.

Government Railways of New South Wales,  
Sydney, 6th May, 1890.

Gentlemen,

We have the honor to report that, in accordance with your instructions of the 27th ultimo, we have held an inquiry into the cause of the accident which occurred to No. 26 Up Mixed Train from Bathurst to Penrith on the evening of the 25th April.

We find this train was due to leave Bathurst at 4:50 p.m., but did not depart until 5:40 p.m., being 50 minutes late. The train was made up as follows:—

- 1 American 8-wheeled coupled Bogie engine and tender, weighing 72 tons.
- 12 loaded goods waggons.
- 1 first-class carriage.
- 1 empty horse-box.
- 1 compo. brake-van, about 12½ tons weight.

The total weight of the train, exclusive of engine and tender, was 147 tons.

The train left Bathurst as before stated at 5:40 p.m., and arrived at Kelso at 5:46 p.m., where four waggons of goods were detached, and eight vans, containing 800 sheep were attached. The train left Kelso at 6:10 p.m., having been delayed by waiting for the arrival of a Down Goods Train, which had to be crossed. The train then consisted of:—

- 8 waggons of goods next the engine.
- 8 vans of sheep.
- 1 empty horse-box.
- 1 first-class carriage.
- 1 compo. brake-van.

The total weight of train, exclusive of engine and tender being 184 tons 4 cwt.

Nothing unusual occurred to the running of the train between Kelso and Raglan. On arriving at the latter place at 6:23 p.m. the rear end of the brake-van came to a stand at the wooden column, which supports the platform awning at the Bathurst end of the station. Immediately the train stopped, the draw-bar of the third waggon (No. 3,008) from the engine broke, and the rear portion of the train, consisting of sixteen vehicles, weighing 154¾ tons, began to move quickly backwards down the incline of 1 in 50 in the direction of Bathurst. The guard was in the brake-van and endeavoured to further screw on his brake (which was already on), but the recoil caused the waggons to move so quickly that, although the guard jumped out of his van and attempted to sprag the waggons he failed in doing so, owing to the velocity they had attained. The telegraph operator also attempted to put a waggon brake down, but was unsuccessful.

The train ran down the incline at a great speed, and was not in any way checked until it dashed into the engine of No. 28 Up Goods Train, which had just left Bathurst Station at 6:30 p.m., and had travelled about 250 yards. The collision occurred at a point about 70 yards on the east side of Russell-street level crossing, the distance from where the train broke loose at Raglan to this point being about 4 miles 4 yards; the first 2 miles 56 chains of the distance being down a gradient of 1 in 50.

The rolling stock of No. 26 train was considerably damaged, as follows:—

- Compo. brake-van completely wrecked.
- First-class carriage completely wrecked.
- Horse-box completely wrecked.
- Eight sheep-vans completely wrecked, and about 300 sheep killed.
- Goods waggons only slightly damaged.

Unfortunately, four people were killed, namely, Rebecca Franklin, Maud Radford, Michael Downey, Henry O'Connor, and three injured, viz., Mrs. Condon, William Condon, Jeremiah Noonan.

The engine of No. 28 up train was also considerably damaged, as also four waggons slightly.

The permanent way was but slightly injured.

The estimated cost of damage to rolling stock being £2,660, and the permanent way £2 17s. 6d.

Evidence.

## Evidence.

*James Palmer* : I was driver of No. 26 up goods train, which left Bathurst on night of 25th April; the number of engine being 132, an American engine; I had two firemen; we left Bathurst at 5:40 p.m., and stopped at Kelso; we detached four trucks of goods and put eight of stock on; this made up our full load; we arrived at Kelso at 5:45 and left at 6:10 p.m.: between Kelso and Raglan I had no occasion to slacken the speed of my train; it was a direct pull; I was advised by the guard to pull up at Raglan; he did not tell me for what purpose I had to pull up; it would be about 90 yards from the Sydney end of the platform where I pulled up; I pulled my train up in the usual way; the brakes on engine and tender were put on by my firemen; the firemen took up the signal given by the guard; I believe the guard showed the firemen a red light which caused them to put on the brakes; the engine came to a stand in the usual manner and I felt nothing to cause me to think that anything had taken place to the train; I felt no jerk; a jerk might have taken place without my knowledge; there must have been a recoil of the train; I was standing on the right hand side of the engine, which would be the inside of the curve, looking out for a hand signal light from the guard (as it was dark), when I noticed the side lights of the brake-van disappearing; I immediately thought the train was running back; I immediately got off the foot-plate of the engine with my hand lamp and went to the rear of the train; I found that there were three waggons (loaded waggons) attached to the rear of the tender, but that the remaining portion of the train was out of sight; the first thing that I did was to look at the couplings of the last waggon, when I found that the draw-bar was hanging half way out of the waggon head-stock; side chains were hanging down; I pulled the draw-bar out; I looked for broken end of the draw-bar three times, but could not find it; I have no idea when it was found; when I arrived at Raglan I could not see without a lamp or light to do any work; the first time I saw Guard Davis was when he came up to me where I was standing on the rails near the third truck, and the station-master came shortly afterwards; the first question I asked Davis was, "Have you blocked the road?" he said he had done so, so it shows that Davis had been to the telegraph office; I could not say what time had elapsed from the moment I pulled my engine up till I spoke to Guard Davis; I did not ask him what precaution he had taken to stop the runaway train; I could not do anything myself; I was powerless to prevent the train from running away; total number of vehicles on leaving Kelso was eighteen and brake-van; the brake-van, then the carriage—I could not say what class of carriage it was—horse-box next,—could not say whether anything was in it—eight of sheep came after the horse-box, then eight loaded goods waggons; I did not count the number of vehicles myself, but was informed by the guard; I cannot form any idea how the centre chain came off the draw-bar hook; if anything, the draw-bar and hook were inclined upwards; the position that I pointed out on ground, as where the rear end of the third waggon was standing after the runaway took place, is about as near the point as possible; this distance is about 66 feet on Sydney side of three-quarter mile post.

*By Mr. Kirkcaldie* : After the train had parted I put the engine and three trucks into siding, and remained at Raglan for orders.

*By Mr. Thow* : Engine did not move back when we stopped; I have no recollection of it on this occasion. I cannot remember that either guard or station-master suggested that I should go back after the train that broke away; the rails were in good condition on this night, and quite dry; I saw the lights of the brake-van disappearing from my side over the hill; the first indication I had of train having parted was the lights going over the hill; I have given you all the information that I possibly can on this matter. I have been an engine-driver on these lines eight years; altogether have been twenty years a driver. When I first commenced on these lines I was a third-class man; I am now a second-class driver.

JAMES PALMER, 1/5/90.

*James Palmer*, recalled. When passing Raglan Station fireman Donald was looking out for a signal and said "Whoa"; at this particular time I was steaming ahead; as soon as I heard fireman Donald sing out "Whoa" I shut the regulator put the reversing screw full forward and the two firemen applied the brakes of engine and tender; at that particular moment I do not think we were travelling more than 3 miles an hour; I cannot say how far I travelled, but the train was stopped as quickly as possible.

JAMES PALMER, 1/5/90.

*James Donald* states: On night of 25th April I was fireman on engine No. 132 of the No. 26 up goods; engine was one of the consolidated class; I am first fireman; I cannot say what time we left Bathurst, but we left Kelso at 6:10 p.m.; we did some shunting, and we picked up eight trucks of stock; I noticed nothing particular in reference to train between Kelso and Raglan; we pulled up steadily when going into Raglan Station; I cannot say what time we arrived, but I was told we arrived at about 6:23 p.m.; we were standing at Raglan about 5 or 6 minutes before I heard that a portion of the train had broken away; the driver was off the engine during this time; we had been stopped about a minute when driver had got off his engine; he returned in about 3 minutes; as the driver was getting up on the engine Guard Davis got up on the opposite side; I was then made aware that the train had broken away; the next thing that was done we put the engine and three waggons in the siding; the engine was standing about 100 yards from platform when we pulled up; I went into the office and inquired of the station-master if it was a fact that train had broken away; I knew that the van was at the platform when the train stopped as the guard gave me a red light to stop; I was on the left hand side of engine; I applied the engine brake hard on whilst we were moving ahead and when I got a red light from the guard; the engine was steaming when I saw the red light; I am positive I felt no jerk and felt nothing unusual in stopping; I cannot give any idea as to the cause of the draw-bar breaking; I have seen a little shunting; I have been a fireman five years; I have seen several draw-bars broken; I have seen them broken during shunting operations; cannot say that I have seen any draw-bar broken in running.

*By Mr. Thow* : I was subpoenaed by the Court but did not give evidence; no one asked me what information I could give; this is the first time I have been asked any question about the matter; I never heard what the driver said; I was not in the Court; the driver did not make any remark to me when he got off the engine; it was a very dark night; the engine never moved after

after we stopped at Raglan; from the conversation which I heard between the driver and the guard I made out that the train had broken away; just at the time that this conversation was going on the station-master came up and said, "There is room for the engine and three trucks in the dock;" we then shunted into the dock; this occupied only about a couple of minutes; the driver and guard then left the engine and proceeded up the line to get the drawbar; the drawbar was in the four-foot on the main line; I remained on the engine during the time the guard and driver were getting the bar; I did not see where they put the bar; the driver, on his return, told me to see that the tail-lamp was lit; after lighting the tail-lamp I went to the station to make enquiry about the breakaway.

*By Mr. Kirkcaldie:* I am perfectly certain that after the engine had passed the platform at Raglan some distance I looked back and saw a red light from the guard's van; at that moment we were still steaming ahead, and I at once said "Whoa," to the driver, and put on the engine-brake myself, and the other fireman put on the tender-brake at the same moment.

JAMES DONALD, 1/5/90.

*Thomas Prince states:*—I was one of the firemen of the No. 26 up train on night of 25th April; do not know what time I left Bathurst; do not know what time I arrived at or left Kelso; at Kelso we put off four trucks of goods and took on eight trucks of sheep; we made two or three shunts in doing this work; after leaving Kelso and before arrival at Raglan I noticed nothing unusual to the train; I was firing between Kelso and Raglan; when we arrived at Raglan I stood by the tender brake; I put the tender brake on; I believe the brake of engine was put on; I cannot say whether the tender brake was put on at the same time as the engine brake; I put tender brake on because the other fireman told me that guard had given him a red light, and the fireman sang out "whoa, whoa;" when we got the signal to stop, the engine was about opposite the sheep race; we were going very slowly when the brakes were applied we were travelling about four miles an hour when we got the signal to stop; I did not know for some considerable time that the train had broken away; it would be fully eight minutes; after the train had stopped I was going to open the fire-hole door, and I noticed the driver looking out of the cab, driver being on the right side of the engine looking back, and he suddenly asked me for the hand-lamp; I gave him a signal-lamp, and he got off the engine and went back; I watched him; I had no idea what he was going back for; I saw him disappear as I thought in between the trucks; I then went across to the firemen's side of the engine to look for the signal for starting, and saw the driver come up from the other side of the trucks; the guard came up to him and both walked up towards the engine; I did not hear what they said, and I thought we were going to do some shunting; presently I heard the station-master say, "There is room for three in the dock," and he gave us the signal to put back over the points; I thought we went back very easily and stopped easily; we then went ahead to get into the dock, and backed into the dock and stood there; after a minute or two the other fireman lit the flare-lamp, and went along the platform to the station-master's office; at that time I was not aware that anything was wrong; I thought I would go and inquire for myself what was the matter; when I arrived at the office I heard some one say that they would not mind so much if there were not some passengers in the train; I said, "What is the matter?" and the reply was, "Don't know until we get word"; from the remarks I heard made at the door I learned for the first time that the train had broken away; they were then waiting for a reply from Bathurst whether she had gone clear; a few minutes after word came that she had struck No. 28 up; everyone seemed excited that were about the station door; I waited for orders; I know the station-master asked for line clear for us to go back to Kelso; during this time the driver was at the office; word came to keep the engine at Raglan for the present; we then stood by for further orders; the driver had previously gone to see what was the cause of the accident; while I was standing at the office door I saw the driver, guard, and station-master go and pick up the drawbar, which they found about where the third truck stood after the train came to a standstill; I did not feel any unusual jerk while the train was pulling; I cannot form any idea as to what caused the drawbar to break; I could not be certain whether the driver got on to the engine again before train was put in the dock; I did not hear the conversation between the guard and driver; the guard rode on footstep of the engine; I think it was the fireman's side; I was a fireman on the leading engine of a train on one occasion when the signal was against us, and then signal was lowered for us to come in when the drawhook of second engine broke; this was between the two engines and at Lawson Station; I have been a witness to a good many drawbars breaking when shunting operations were carried on at Eskbank.

*By Mr. Kirkcaldie:* I feel satisfied that the engine was steaming until the other fireman said "Whoa," and as soon as I heard the other fireman say "Whoa" I began to apply the tender brake; I cannot tell how many yards we travelled after we put the brakes on; I fancy that while I was putting the brakes on the tender the other fireman was putting the brakes on the engine.

*By Mr. Thow:* When I arrived at the station-master's office the other fireman was there; the driver was also in the office; I had no conversation with the driver or fireman; the driver did not give me any information as to what had happened when he came back to the engine; I was not subpoenaed to appear at the Court, but was instructed by the driver that I had to be there; I did not hear the driver's evidence.

*By Mr. Kirkcaldie:* I have been four and a half years in the service; for the last five months as fireman.

THOMAS PRINCE, 1/5/90.

*Edwin Brady Davies states:*—I have been about nine years in the Railway service; I was first at Darling Harbour; I have been running assistant guard and guard for a period of about seven years; I have been running principally between Penrith and Bathurst; I have run all classes of goods trains, and have had all classes of goods brakes on; on the night of the 25th April I was guard of No. 26 up goods train from Bathurst to Penrith; my train is due to leave Bathurst at 4:50 p.m., but on the night of the accident I did not leave till 5:40 p.m.; on leaving Bathurst my train consisted of twelve loaded goods trucks, one first-class carriage, one empty horse-box and compo. brake-van, a total of fifteen vehicles altogether; I examined the whole of the couplings between the brake-van and tender of engine; I did so by going up one side of the train and down the other; the station-master gave me the word "alright" to start from Bathurst; we arrived at Kelso, time booked by me at 5:46 p.m.; at this place we detached four waggons of goods, and attached eight vans of sheep; we left Kelso at 6:10 p.m.; the reason for  
being

being so long at Kelso was owing to the delay in consequence of waiting a down goods train; we proceeded safely along the road from Kelso to Raglan; on leaving Kelso the train from the engine consisted of eight trucks of goods, eight trucks of sheep, one empty horse-box, one first-class carriage, and compo. brake-van—nineteen altogether; we proceeded safely until we arrived at Raglan station; I felt no unusual motion or jerk to my train between these two points; on approaching Raglan station I gave the signal to engine-driver with the white light, waving him forward; when I gave the signal my van would be somewhere about the gate at level crossing on the Kelso side of station; I afterwards gave the engine a red light; these signals were given on the station side of the van; when I gave my last signal the van would be about the point where my van came to a standstill. The rear end of the van came to a stand at the wooden column carrying the awning of platform at Bathurst end of station; the telegraph operator stepped right into the brake-van just about the time the brake-van came to a stand; I then found that my van was travelling backwards, and I said to the operator, "What! is she away?" At the same time that I spoke to him I had hold of the brake-wheel, and feeling that the train was travelling backwards I applied greater force to the brake; I am positive that I did not skid the wheels by applying the extra force; I am positive I put the brake on as hard as it could be; after doing this I took a sprag from the shelf and jumped out on to the right-hand side of the line; the place where I jumped out would be about 115 feet from where the brake-van had come to a stand; (this is the place I pointed out on the ground to-day as being the distance from awning-post on platform; it is as near as I can tell the spot where I jumped out;) I attempted to sprag the wheels of the first sheep-van, the third vehicle from the brake-van, but failed to do so; in doing this I was knocked over, and at the present time I feel the effects of the blow I received from the sprag; I then made three more attempts with the sprag, but I could not succeed in spragging; I then threw the sprag on to the rails in front of one of the wheels, but it was knocked off; I did not feel any recoil or sharp jerk when my train came to a stand; the only thing I felt was the train coming back, and all at once it seemed as if a great weight had come upon the brake-van; it was sufficiently dark to require to use a lamp; when I jumped out of the brake-van I thought the train had broken away, but I was not sure of it until the last vehicle had passed me; I then ran to the telegraph office and called out to wire Kelso and Bathurst.

*By Mr. Kirkcaldie:* I believe the engine was steaming ahead when I showed the red light to engine; the train was just moving ahead when I showed the red light; the train only travelled a few yards after I held it out; I did not feel any recoil of the train; have been goods guard for seven years; my experience is that I have had a goods train stop at Raglan without the slightest recoil, and have had them start away bodily, and other times drivers have attempted to start away, and have had to put back to get a start; as a rule, more often than not, I feel a certain amount of sagging and stops of the train at Raglan on the up journey, and I have known what I call sagging, that the whole train and engine came back; many a time I have jumped out of my van to put a sprag in the wheel of a waggon at Raglan, owing to the whole train, including the engine, coming back.

*By Mr. Thow:* I should think the speed would be about 13 miles an hour up the bank between Kelso and Raglan; the strain on the draw-bar would be greater going up the bank at this rate of speed, and I cannot account for the draw-bar breaking at Raglan when the train was only travelling 8 miles an hour; I cannot give any reason for coupling breaking; the train was travelling about 15 miles an hour when I jumped out of the brake van; I jumped out of the van on the station side of Home Signal; at the time I said something to the Raglan operator I thought something had gone wrong, but I could not tell what; I did not think the engine was backing the train; my idea was that the train had parted.

*By Mr. Kirkcaldie:* The telegraph operator was some distance on the Bathurst side of platform before I jumped out of the brake-van, and my conviction then was that something had broken away; in this particular case the brake was a good one.

E. B. DAVIES, 1/5/90.

*Francis Davidson* states: I am station-master at Raglan; on the night of the 25th April, when the No. 26 up-goods came to the station, I was standing on the platform opposite my house door; when the engine passed me they were not going more than 2 miles an hour; I noticed one man was looking out on the side next the platform when the engine passed me; she was going under steam; the brake-van came up and stopped about the Bathurst end of platform awning; I saw the guard then; he was stooping in his van to hand out some parcels; I do not think he got out of the van; I saw him signal to the engine; it was a white light which I first observed, and he afterwards waved a red light to the engine; he then stooped down, and appeared to be sorting parcels.

*By Mr. Kirkcaldie:* After the guard turned the red light on to the engine the train travelled about the length of a carriage forward.

*By Mr. Angus:* Then I noticed that the train was moving backwards; I thought when I saw the train moving backwards it was a rebound of the train; I believe the guard had his brake on at this time; I cannot say whether the wheels of the brake were skidded; I afterwards saw the guard jump up to the wheel of the brake, and he was exerting himself to a considerable extent, so much so that it appeared the brakes were hard on; I then turned up the platform and noticed that the train was then moving gently backwards, and I turned a red light on towards the driver; at the time I showed the driver a red light I was under the impression that the train was moving back with the engine and tender attached; it is a very common thing to see a train move back at the same rate of speed; I was beginning to be aware that there was something wrong with the train owing to the speed it was coming backwards, but was not aware that train had parted until the last waggon had passed me; when the last waggon passed me it would be going about 6 or 7 miles an hour; I jumped down off the platform on to the line with the intention to stop the train, but before I could do so it was out of my reach.

*By Mr. Kirkcaldie:* I am confident that the speed of the waggon at the time it passed me was not more than 7 miles an hour, and it was impossible for me to check the runaway portion.

*By Mr. Angus:* I did not see the guard on account of the darkness; when I found that I could do nothing in stopping the train, I waved my hand-lamp to the driver with the view of bringing him back for the purpose of seeing if he could catch his train, and I called out to him to try and come back and catch his train; at the time I called out to the driver I was standing about opposite the ladies' waiting-room door; as I found he was not coming back, and would be useless for him to do so, I jumped on to the platform, with the intention of going to the operator, and on glancing in the office I did not see him

him there, and as I saw a light on the Bathurst end of the platform I went towards it and found it was the operator, and as I was running down the platform I called out to him to come here and wire Bathurst and Kelso that the larger portion of No. 26 Up had broken away; from the time I saw the last waggon pass me the operator was at the instrument in about a minute and a half, and would not take more than half a minute to get a message off; the train arrived at Raglan 6.23 p.m., and from the time of the arrival until the last waggon passed me would not be more than one minute; no exertion on my part would have prevented the train from running away after I found that the train had parted; when the operator was sending away the message and while I was standing in the office Guard Davis came in and called out to the operator, "Wire Kelso and Bathurst;" after the message had been sent away I went in the direction of the portion of the train that was left behind attached to the engine and found the driver beside the draw-bar, which was lying in the four-foot, and looking at it; the driver made some remark to "Wire Kelso and Bathurst"; Guard Davis then spoke and said that Kelso and Bathurst had already been advised; after taking the draw-bar away and putting it beside the lamp-room, I shunted the train into the siding.

*By Mr. Kirkcaldie:* According to instructions from Mr. Duff, I looked for the broken end of draw-bar, and found it on Sunday afternoon about 12 or 15 feet on the east or Sydney side of where the draw-bar was found.

*By Mr. Thow:* This train passed me at a rate of about 2 miles an hour; this is the usual speed for trains coming into Raglan Station; I did not see guard jump out of the brake-van; I did not see any fire from the wheels of the brake-van as the broken part of the train passed the platform; when train was coming back I took it to be the recoil; I have seen them go back two or three truck lengths, and sometimes with the engine attached to the waggons; this is a usual experience with all goods trains to go back more or less; I have jumped across the couplings and put a sprag in; it is my usual practice when I see anything going away like that two or three waggons length backwards; I saw brake-van and fifteen waggons pass me while I was standing on the platform; it was impossible to put a sprag in as the train was between the sprags and myself, and the speed was high.

*By Mr. Kirkcaldie:* I cannot account for the draw-bar breaking.

*By Mr. Thow:* I have seen when a train is about to start that the whole train has come back four or five truck lengths; generally put a sprag in under such circumstances; I have been station-master at Raglan five years, and nearly eleven years in the Service.

F. DAVIDSON, 1/5/90.

*John Collins states:* I am the operator at Raglan Station; I remember the night of the accident (25th April, 1890); No. 26 arrived at 6.23 p.m.; on its arrival I went to the carriage and called out "Raglan," and no passengers seemed to get out; I then went to the brake-van; I stood on the step of the brake-van; the front end of the brake-van was just at the post of the Bathurst end of the awning of Raglan platform; brake-van was not stationary, but still travelling towards Raglan—only a few feet, when the recoil of the train caused it to go in the Bathurst direction; I did not feel any jerk, and the train continued to move gradually faster in the direction of Bathurst; the brake was hard on, but the wheels were not skidding; I rode on the footstep of the brake-van to within 5 yards of the end of the platform, when the guard said, "Is she away?" I did not reply; I ran down the platform-ramp and put one waggon brake down near the centre of the train; had there been a sprag on the platform I would have attempted to sprag one of the wheels; I never have done anything of the kind; when I put the brake of one of the waggons down I was nearly knocked down in doing so; the train would be going at a speed of about 7 to 10 miles an hour; it would be above 10 yards from end of platform close to where I jumped down when train had got away; I immediately rushed to the telegraph instrument to call Kelso; it would not be more than two minutes after train arrived; I only called twice when I raised him and informed him that a portion of No. 26 Up had broken away; this would only take half a minute; Kelso at once called Bathurst; I heard him on the instrument; I heard Kelso call Bathurst about a minute before he got him; and I am of opinion that Bathurst would receive the message about No. 26 Up breaking away about three and a half minutes after the train arrived at Raglan; the station-master was at the office door when I rushed to the instrument; he was coming down the platform towards Bathurst and I was at the end of platform when I heard the station-master call; I wired Kelso but did not wire Bathurst as I thought No. 23 Up would be at Kelso; the guard came into the office just as I had told Kelso; he said, "Have you told Kelso and Bathurst?" I have been in the Service about four years, and have been telegraph operator at Raglan for the last eight months; I have seen trains arrive at Raglan, and recoil, and have never seen a train on the up journey arrive without a recoil; I have seen the trains recoiling, the engine has also gone back occasionally; I have seen a train recoil about 6 yards, the usual practice of guards on arrival at Raglan is to only put the brake of brake-van on, sprags are only used to put in wheels of trucks when engines are detached for shunting, and sometimes the waggon brakes are put down.

*By Mr. Thow:* Brake was hard on; I saw a guard putting it on; I did not see any fire fly from brake-van wheels; guard asked me, "Is she away" before I got off the footstep of the brake-van; I did not think control of the train was lost; I knew when I put the brake down the train had broken away; I have seen the station-master go across couplings to sprag a truck for shunting purposes only; this is the first occasion in my time that I have seen an accident of the kind at Raglan; I saw the guard waving the driver up near the home signal, which is about half-way between level crossing and platform; when brake-van was at end of platform guard gave driver a red light; I was at the office door when engine passed me; I noticed it passing; engine was travelling at rate of 4 to 5 miles an hour; driver did not increase the speed when he got the guard's signal to go on; the driver steadied a little before he got the signal from guard to go on; he was then running at about 3 miles an hour; I do not remember the buffers striking together; I have often heard them strike when waggons come together; I think the breaking of coupling was due to recoil, but I did not observe anything unusual in the motion of the train during its up journey.

*By Mr. Kirkcaldie:* When I was standing on platform engine was steaming ahead, and driver shut off steam after the engine passed me; after steam was shut off they pulled up pretty quickly; when they pulled up I do not remember hearing buffers striking; yet all trains stopping at Raglan on the up journey have a certain amount of recoil.

JOHN COLLINS, 1/5/90.

George

*George Watsford* states: I am station-master at Kelso, and have been in the Service fifteen years next August, and station-master about five years; have been station-master at Kelso about three years, previous to which I was twelve months at Brewongle as station-master; on the night of 25th April, No. 26 Up goods train arrived from Bathurst at Kelso at 5:47 p.m. and detached four loaded D trucks and picked up eight loaded sheep vans containing about 800 sheep; it left Kelso at 6:9 p.m.; it did not have much shunting in attaching or detaching; the reason why the train was so long at Kelso was waiting the arrival of a Down train which it had to cross at Kelso; I was advised from Raglan by wire about twenty-five to twenty-seven minutes past six that the train—26 Up—had broken loose; I was standing at the office door when informed of it, and I immediately advised Bathurst, and, at the same time, told one of the porters to run and open the level-crossing gates; the porter had just time to open them when the train dashed through the station; I have no idea of the speed at which it was travelling, but I never saw a train travel faster; the porter had a distance of about sixty yards to run to open the gates; he ran back from the level-crossing gates and jumped on platform, at the same time exclaiming that the train had crossed over the bridge (Macquarie Bridge); it would take porter about half-a-minute to run from gates to platform.

*By Mr. Thow*: I did not think a brake was on; so far as I could see there was no fire coming from the wheels of brake-van; my porters informed me that they did not see any fire.

G. H. WATSFORD, 1/5/90.

*Joseph Dowling* states: I am the telegraph-operator at Kelso; have been operator at Kelso about ten months, and have been in the Service about two years; I was on duty when the No. 26 Up passed there; I cannot say what time she arrived, but she left at 6:9 p.m.; after the train had left, Raglan told me that it had broken away; this was about 6:28 p.m.; I was in the office the whole of the time, so that Raglan had not to call much before I answered; when I received the message, "A portion of No. 26 Up broken away," I called out to the station-master, who was standing opposite the door, and told him No. 26 Up had broken away; I then proceeded to call Bathurst at the request of station-master, Mr. Watsford; I raised Bathurst in about three-quarters of a minute, and I told him No. 26 had broken away, and was running down the bank; I know the operator at Bathurst received the message; from the time I received message from Raglan to the time train passed Kelso it would be about a minute; I cannot say the time definitely; I cannot say what time had elapsed after train had left Kelso to the time of collision; I did not hear the collision; I stood by the instrument all the time.

JOSEPH DOWLING, 1/5/90.

*William Nash* states: I am operator at Bathurst Station; on the night the accident occurred I was on duty, and received a message from the operator at Kelso that the No. 26 had broken away and was running back into Bathurst; I received the message at 6:30 p.m.; I immediately informed the station-master; I did so instantly, as the station-master, Mr. Farquhar, was standing at the office window.

*By Mr. Kirkcaldie*: Mr. Farquhar immediately rushed away out on the platform, with the purpose of stopping the train.

*By Mr. Angus*: The accident or collision occurred almost immediately I informed Mr. Farquhar.

W. NASH, 1/5/90.

*George Farquhar* states: I am station-master at Bathurst, and will have been so six years on the 14th of September; No. 26 Up is recorded as having left Bathurst station at 5:37 p.m. on the 25th April, making her 47 minutes late leaving here; the train on this occasion had about its usual load on; I started it myself; on the departure of No. 28 Up at 6:30 p.m. I went to the window of telegraph office and entered the train number in the Train Book, when the operator turned round to me and said, "No. 26 is broken away"; I do not remember him saying where she had broken away; I then rushed out on the platform exclaiming "Too late"; she (No. 28) had then just started and was going through the Russell-street gates; I exclaimed at the same time, "26 has broken away," and Goods-guard Payne, who was standing alongside me, said "Yes, and there she comes across the bridge"; I may here state that immediately afterwards the collision occurred; it was out of human power for anything to be done then to prevent the collision; I, with others, proceeded to the spot and commenced at once to search for the injured; everything that was possible was done to alleviate their sufferings; I may add that I received valuable assistance from the residents of the town in looking for the injured and clearing up the debris; from the time I received the message to the time the collision occurred scarcely a moment had elapsed.

GEORGE FARQUHAR, 1/5/90.

*Hugh Miller*, driver of No. 28 Up Goods train, states: I was driver of train on the 25th April; I had a big Consolidated engine, No. 140; I had two firemen, Henry Bannister and Charles Towle; I usually leave Bathurst at 5:40 p.m.; on this date I left at 6:30 p.m.; I believe there were eleven waggons and brake-van on the train, and one guard; it is a pick-up train generally; I got about 70 yards on Sydney side of Russell-street crossing when the collision took place; the first intimation of an approaching train was a red light hanging very low; this, no doubt, would be the tail lamp of the train with which I collided; I never heard or noticed any noise of an approaching train until I saw the light; I shut the regulator and called out "Whoa, whoa"; I remained on the engine until she was struck, and possibly half a minute afterwards, when I was swung off the engine and rolled half-way down the embankment; I was slightly giddy, but not unconscious; somebody came to me and said, "You are hurt, old fellow, you had better sit down," which I did; the firemen also remained on the engine and put the brakes on; I believe the engine brake was put on by Henry Bannister; cannot say whether tender brakes were put on; I believe the fireman was putting coal in the fire-box at the time; I would be going about 10 miles an hour at the time of the collision; I had run about 250 yards before the collision took place; there was nothing that I could have done to prevent the accident.

*To Mr. Kirkcaldie*: I believe my engine was driven back by the force of the collision to Bathurst side of Russell-street crossing, a distance of about 70 yards; I do not think that any of the waggons were knocked off the road; my engine was not derailed.

*To Mr. Thow*: I had engine No. 140; I did not know that the engine and tender had parted after the accident.

HUGH MILLER, 1/5/90.

William

*William Henry Bannister* states: On the night of the 25th April I was first fireman of No. 28 up train; No. 28 Up is due to leave Bathurst at 5.40 p.m.; according to the driver's watch it was 6.30 p.m. when we left there; we had eleven loaded trucks and C vans, chiefly loaded with grain; we started from a point near the turn-table at the carriage dock, Sydney end of Bathurst platform; we had travelled about 80 yards on the Sydney side of Russell-street crossing when we came into the runaway train; I just watched our own train over the Russell-street crossing and looked forward and saw the tail lamp of a train coming; when I first saw the tail lamp of the runaway train it would be about the length of the engine and tender from us; I made for the engine brake and was screwing it on all the time until we came to a standstill after the collision; I kept screwing on the brake after we were struck; I was not knocked down by the force of the collision, nor yet was I injured; the bogie wheels of the engine were on Russell-street crossing, so that we must have been knocked back; we would be going about 10 miles an hour at the time of the collision; our engine was not knocked off the line; the casting securing the draw-bar on the engine, which secures the draw-pin, was broken, as also the draw-bar pin itself, allowing the tender and train to go apart from the engine to a distance of about 48 feet; side chains were connected between engine and tender; when we came to a stand I found that the tender had parted, and on looking round I found that the driver was not on the foot-plate; I took the staff-ticket from the rack and put it in my pocket; I then made an attempt to go past the engine on driver's side, but was unable to get past; however, on getting round to the other side, I found the driver in charge of two or three persons, who were assisting him, and took him to driver Watley's, who resides near the Russell-street gates; I then assisted the other fireman to put the fire out in the firebox; while we were doing this our attention was drawn to a little boy on the top of the boiler whose name was O'Connor; my mate handed him down from the top of the boiler; afterwards we searched about the tender to see if any others were about the tender of the engine; nothing that my driver, mate, or myself could do would have prevented the collision.

H. BANNISTER, 1/5/90.

*Charles Towle*: I was one of the firemen of No. 28 Up goods train (second fireman), on night of 25th April, 1890, and was making up the fire at the time the collision took place, and the first intimation I had was the driver calling out "Whoa, whoa;" I made to put on the tender brake on hearing this. before I could reach the brake-handle I was knocked down, and fell on the tender foot-plate on the coals; I was not hurt that I know of; I cannot say whether I was rendered unconscious; I got up and got hold of the cab stanchion, as I felt the engine and tender was parting; I was partly knocked off and fell on the ground; I did not roll down the embankment; the coupling between the engine and tender parted owing to the pin on the draw-bar being broken on the foot-plate of the engine; it was a plain draw-bar; there were two side chains; I cannot remember whether the side chains were broken; I heard no noise of an approaching train prior to the driver calling out "whoa;" this train was due to leave Bathurst at 5.40 p.m.; I think we left at about 6.30 p.m.; we were standing at the end of the platform near the signal box; I could not say what distance we had travelled when the collision took place; I could not say exactly how far the engine was knocked back; the tender and portion of the train were a greater distance than the engine as the couplings had parted; I believe my driver and fireman did all they could to prevent the accident; I did all I could possibly do myself; I may also state while I was endeavouring to put the fire out after the accident had taken place I got my foot scalded, but it is getting on fairly well; it was I who found the little boy O'Connor; I found him on the top of the boiler, between the dome and sand-box; he was lying on his side; he was not dead, but crying; I handed him down to fireman Bannister; I could not say if he was scalded; I do not think the fire-box was injured.

*By Mr. Thow*: We had engine No. 140; the first thing I did after the accident was to look for the driver; I put the fire out with water; I did not know the full extent of the accident until about half an hour after it occurred; we were travelling engine first.

CHARLES TOWLE, 1/5/90.

*George Weekes* states: I am an examiner of carriages and waggons at Bathurst, and have been seven years in the service, and seventeen years in railway service in England; I remember the No. 26 up goods leaving Bathurst on the night of 25th April; every part of each vehicle, so far as examination could go, I examined; I examined the brake of the brake-van on No. 26 up, and the brake gear was good; in my opinion, if the brake had been put hard on, as hard on, as the guard could possibly get it, the wheels would have skidded; the same class of van going out of Bathurst with brakes on, I have seen the wheels skidded.

*By Mr. Thow*: But I am aware that the rails in Bathurst yard are more greasy than between stations; I therefore think the wheels would be skidded more easily in the yard than between stations; the van started from here; I went inside and tried the handle; lately I have known of nuts being stripped, and this has caused me to always go and try the handles of brakes; I see where the brake screw is broken off, and I examined the other part left on, and the conclusion I come to is that the brake must have been hard on judging from the position of the screw in the nut.

*By Mr. Angus*: I also examined the brake blocks—they were about half worn out; about three weeks to a month is the maximum time for brake blocks to be on vehicles; there would be four blocks on the brake-van, and I am perfectly sure they were in good order.

G. WEEKES, 1/5/90.

### Conclusion.

From the foregoing evidence the cause of the accident was the breaking of the screwed end of the draw-bar of the third waggon (No. 3,008) from the engine.

This waggon was built by Messrs. Hudson Brothers in 1882, and we have no reason to doubt that the broken draw-bar was the one originally supplied with the waggon; at all events it is a duplicate in all respects with the standard draw-bar of that date; it has thus been in use for seven or eight years, and engaged like others of the same kind in the ordinary traffic of the railways. The original links and shackle have been changed and stronger links substituted. The strain which passed through the draw-bar due to mere haulage of the load behind it, up the grade on which it broke, did not amount to 4 tons, and from the section of the iron which broke we have no doubt that a strain of not less than 28 or 30 tons must have been sustained by it before fracture ensued. This additional strain must have acted on the draw-bar as the result of the recoil on the stoppage of the train at Raglan Station.

The evidence of engineman, James Palmer, and his firemen, James Donald and Thomas Prince, who were engaged upon the engine of No. 26 train, shows clearly that at a red signal from guard's-van steam was shut off, and both engine and tender brake applied with force. The stoppage of the engine on this rising grade of 1 in 50 would thus be suddenly checked, and the waggons following it would run in upon the engine compressing their buffers, and creating a recoil, and a strain at least sufficient, but in all probability much more than sufficient to fracture the draw-bar. We cannot accept the statement of the station-master at Raglan, and other witnesses who said that no recoil occurred, as there are four facts in the case which seem to us to render such a view incredible.

First.—The sudden breaking of the draw-bar on stopping, when the stoppage and haulage strain were least.

Second.—That to cause the fracture the draw-bar must have been subjected to a strain about eight times that of the haulage strain.

Third.—That the steam was shut off, and the brakes of both engine and tender applied with force at the same moment.

Fourth.—That the draw-bar of waggon No. 3,008 was not drawn completely out of the waggon, which would certainly have been the case had there been any gentle parting; but from the engineman's evidence it will be seen that he found the draw-bar sticking half way out of the waggon and pointing upwards, showing that it must have sustained a disturbance sufficiently violent to jerk the heavy centre coupling links of the following waggon off the hook, and at the same time throw the inner end of the draw-bar downwards, allowing it to catch underneath some framing timbers of its own waggon.

The evidence of John Collins, telegraph operator at Raglan Station, is very pertinent to this point of recoil. He shows that the train made a rapid movement backwards, and such would be the exact result caused by the compression of the buffers. It would be a smooth movement, comparatively speaking, not as if the engine had pushed the train in a backward direction.

The side-chains of waggon No. 3,008 were not made use of as required by Rules 235 and 372; but we are of opinion that if the side-chains had been in use they would not, under the circumstances of the recoil which, we believe, occurred, have prevented the accident. We consider the recoil must have been violent, and far more than enough to fracture both main and side couplings from the fact disclosed by the evidence of the witnesses at Raglan Station, which show that the train immediately began to descend the incline at a high velocity, estimated by them at from 7 to 10, and even up to 15 miles an hour before many yards had been traversed. In consequence of this high speed their efforts to sprag the wheels were defeated. The brake-van of No. 26 Up Goods Train on the date of the accident was a composite van, No. 59. It weighed  $12\frac{1}{4}$  tons; it has a brake-power equal to skidding the wheels of a van weighing  $10\frac{3}{4}$  tons, and therefore is, we consider, as powerful a retarding brake-van as any in use for this service on the lines. The engine, No. 132, of No. 26 Up Goods Train was capable of taking a load up the incline in question of 211 tons; it will therefore be seen that the load behind it was well within that mark.

It

It is also known that the strongest draw-gear which has been made is liable to fracture through violent shunting or undue strains by jerking, and that, such being the case stations should not be erected or sidings laid down on gradients such as the one where this breakaway took place unless an up and down line be put in through the station or sidings which enables runaway points to be used, thereby preventing such mishaps; and we strongly urge the necessity for these precautions to be carried out, as also avoiding the erection of stations on gradients of less than 1 in 260, which latter grade has been found from long experience to be the heaviest for safety.

It is clearly proved that the guard put his brake as hard on as it was in his power to do, but the recoil of the waggons, owing to the steep grade of 1 in 50, was of such a sudden nature that no other means, either spragging or putting brakes down, could be effected, and that, had there been two guards, it would not have been avoided as the evidence of the Raglan telegraph operator proves, who, it will be seen from his evidence, endeavoured to do what a second guard would have attempted.

JAMES ANGUS,  
Acting Engineer for Existing Lines.

W. THOW,  
Locomotive Engineer.

DAVID KIRKCALDIE,  
Chief Traffic Manager.

The Commissioners for Railways.

[Six plans.]



POINT WHERE N<sup>o</sup> 26 TRAIN BROKE AWAY  
AT RAGLAN STN

BRIDGE  
SYDNEY

4 MILES 4 YDS

1 1/2 Miles

POINT WHERE COLLISION OCCURED  
BETWEEN RUNAWAY TRAIN N<sup>o</sup> 26 & TRAIN N<sup>o</sup> 28

70 Yds

POINT WHERE ENGINE OF N<sup>o</sup> 28 GOODS TRAIN  
WAS KNOCKED BACK TO BY COLLISION

LEVEL  
CROSSING

Russell St

250 Yds

POINT WHERE ENGINE OF N<sup>o</sup> 28 GOODS  
TRAIN STARTED FROM AT 6.30 P.M

Bathurst Stn

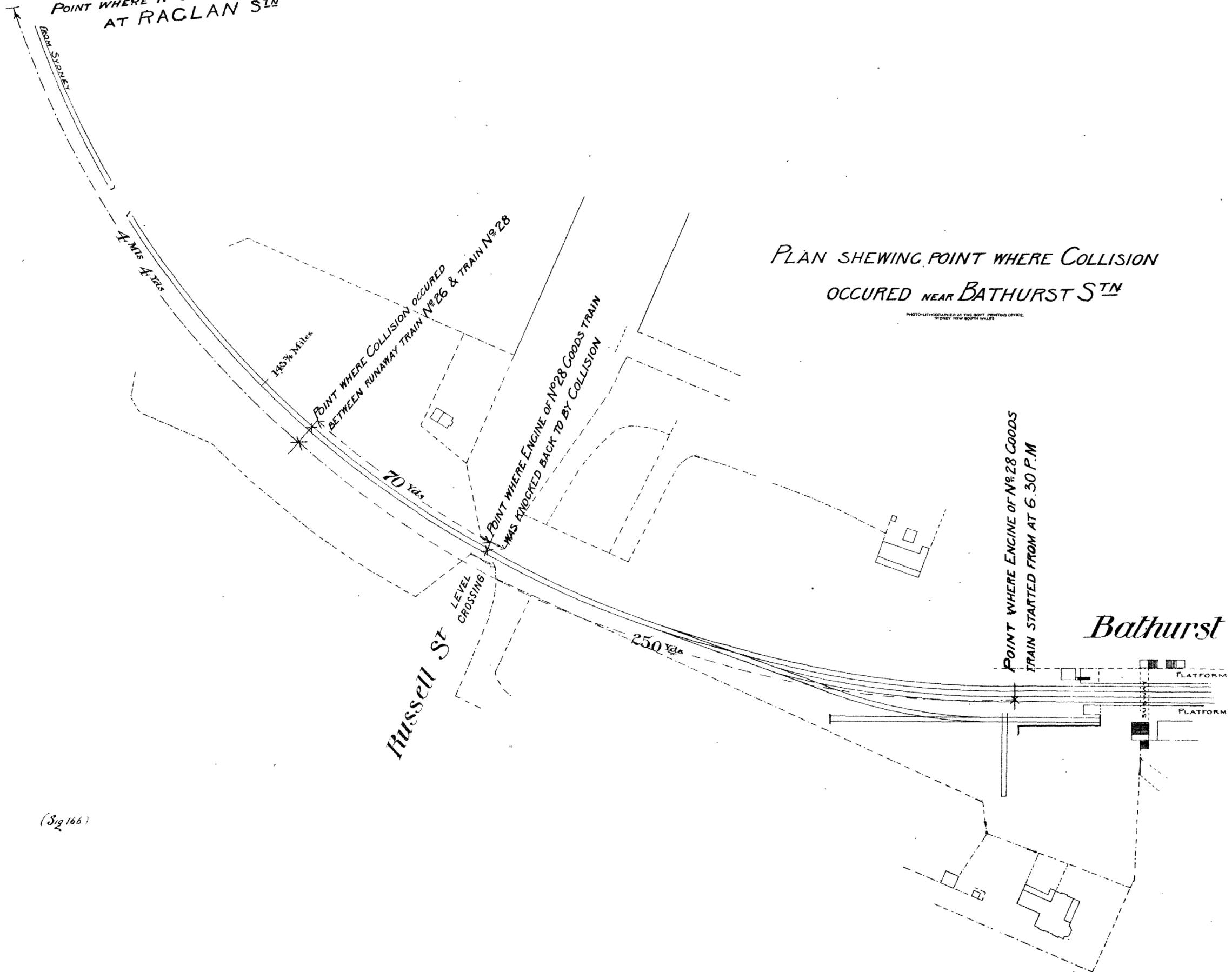
PLATFORM

PLATFORM

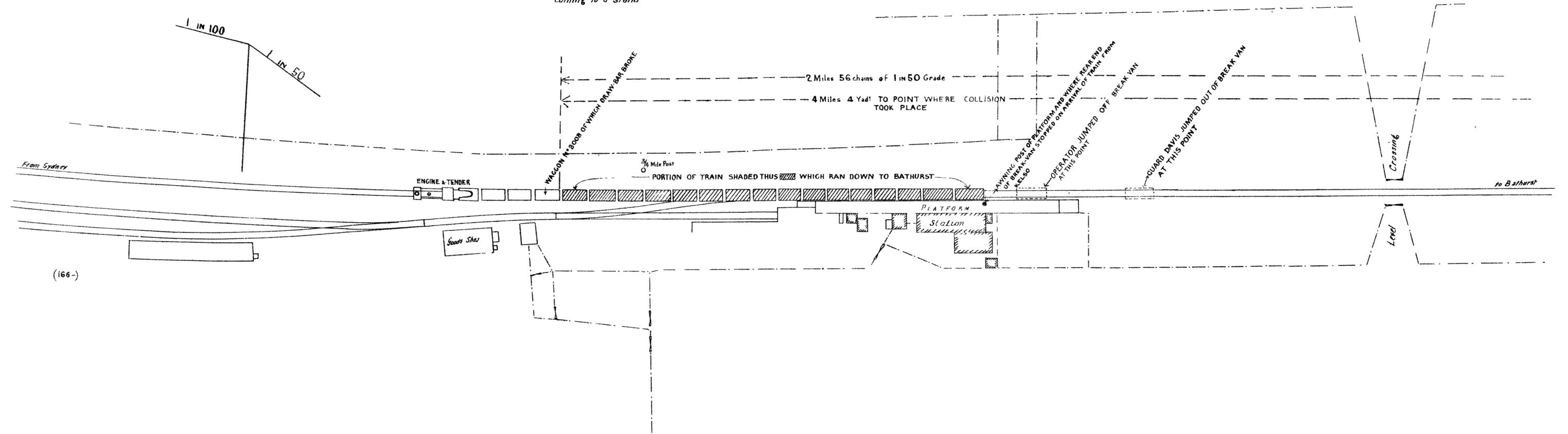
PLAN SHEWING POINT WHERE COLLISION  
OCCURED NEAR BATHURST STN

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,  
SYDNEY NEW SOUTH WALES

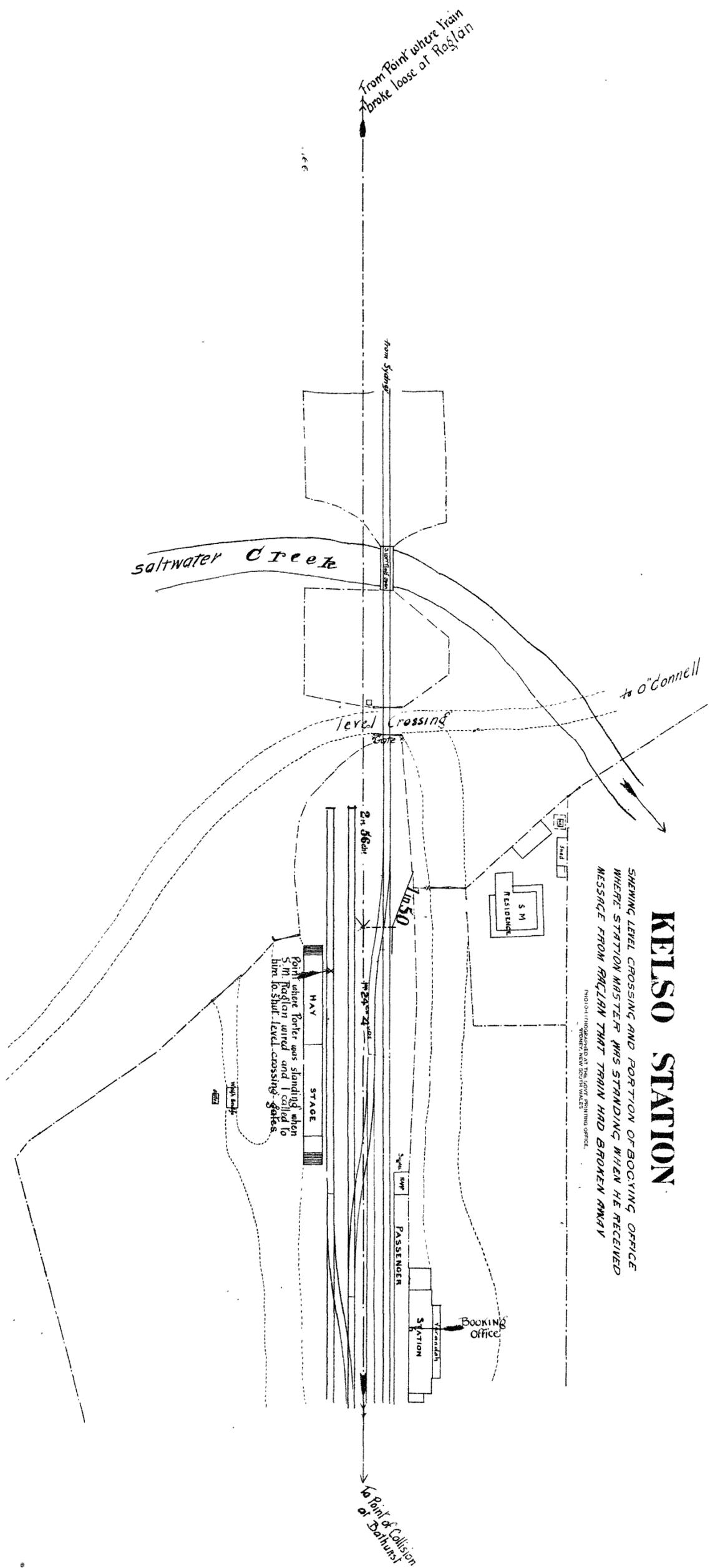
(319166)



PLAN of RAGLAN STATION showing arrangement of Lines & Sidings  
 also Platform & Station Buildings & position of N<sup>o</sup> 26 Up Goods Train on  
 coming to a stand



(166-)



# KELSO STATION

SHOWING LEVEL CROSSING AND PORTION OF BOOKING OFFICE  
 WHERE STATION MASTER WAS STANDING WHEN HE RECEIVED  
 MESSAGE FROM RAIGLAN THAT TRAIN HAD BROKEN AWAY

PHOTOGRAPHED AT THE SCOT. PHOTOGRAPHIC OFFICE,  
 STONEY NEW BORTH WALLS

Point where Porter was standing when  
 S.M. Raiglan wired and I called to  
 him to shut level crossing gates

From Point where train  
 broke loose at Raiglan

To Point of Collision  
 at Ballinast

saltwater Creek

Level Crossing

to o'Connell

S.M.  
 Raiglan

BOOKING  
 OFFICE

PASSENGER

HAY

STAGE

STATION

2 1/2 Miles

1 in 50

1 in 25

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

ADMINISTRATION OF JUSTICE.

(DEPOSITIONS TAKEN AT INQUEST INTO RAILWAY ACCIDENT NEAR BATHURST.)

*Ordered by the Legislative Assembly to be printed, 3 June, 1890.*

RETURN to an *Order* of the Legislative Assembly of New South Wales, dated 29th May, 1890, That there be laid upon the Table of this House,—

“Copies of the Depositions taken in the late Inquest into the Railway Accident at Bathurst.”

(*Mr. Crick.*)

The Coroner to The Under Secretary of Justice.

Sir,

Coroner's Court, Bathurst District, 2 May, 1890.

I have the honor to forward herewith depositions at the inquest heard before me on the 26th and three following days into the cause of death of Rebecca Franklin at the late Railway collision at Bathurst.

The proceedings would have been forwarded earlier but for my unavoidable absence at Sofala on official duty.

I have, &c.,

W. A. STEEL,

Coroner.

A copy of the verdict and rider in this case might be forwarded for the information of the Railway Commissioners. Submitted.—A.C.F., 5/5/90. Approved.—A.J.G., 5/5/90.

The Under Secretary of Justice to The Secretary to the Railway Commissioners.

Sir,

Department of Justice, Sydney, 8 May, 1890.

Referring to an inquest held at Bathurst on the 26th, 28th, 29th, and 30th ultimo, by Watson A. Steel, Coroner, touching the cause of death of the woman named in the margin, I am directed by the Minister of Justice to forward herewith, for the information of the Railway Commissioners, a copy of the verdict and rider in the case referred to.

I have, &c.,

ARCH. C. FRASER,

Under Secretary.

[*Enclosure.*]

New South Wales, }  
Bathurst, to wit. }

INQUIRY held at the Bathurst Hospital, at Bathurst, in the Colony of New South Wales, this 26th day of April, 1890, before me, Watson Augustus Steel, one of the Coroners of our Sovereign Lady, the Queen, for the Colony aforesaid, on view of the body of Rebecca Franklin, then and there lying dead.

Upon the oaths of William J. Pascoe, Alfred W. Avery, Charles J. Pruett, John M'Donald, James Kellaher, Walter Hall, Alfred Jones, William Mackie, Frederick Lumley, Richard Kenna, Robert Waters, Patrick J. Parker, good and lawful men of Bathurst aforesaid; who, having been sworn and charged to inquire (on the part of our said lady the Queen) when, where, how, and by what means the said Rebecca Franklin came to her death, do, upon their oaths say that the deceased Rebecca Franklin met her death at the Russell-street Crossing on the 25th of April, 1890, caused by an accident through the breaking away of a portion of No. 26 up train, which collided with No. 28 leaving the Bathurst Station.

In witness whereof, as well the said Coroner as the Jurors aforesaid, have to this Inquisition set their hands and seals, this day and year aforesaid.

W. A. STEEL,  
Coroner.  
CHAS. J. PRUETT,  
Foreman.  
ROBERT W. WATERS,  
J. M. MACDONALD,  
PATRICK J. PARKER,  
FREDERICK LUMLEY,

WALTER HALL,  
WILLIAM MACKIE,  
ALFRED JONES,  
JAMES KELLAHER,  
RICHARD PHILIP KENNA,  
WILLIAM PASCOE,  
ALFRED W. AVERY,  
Jurors.

RIDER.

283—A

[920 copies—Approximate Cost of Printing (labour and material), £10 1s. 8d.]

## RIDER.

And that the jury are of opinion that the safety of the travelling public and the railway employees has been endangered by the discontinuance of the use of side-couplings while the weak gear is in operation, and recommend the use of side-couplings to be resumed pending the fitting of all rolling-stock throughout the Colony with the strong gear; and they further recommend that the practice of carrying assistant-guards on all goods trains be resumed. And the jury desire further to exonerate Guard Davies and the engine-driver, Palmer, from all blame in this accident.

CHAS. J. PRUEN,  
Foreman.  
WALTER J. HALL,  
P. J. PARKER,  
W. MACKIE,  
J. M. MACDONALD,  
FREDK. LUMLEY.

ALFRED JONES,  
R. W. WATERS,  
ALFRED W. AVERY,  
JAMES KELEHER,  
RICHARD PHILLIP KENNA,  
WILLIAM PASCOE.

New South Wales, }  
Bathurst, to wit, }

INFORMATION and depositions of witnesses, taken on oath, before me, Watson Augustus Steel, one of the coroners of Our Sovereign Lady the Queen, for the Colony of New South Wales, this 26th day of April, 1890, at Bathurst Hospital, at Bathurst, in the said Colony, on view of the body of Rebecca Franklin, then and there lying dead.

*Richard Musgrove*, having been sworn, states:—I am a senior constable of police stationed at Bathurst; at 10 minutes to 7 o'clock last night I received information that an accident happened at the railway station, near the Russell-street crossing; I hastened down, and there saw the body of the deceased Rebecca Franklin lying on the town side of the embankment; I had the body removed to the gates, and had it put on the police van and forwarded to the hospital; I also saw the body of a man, Michael Downey; that body was cut to pieces.

*By Mr. Webb*: The body of deceased was about 75 yards from the gate.

R. MUSGROVE.

Taken on oath before me, this 26th April, 1890,—

W. A. STEEL, Coroner.

*Thomas Franklin*, on oath, states:—I am a blacksmith, living at Mount Victoria; I have viewed the body of Rebecca Franklin, now lying dead; she was my mother; I have not seen her for some months; she was 60 years of age, and a married woman; she lived at Tarana.

THOMAS FRANKLIN.

Taken on oath before me, this 26th April, 1890,—

W. A. STEEL, Coroner.

This inquest stands adjourned until Monday, the 28th instant, at 10 o'clock in the forenoon, at the Bathurst Court-house.

W. A. STEEL,  
Coroner.

Court-house, Bathurst, 28 April, 1890

Adjourned inquest from 26th instant.

*Sidney Ferguson*, on oath, states:—I am a carpenter; I was standing on my back door on Friday evening last; I heard a great noise, as if by a collision, and saw the steam escape; I saw the steam escape from the engine; I saw an engine standing at the gate, and went to the broken carriages; I saw a woman lying near the broken carriages, and she was still alive; her name was Mrs. Connor; I proceeded to look about the wreckage, and saw the body of a dying woman; she was about 12 feet from the rails, and when I felt her face she was still alive; her name was Mrs. Franklin; afterwards I saw her dead at the hospital; I assisted in removing the body from the wreckage; I live in Seymour-street; I saw there was a collision between two trains.

SIDNEY FERGUSON.

Taken on oath before me, this 28th April, 1890,—

W. A. STEEL, Coroner.

*Arthur Henry*, on oath, states:—I am a legally qualified medical practitioner, and Resident Medical Officer at the Bathurst Hospital; about 8 o'clock on the evening of the 25th instant, I remember the body of Mrs. Connor being brought to the hospital at the same time as the bodies of Michael Downey and Rebecca Franklin were; they were put under treatment at the Bathurst Hospital; I examined the body of Rebecca Franklin on the 26th instant; on the external appearance, there were marks of bruises on both sides of the body; the left thigh was fractured, midway between the knee and the body; there was a lacerated wound at the back of the head, extending one inch and a half to the bone; on opening the skull the brain was very pale, paler than natural; there were no signs of injury to the brain; on opening the chest, I found there had been hemorrhage behind the right lung, while on the left lung, it was still more marked; I then noticed that the fifth, sixth, and seventh ribs on the left side were fractured; the broken ends piercing the lungs; on opening the abdomen, I noticed no injury at all; these are the injuries I discovered on the body; I think an injury to the brain and to the chest would cause instant death; the body must have been crushed very severely; the brain was paler than if death was due to natural causes; four other patients were brought in; they were a little girl, named Maud Radford, and a little boy, named Harry Connors; the boy died at 11 o'clock in the same night; the little girl died at half-past five on Saturday morning; a man named William Condon and Jeremiah Newnan, are still in the hospital.

*By Mr. Kenny*: Condon was brought into the hospital about the same time, and he was injured, and the two children were injured in the same accident; Mrs. Franklin was a well nourished woman, and I did not detect any disease.

ARTHUR HENRY.

Taken on oath before me, this 28th April, 1890,—

W. A. STEEL, Coroner.

*Edwin Brady Davies*, on oath, states:—I am a railway guard at the Bathurst railway station, and I was the guard of the train that left Bathurst railway station at 5:40 p.m.; the number of the train was 26, and it was a mixed train; I started on my journey to Penrith; the train consisted of twelve of goods, an empty horse-box, and a first-class carriage, and a brake-van; I arrived at Kelso, 46 minutes past 5 o'clock; I left at 10 minutes past 6, having attached eight sheep vans, loaded with sheep, a D truck, and four of goods; speaking from memory, I arrived at Raglan at 6:23 p.m.; before leaving Kelso, I told the driver to stop at Raglan, Brewongle, and Locksley; on approaching the station, there was a green light shown me; I waved the driver up with a white light, and turned a red light on to stop him, having a number of parcels to put out of the van at Raglan; before the brake-van came to a standstill, I applied the brake on; I thought it was sagging; I caught hold of the brake again, and tried to put it on tighter than it was; it immediately came away so fast, and the brake being on as tight as I could put it; I opened the sand-box, took a sprag, and jumped out; I had a light in my hand also; I attempted to sprag the truck; it flew back knocking me on my chest, and knocking me down; I then made three attempts to sprag the lower part of the wheel and failed; the sprag flying each time; I then threw the sprag on the rails; the truck knocked it away; I made an attempt at the brake, but could not stop it; I then ran towards the station calling out, "Wire Kelso and Bathurst"; when I got to the station, I looked round, but could not see the train at all; at arriving at the office, I saw the boy at the instrument; after a few minutes I wrote out a telegram to the Superintendent and Out-door Superintendent; hearing of the accident, I proceeded on foot to Kelso, thinking it possible some passengers had jumped out; the fettlers overtook me, and I then proceeded to the scene of the accident at Bathurst; I knew there was a break away when I noticed the trucks passed me; I did not know how many passengers there were in the train; I had no assistant-guard; there was nobody in the van but myself; it is a very common occurrence for the guards to travel alone.

*By*

*By Mr. Thompson :* It is a common occurrence for the guards to travel alone ; I have been on the Railway for ten or eleven years ; I can't say how long it has been that guards travel alone ; there was no special brake on this train ; I would certainly call it a heavy brake-van compared to the light brake-van ; a part of the train did not come away ; fifteen trucks and a van broke away ; it was stopped as carefully as ever a train was stopped ; I examined the couplings at the break away ; I saw the truck with the draw-bar drawn out, and the side-chains hanging on the truck that was left ; this produced is the one I refer to, it is known as the light-gear, and when light-gear is used there should be side-chains, but it could not be used, and when light-gear comes together we must use it ; there were no means of fastening the side-chains ; rule 372 (means) side-chains, but I could not comply with it because they were not there ; rule 519 ; there are general orders put in the books for our guidance ; circular 221 ; I have seen and signed a book, and I have acted in accordance with the circular ; the gear produced is not strong gear, one truck had the strong gear, and the other had the light gear ; I have known cases where the centre coupling has broken or been disconnected and held together by the side-chains going up an incline ; the brake on the present occasion was not one of the best ; if there had been an automatic brake this accident would not have happened.

*By Mr. Kenny :* There are some in the compo. part of the brake-van, but I did not know how many ; I know Mrs. Franklin ; she was in the carriage at the time ; she got in at Bathurst ; I knew a man named Condon at the hospital who got in at Bathurst.

*By Jury :* It is possible if it had side-chains it would not have occurred ; it has never been represented to the Commissioners about doing away with the side-chains ; we always couple the side-chains if it is possible as an assistant, first, because it is required, second, because of promotion ; I had to do without an assistant ; I would have been pleased to have one ; I think I was there five minutes writing the telegram, it took six or seven to go to Bathurst ; I have heard of trains going without a van, the brakes were slow of action and were used in a horizontal position.

*By Mr. Webb :* This was a mixed train, by that I mean a stock goods and a passenger train ; it is known as a through train on the time-table ; I had some shunting at Kelso ; I would have had to put the carriage off at Esk Bank, as it only went that far ; the next shunting would possibly have been at Bell or Mount Victoria—some of the through trains have at the present time an assistant-guard, they are just the same as this train ; some of the through trains carry an assistant-guard ; I have been running as a guard in this train for a long time at a period ; I have run with an assistant and without one ; the brake is regulated by the screw ; I had my brake on as we came up to the station so as to prevent a recoil ; there is a sagging at times ; sagging means fetching the train back, in most cases the train always goes a little back ; when I reached Raglan there were eight trucks of sheep, eight of goods, an empty horse-box, a carriage, and the van ; fifteen of these trucks broke away and the van ; they were all loaded except the horse-box and the carriage ; rule 516 relates to passenger trains ; I can't say when the Department did away with the light gear ; at Wentworth Falls I was in charge of a train which had its draw-bar broken whilst travelling, and reached Lawson before I was aware of the fact ; it was an up train and broke opposite Wentworth Falls ; it is not quite a level ground ; I took it off at Lawson ; the truck that broke was nearer the engine than the middle ; the draw-bar broke going up grade near Wentworth Falls ; the rest was down grade ; the telegrams were merely to report to the superintendent ; I attempted to put the sprag in the first truck but it had gained too much speed to do so.

*By Mr. Thompson :* Rule 516, referring to passenger trains ; rule 520, referring to all heavy vans.

*By Jury :* The grade from Wentworth Falls is 66, and a bit 33 ; the grade here is 50 ; I had a break away two or three weeks ago, when the side-chains parted ; it took place at Hartley Vale platform ; it was a similar case as this.

*By Mr. Thompson :* We were just steady up when it broke, but we did not use the sprag ; I had an assistant with me ; there was no jerk whatever.

*By Jury :* I have seen instance in shunting when I could couple on ; I have seen them pulled by the side-chains ; the brake was as good as the average.

*By Mr. Kenny :* I would not consider it an inferior van of its class ; I do not know how long it has been in use ; I cannot say what its defects were ; there are brakes of the same description which held better ; it was not one of the heaviest trains, and they are not supposed to take a heavier load up that grade ; a train loaded with wheat would be heavier than this ; there is no order to take up a heavier load with two engines in front that grade ; a double load means equal to two engines ; on this side of the mountains we never use two engines, one in front and one behind ; the assistants are nearly always running as full guards, and there are less men to do the work ; I think it advisable to have an assistant ; it is very unsatisfactory among the guards to have no assistant ; at one time it was, on this particular train, a custom to have two guards, and I cannot tell when this was altered ; it might be a couple of years ago ; it was dark and I had to use a lamp ; I would have to have a lamp in one hand and a sprag in the other ; it is almost an impossibility to stop a train at night time ; if I had had an assistant, the assistant might have attempted sooner to stop the train ; I could do nothing until I had stopped the brake ; the weight of a sprag would be about 20 to 25 pounds ; I screwed the brake on as hard as I possibly could do it, but it was not sufficient to stop the train ; there is no brake power possible to stop the train ; the grade is 1 in 50 ; there is no brake that would hold the train ; the brake-van was a compo. brake, but it is not as heavy as some of them ; the light brake-van never comes up here, and the one I was using was strong.

*By Mr. Webb :* The draw-bar broke at Wentworth Falls.

*By Mr. Thompson :* I would not say that, knowing the same draw-bar to draw heavier loads, it struck me the iron was inferior because it broke so short.

Taken on oath before me, this 28th April, 1890,—

W. A. STEEL, Coroner.

F. B. DAVIES.

*James Palmer, on oath, states :—*I am an engine-driver on the Bathurst Station, and am driving between Bathurst and Penrith ; I was driver of engine No. 26 up on Friday night ; it was a mixed train ; it left Bathurst at 5.40 p.m. ; I arrived at Raglan at 6.25 p.m. ; the draw-bar of the third truck from the engine broke ; sixteen trucks broke away ; I was looking for a light from the guard, and I saw the light from the brake-van disappearing, so I concluded there was something wrong ; this is the draw-bar from the truck 3008.

*By Mr. Thompson :* I stopped the engine at Raglan in the ordinary way, but felt no jerk ; the guard told me to stop at Raglan ; there was nothing but hand-brakes on the engine, and I could not stop it suddenly so as to jerk it.

*By Mr. Kenny :* I did not go far from the station ; the brake-van was pretty near this end of the platform ; I did not consider it a heavy train ; I have taken up heavier loads up the same grade ; I call a heavier load eighteen and the brake ; I saw some of the passengers, and I saw the girl and boy running to get into the brake at Kelso ; I saw the draw-bar half-way out of the truck ; I could not tell whether this draw-bar is any different.

*By Jury :* I think if the side-chains were on it would have been a preventive.

*By Mr. Thompson :* I have been driving nine years, and it was usual to have two guards ; we have always had two guards in this train, as far as I can remember.

*By Mr. Kenny :* It is exceptional not to have two guards on this train, especially in a pick-up train.

Taken on oath before me, this 28th April, 1890,—

W. A. STEEL, Coroner.

JAMES PALMER.

*Thomas Parry, on oath, states :—*I am a carriage and waggon examiner ; I was so on the 25th instant ; I recollect No. 26, and I examined the train that day ; I saw it was in proper working order, and safe to go on any journey ; I am a coach-builder by trade, and have twenty years experience on the railway.

*By Mr. Thompson :* I noticed all couplings ; I noticed that several trucks had a strong draw-gear, and were fastened on light gear ; that coupling was safe to travel on its journey ; the side-chains were hanging down ; I don't know what the side-chains were for ; I know that in accordance with the rules of the working of the Department the side-chains should be coupled ; I have seen the order before, but the couples were not in accordance with the order, but they were safe to go on the journey ; I was to see if it was in the proper running order, but it was not in accordance with the order ; I did it in custom with the Department ; I passed the train on Friday, as it was properly coupled with the rules of the working of the Department for coupling of the trucks ; I do not couple the trucks.

*By Mr. Kenny :* The shunters couple the trucks, and I examine them on the platform ; I go by my common-sense and experience that they were coupled right ; I have an intimate knowledge of stock trucks ; when the weak draw-gear is used we use the side-chains ; the draw-gear produced is one of the weak gear ; the last couple of years the continuance draw

draw-gear has been introduced; the strong gear is  $1\frac{1}{2}$  inch thick at the end, and the weak is  $1\frac{3}{4}$ ; the weak draw-gear is not connected from end to end; the strong draw-gear is expected to be the stronger draw-gear of the two; there are no side-chains in the strong gear; there is a strong draw-gear on that produced; when the weak gear wants repairing we replace them by strong gear.

*By Jury*: I cannot say whether the new gear came in before the Commissioners arrived.

*By Mr. Kenny*: I have seen a few small draw-gears break, and within the last few months I have seen them broken at the end, and one or two more broken through accident at the shoulder, and I have seen some with flaws in them; I have seen, within the last two weeks, similar draw-gear broken at Brewongle at the screw end; I never saw one come from Tarana, but I saw one with a broken hook.

*By Mr. Thompson*: I am not aware of any rule, and I don't know whether it is printed or not.  
Taken on oath before me, this 28th April, 1890,—

THOS. PARRY.

W. A. STEEL, Coroner.

*George Farquhar*, on oath, states:—I am the railway station-master at Bathurst; on Friday, the evening of the 25th of April, instant, about 6:32 p.m., I received intimation from the operator that 26 up-goods had broken away an hour previous; I had despatched it from Bathurst; on receiving that intimation I rushed out on the platform, exclaiming "Too late, too late," and the guard said "There she comes, across the bridge"; 28 goods had started about two minutes previous to that; it was drawing up by Russell-street gates; from the time the runaway train and up train struck I may say it was only a moment; by the time I had got to the scene of the accident a number of people had congregated there, everyone exerting himself to the utmost looking for those who were injured; I sent for the doctors, and on turning back to where the engine was standing, inside Russell-street gates, I found the body of Downey; from the description of his clothes I took him to be the guard; he was quite dead; I arrived at the telegraph-office, and reported, by wire, all what had taken place; I saw the remains of Rebecca Franklin taken out, but could not say where she was found; I did not examine anything that led to the accident; ten trucks were demolished and six were intact; the train consisted of nineteen of goods, and there was one passenger carriage; I know nothing that caused the accident, except that which was reported.

*By Mr. Thompson*: I have been station-master at Bathurst for six years; it is not customary to have two guards, but they do when they are not required otherwise; only one guard has generally gone out with this train, and I cannot see that it is necessary for two guards; when two guards go away it is because they are not wanted; I have gone through as a guard up to my present position; we don't usually change men on the railway when they can be of use on their way, and home-guards who have been acting as assistant-guards have been sent to take charge of a train; the rules require not only centre couplings, but also side-chains; the side-chains would have been gone just the same in this accident; a strong gear being fastened on to a weak gear would be quite sufficient; side-chains were used, but they did not hold the trains when they broke away; it is because of the strengthening of the centre-chains that they did away with the side-chains; if it was necessary to make a centre-chain heavier it was necessary to make the draw-bar heavier; the strong bar is marked with a cross: the centre-chains and the old gear we considered quite sufficient to hold the train with the side-chains; if the side-chains had been applied it would not have held the train; so far as the appliances we had at hand it was properly made up; rule 235 I am acquainted with; there was no means of complying with the rule.

*By Mr. Kenny*: I did not see another body carried away or any other passengers except Mrs. Connors, who was brought into the waiting-room; I did not know what the injuries were; we don't run an assistant-guard west of Bathurst, and on the east of Bathurst in stock-trains the assistants are sometimes used; the van used in this train was a heavy van; she was a 12-ton; she was a compo., and it is among the heaviest class of vans among goods trains; sometimes we have been ordered to put heavier centre-chains on; there is no provision for the side-chains to be used: the new trucks are used with the old trucks, and having no provision for the side-chains; I have known instances where the draw-bars have broken, and side-chains have held the train.

*By Mr. Webb*: It would depend upon the weight of the train which the chains had to hold; sixteen trucks, equal to 160 tons, broke away; the side-chains are  $\frac{1}{2}$ -inch thick; they were pulling on dead wood, and there are no springs with the side-chains; there is a spring with the draw-bar; two similar trains broke away at the bottom point of the Zig-Zag; the coupling broke and the two side-chains broke away, which caused a collision with the other train; it was equal, if not more, to train in question; I don't believe the side-chains would have been any use in the grade she stopped in; I have observed the brake, and I think it was the rail of the train running on to the engine; the brakes could not stop it from recoiling; a G truck has been used as a brake-van, and has the same weight of a van; these rules were promulgated about five years ago, and there is general order book for the guard's information; under the general order the train was coupled, as it should be; the van was one of the heaviest used on the line for goods train.

*By Mr. Thompson*: The driver told me that at the Zig Zag the side-chains at the brake snapped like a bit of wire; the brake, I think; it was the recoil that caused the draw-bar to break; there are very few springs on the side-chains; I cannot say there were side-springs on these trucks; there is a general order referring to single couplings, and that is the order produced; this order is our authority.

*By Mr. Kenny*: There was a first-class carriage and compo. brake-van for second-class passengers that was wrecked; all passenger carriages attached to the train have a centre coupling screwed on, and two side-chains, which are always used, in addition to centre coupling, the kind used in all passenger trains; it was not reported to me that a similar break had taken place near Raglan; the side-chains would not have held; they may have held if they had springs between them.

GEO. FARQUHAR.

Taken on oath before me, this 28th April, 1890,—

W. A. STEEL, Coroner.

29th April, 1890.

*George Watsford*, on oath, states:—I am station-master at Kelso; I recollect Friday the 25th, and remember being at Kelso; the train took eight more trucks on at Kelso; they were eight sheep trucks; the couplings were examined on the sheep trucks before leaving Kelso by the carriage examiner, named Weeks; the train left Kelso at 9 minutes past 6; shortly after the train left Kelso I received a telegram from the station-master at Raglan that 26 had run away and was running towards Bathurst; I then sent one of my men to open the gates at the level crossing; by that time the train dashed through the station; I had just got the gates open; I then got on the platform, and asked the operator if he had told Bathurst; he said he had done so.

*By Mr. Thompson*: I have been employed for fifteen years on the railway; I was employed in Sydney as station-master's clerk; my occupation only gave me experience in the suburban trains; I was employed as a porter first on some trains; there are two guards used, and on some one.

*By Jury*: I have never been shunting; I have been as guard in a second brake-van.

*By Mr. Thompson*: On a train that would pick up or do shunting there would be two guards, and on through trains there would be one guard; there would be two guards if the men were available; two guards would be necessary over the mountains.

*By Mr. Kenny*: While at Brewongle I never heard of a similar accident between Raglan and Brewongle; I never heard of one last night; Maud Radford and Edward O'Connor got in at Kelso; no one else got in; I did not notice any other passengers; I know the centre chains have been strengthened; I have seen instructions about coupling of the trucks; I have seen some of the strong gear marked with a cross; the strong gear is stouter; where two trucks come together with strong gear we only use one coupling; when two trucks come together one strong gear and one weak we connect the strong with the weak gear.

*By Jury*: I put the trucks with the perishable stock next the engine, and the live stock next the brake-van.

*By Mr. Webb*: On this side of the mountains a good load would be eighteen trucks, and from Penrith to Sydney forty-five trucks; the train in question that left Kelso was a through train, and it is the custom in through trains to have one guard; I never heard of any break in the gear since I have been at Brewongle.

*By Mr. Thompson*: Two guards are required between Sydney and Penrith to do the shunting; in a shunting train between Bathurst and Penrith there ought to be two guards; on a through train from Penrith only one guard is used.

*By Jury*: I have seen a coupling smash at a station and the side-chains hold.

G. H. WATSFORD.

Taken on oath before me, this 29th April, 1890,—

W. A. STEEL, Coroner.

Hugh

*Hugh Millen*, on oath, states : I am an engine-driver at Penrith station, No 2 section ; I drove 28 up on Friday, the 25th instant ; I left Bathurst station at 6.30 p.m. ; shortly after I left Bathurst station I collided with No. 26, about one or two minutes after I left Bathurst ; No. 26 was about 10 yards off when I first saw it ; it would be about 75 yards from the Russell-street gates ; I had no time to avert the collision ; I had only just time to shut the regulator ; I was swung outside the engine ; I had hold of the pannel ; my firemen were Henry Bannister and Charles Cowle.

*By Mr. Thompson* : I have been driving four years and five months ; I have some times two guards and sometimes one ; until lately, on all through trains, we had on up the journey two guards ; it is within the last month or two I have had only one guard ; in a shunting train it would be better to have two guards ; in a train such as No. 26 it would be better to have two guards ; in my experience I have known the centre-chain or draw-bar break ; side-chains were used on those occasions ; on a grade 1 in 60 it would very likely break the side-chains ; No. 28 was a through train ; I have been in about six smashes ; some through trains stopping.

*By Jury* : There are four guards from Penrith to Katoomba.

*By Mr. Kenny* : I do not know what sort of brake-van this was on No. 26 ; the compo. van has accommodation for passengers ; I could not say if it was the largest kind of van.

*By Mr. Thompson* : With the assistance of the brake power on the waggon I could have power with my engine ; in some parts of road we have to stop the goods train and put on the hand-brakes altogether.

*By Mr. Webb* : If a train is divided into two trains it would be necessary to have two guards on ; the trains from Sydney to Penrith, we run more carriages, on account of an assistant engine from Bathurst to Penrith ; on through trains I think two guards would be the best, but it all depends on the work they have to do.

HUGH MILLEN.

Taken on oath before me, this 29th April, 1890,—

W. A. STEEL, Coroner.

*George Weeks*, on oath states : I am a carriage and waggon examiner, stationed at Bathurst ; I recollect Friday, the 25th instant ; I inspected all the trains at Kelso, and found them all in good order and fit for the journey ; I could not say anything about the truck that broke.

*By Jury* : I did not examine the train at Bathurst.

*By Mr. Thompson* : I examined a part of it at Bathurst and also at Kelso ; I examined all the sheep-trucks and couplings belonging to them ; I did not examine the couplings where the break was ; I understand what is known as weak gear ; two years ago, about February or March, we used both couplings, and my colleague wrote to Mr. Turton for instructions, because the shunters got into the habit of using one coupling ; we have to use the materials we have, and they are coupled according to the rules and instructions I have to go by ; until the issue of general order No. 8, trucks were coupled according to the rules and regulations, and from the time of the issue of that we have made a departure from that rule, and have not used the side-chains ; the side-chains were not thought necessary when a weak gear and a strong gear came together ; the side-chains were used to make it stronger ; I examined the van of No. 26 ; it was what you call a medium ; I have found some of the light vans very good ; under ordinary circumstances it was a good brake ; I have seen two guards and have seen one on this train.

*By Mr. Kenny* : I have seen the circular produced ; the strong coupling only is attached to the strong gear ; to the weak gear ; I went to Brewongle, and attached a draw-gear to a truck out of which it had been drawn ; I replaced it by a stronger gear, and it was stronger than the one produced ; it was fitted the same, only it had a steel spiral spring ; the spar was broken near the nut.

*By Mr. Kenny* : Last week a train of empties came in with both side-chains and centre-chains broken ; I do not know how it was coupled when it came in ; the side-chain had drawn and cracked ; it was the last truck next the guard-van ; when the shunters began to use only single couplings we asked for instructions ; when the side-chains were there I always used them ; the side-chains are a check ; I have seen trains come into Bathurst with centre-chains and side-chains broken, which were replaced by the guard on the journey ; the centre-chains can be broken by shunting ; if the train had come up easily it would have held.

*By Jury* : I might pass a draw-bar out of the yard with a flaw in it ; you cannot tell whether there is a flaw till you unscrew it ; I cannot tell for a certainty if it's safe.

*By Mr. Kenny* : I think some precaution should be taken about the draw-bar ; if there was a flaw I could see it in the continuance ones but not on the others.

*By Mr. Webb* : I hook them up when there are side-chains ; it is more often that centre-chains break than centre-bars ; centre-chains are often broken while shunting ; when the centre-chains break and the side-chains hold it would be a great strain, 1 in 50 ; I should say more than ordinary care is taken in this engine.

*By Mr. Thompson* : Cross-coupling is used as an extra precaution ; I have crossed them on my own authority ; I cannot say if they were cross-coupled ; I call the gear produced a strong gear ; heavier links are put on the weak gear ; the weak gear have hooks on them as strong as strong gear.

*By Jury* : I was seventeen years on the railway in England and seven years here.

*By Mr. Thompson* : I heard of no break last night.

Taken on oath before me, this 29th April, 1890,—

GEORGE EDWARD WEEKS.

W. A. STEEL, Coroner.

*Francis Davidson*, on oath, states : I am station-master at Raglan ; I recollect Friday, the 25th instant, and I also recollect No. 26, which arrived at Raglan at 6.23 ; Palmer was the driver, and Davies was the guard ; on the arrival of the train at Raglan the brake-van drew up nearly opposite the door of the station ; the train then stopped ; I went to the brake-van, together with my porter, to assist in taking out parcels, and to see if there were any passengers requiring to get out ; Guard Davies was stooping in the act of handing the parcels out when the train seemed to be coming back ; Guard Davies immediately jumped to the brake-wheel, and he seemed to be in the act of turning it on when I last saw him ; thinking it was only the recoil of the train I turned up the platform towards the engine, and turned the red light on the driver and sang out, "What the devil are you doing" ; seeing the train still going by I continued up towards the engine ; when I saw the train had parted I jumped down the forefoot, and crossed the line, and sang out to the driver, "For God's sake come back, and try and catch the train" ; realizing it was too far away to hear me I rushed back on the platform towards where I had last seen the porter, and called out to him, "Jack ! Jack ! come on quick, and wire Kelso and Bathurst" ; he was then at the end of the platform nearest Bathurst ; he ran into the office, and went to the instrument immediately ; Guard Davies then ran in crying out, "Wire Kelso and Bathurst" ; I sent a message to Kelso to look out, that the larger portion of 26 train had broken away, and was proceeding towards Kelso at a terrible rate ; as soon as that was done, I turned my attention towards the engine that was standing on the line ; I saw the driver there with a light and broken draw-bar laying on the forefoot ; I took charge of the draw-bar and instructed the driver to come back and put the train in the siding ; this he did ; I then went into the office, and instructed the operator to wire Kelso for line clear ; I think the answer returned was, "The station-master is away," and the operator could not give line clear ; I had sent over for my night officer and all the available men that were about the station, and instructed them to put the trolley on the line, and proceed down the road as quick as possible ; myself and Guard Davies then proceeded down the line ; the ganger and one or two of his men had already proceeded on foot down the line ; we overtook them, and I gave them instructions to the ganger to go back and put the trolley on and bring his men, and I and Davies would walk on and see if anyone had been thrown out or jumped out on the line ; we found nothing along the road, and when the trolley pulled us up about 2 miles from Raglan ; we got on the trolley, and proceeded to the scene of the wreck ; I there saw Mr. Farquhar and several other officials but I do not remember any particular conversation, beyond a few questions as to how the train got away ; that is all I know about the accident.

*By Jury* : I have never seen a train held by side-chains ; it is quite possible if there had been two guards it would have been prevented.

*By Mr. Kenny* : I have been station-master five and a half years ; I could not say if there was usually always two guards ; the draw-bar produced on this particular occasion is the same that was broken ; I have not examined the bar ; I believe there was provision for the side-chains on the truck that broke away ; I could not see the guard spragging the truck ; the passenger trains have a centre coupling and two side-chains always fastened ; I do not think passenger trains are

are as heavy as goods trains ; sometimes there were passengers carriages attached, and sometimes only the brake-van on this train ; the chain produced is the side-chain that is generally used in stock trucks, and it is about the ordinary size of side-chains ; if they had been hooked, the side-chains would not have felt the jerk that broke the bar until after the bar was broken.

*By Mr. Kenny* : There is not the slightest doubt about it ; I don't remember ever seeing a train stop steadier than that ; I think if the side-chains had been on the train, it might have been stopped by the spragging ; the side-chains would have held it temporarily and we would have had time to put the sprag in.

*By Mr. Webb* : There is always a certain amount of recoil ; the guard should have his break on when the train stops ; heavier the train, more the recoil ; the strain would just come on the bar, and then on the side-chains, some trains run with two guards and some with only one ; the guard would not get out till the train did stop.

*By Mr. Thompson* : I have never known them to stop without using the brakes at all.

*By Jury* : I have heard of two or three breakings lately ; I did not hear of two or three draw-bars breaking last night. Taken on oath before me, at Bathurst, this 29th April, 1890,—

W. A. STEEL, Coroner.

G. DAVIDSON.

*William Brady*, on oath, states :—I am a carriage and waggon builder by trade, but a carriage examiner now and am employed at Bathurst ; I remember Friday the 25th instant ; I did not inspect the trucks and carriages attached to No. 26 ; I saw No. 28 go out ; I was standing on the down platform about 25 yards from the signal-box ; I heard a noise and I looked over towards Kelso, and saw a red light, and saw a train shoot over the bridge, it was travelling very fast ; I could see the carriages lighted up ; I saw the engine No. 28 go outside the gate ; I threw the tools I had in my hands down ; I had not run very far when the collision took place ; when I got to the engine I met one of the firemen, he said "Look for my mate, the driver, I don't know where he is, I ran round the fence, the driver was lying down the bank, his name was Millen ; I asked him if he was badly hurt, and he said, "No" ; I then left him and went down further and found a man about thirty yards from the driver ; he was a fletcher on the line, his name is Condon ; I could see he was badly hurt, and my mate and I moved him ; one shunter came up and he sent for the doctors ; when I left him I went up a bit farther and I saw a woman under a pair of wheels, that was Mrs. Condon ; more assistance came then ; I saw a little girl on the top of bank, two axle-boxes were across her legs and a piece of panel of a carriage, I believe her name was Radford ; I lifted her out to Signalman Stewart ; I could then see her two legs were broken ; some one sang out there is some one on the other side ; I went round and I could see he was jammed with a spring across his legs ; I have heard his name was Jeremiah Newnan ; I removed the spring off his leg, and I could see the foot was taken off the other leg ; some assistance came then and we took him to where the other injured people were lying ; when we were carrying him down the bank, he asked us what he had been doing ; I went up again and picked up a leg of a man with a boot on it ; I brought it down to the bottom of the bank where I had left the other ones ; I went up again on the Russell-street side and some one told me there was a woman at the bottom of the bank ; there I saw a woman lying on two cushions ; I thought first she was alive, and felt if her pulse was beating, I could then see that she was dead ; her name was Mrs. Franklin ; I went back to the other side and picked up another leg and brought it where I had left the other one ; I went then and assisted in getting the wreckage off the line, while doing so a man picked up another part of a human being, this is all I know about the accident ; the body of Mrs. Franklin, and the other people were taken to the hospital.

*By Jury* : I have been eleven years at England in the railway, and six years here.

*By Mr. Kenny* : I was engaged in County Down the last time at home.

*By Mr. Thompson* : I have been six years here ; there is only one guard running now ; I used to see two ; lately I have seen one : it is about the last six months that I noticed one guard ; I examine trains leaving Bathurst, and have a knowledge about the couplings ; one of the trucks at the breakage was a weak gear, and one strong gear ; I fastened the weak gear and strong gear, according to instructions, and the side-chains left hanging, as the weak gear go into the shop ; they are taken off, and the strong gear put on ; the weak gear and the strong gear are coupled together, as they cannot do otherwise.

*By Mr. Kenny* : I did not see the body of Downey ; I only saw the legs ; I never saw the order about coupling the weak and strong gear, but the late Mr. Turton told me that an order was out to that effect ; where the side-chains could be used they were used ; the new trucks have no provision for side-chains ; I have heard the men speaking about the order, but no dissatisfaction ; I know the matter has been represented to the Commissioners about the side-chains within the last twelve months ; I saw that in the paper, passenger trains have a centre coupling, two side-chains always hooked, and have automatic brakes.

*By Mr. Webb* : I did not see train No. 26 go out ; when trains draw up, there is always a recoil, unless there was tight coupling ; I know nothing of the deputation to the Commissioners, except what I saw in the newspapers ; the coupling up of the trains is done by the shunters ; I have to see it is properly done ; they are putting the strong chain on the old trucks ; but I cannot say about the bar ; by single coupling only ; one chain is fastened on, and the other left hanging down ; it was the custom to hook two centre-chains ; the passenger trains are coupled by screw couplings, and it would not be more than six seconds when the train collided after I saw it ; I have nothing to do with the arrangement of the guards ; I cannot say it is customary for one guard to run on through trains.

*By Mr. Kenny* : If the chain is left slack, it will not come out of the hook.

*By Jury* : I have known an instance where the train has come in drawn by the side-chains.

*By Mr. Webb* : The centre coupling was broken and drawing on the side-chains ; I have seen it happen a couple of times ; the last accident like this, the train was partly loaded and partly not ; the last one was about twelve months ago, and the draw-bar was pulled out.

WILLIAM BRADY.

Taken on oath before me, this 29th April, 1890,—

W. A. STEEL, Coroner.

*William Nash*, on oath, states :—I am an operator at Bathurst Railway Station ; I recollect the night of Friday, the 25th instant ; I received the wire from Kelso about 6:30 p.m. that No. 26 had broken away, and was running back into Bathurst ; I immediately informed Mr. Farquhar ; I told Mr. Farquhar verbally.

*By Mr. Kenny* : As far as I can remember, I got the telegram about 6:30 p.m.

*By Mr. Webb* : Mr. Farquhar was standing near the window of the telegraph office, and I told him at once ; I did not see the collision.

*By Mr. Kenny* : I believe No. 28 had just started when we got the message ; it had started about a minute.

W. NASH.

Taken on oath before me, this 29th April, 1890,—

W. A. STEEL, Coroner.

*Edwin Davies* recalled.

*By Mr. Thompson* : I have heard the evidence of Mr. Weeks about the cross-coupling ; the cross-couplings spoken of by the witness Weeks could not have been defective in this case.

*By Mr. Kenny* : I do not recognize the heavy draw-bar ; I only recognize the centre-chain ; the cross directs me to the centre-chain.

*By Mr. Webb* : The gear produced I do not recognize as strong gear ; I hooked the chain on the other carriage into this hook produced, and left the chain hanging ; I hooked the strong gear into the other chain according to instructions.

T. B. DAVIES.

Taken on oath before me, this 29th April, 1890.

W. A. STEEL, Coroner.

*David Kirkcaldie*, on oath, states :—I am Traffic Manager ; I have been so for twelve or fourteen months ; as Traffic Manager I have the management of running of the trains under my supervision ; from Sydney to Penrith is practically the same on all portions of the line except Penrith and Katoomba, where there is much shunting to do on the journey or a quantity of goods put in trucks or taken out of trucks at intermediate stations ; the practice is to give the guard an assistant

so as to minimise the delay at stations; under no circumstances do we provide assistant-guards on through trains except when sent to take charge of a train at that point or returning to his home, the only exception being between Penrith and Katoomba, where assistant-guards are provided for all goods trains in consequence of the exceptional character of the road; No. 26 would be considered a through train; this train would not require two guards; beyond detaching the carriages at Esk Bank and reducing the load at Katoomba in order to allow the train to go down the heavy grade safer; there would be no shunting all the way to Penrith; I have a good deal of practical experience; I have had nearly thirty years of it, ever since I left school; I know what the contents of this train was, and the weight would be about 190 tons; I considered a load from this end for that class of engine from 205 to 210 tons; the grade at Raglan is 1 in 48; I do not consider it possible to draw up this train without a recoil; if the side-chains had been attached there would not have held, but they might on a level road; there have been no instructions from the Commissioners about curtailing the number of guards; we have not reduced the number of guards; I have no knowledge about the deputation to the Commissioners about the removal of the side-chains; had such been made, I would certainly have heard it.

*By Jury:* They frequently increased their loads from Bell to Katoomba.

*By Mr. Thompson:* I would not call it a shunting train unless it shunted at nearly every station; we have not shunters at every station; it has not been customary to have two guards on this train; these through goods trains have been running for some years; Brady's evidence is incorrect; notwithstanding the evidence of Brady, I say he is incorrect; they only send two guards when one is returning home, but they are not employed; they go in uniform, and we make use of their services on their return to their home; the guards are paid for the hours on duty, and they would not have held their work on their way home; they help to a certain extent; a very heavy train would be over 210 tons (about); the running of assistant-guards is left for the District Superintendents, and it might not come under my notice; rule 379: the guards are supposed to use their brakes to the best advantage; on a level road they could stop a recoil; on a bank they could not; I know about the side-chains being coupled, and they were set aside because of a stronger centre draw-gear being put on the trucks; the alteration was made by the authority of the late Commissioner, about five years ago; the circular produced was printed before I became Traffic Manager, and it was reprinted since I was Traffic Manager; the Commissioners can make rules and regulations, approved by the Executive Council; the circular is sent to all the men; the Commissioners are using the strong gear as quickly as they can; all the light draw-gear should be replaced by strong draw-gear; I say the gear produced was sufficient for the train; the side-chains can be used when the strong and light gear meet; stronger centre couplings are to be used; there is no reason why the side-chains should not be used; if the side-chains had been used it might have helped to hold it; they could have been used by cross-coupling; the side-chains should have been hooked on the centre-chains; no order was made as to the cross-coupling; the guards are to take every precaution to ensure the safety of the trains; the weak draw-bars are being replaced by strong draw-gear as soon as possible; strong gear has been put on to the weak draw-bar (produced) since 1884; all the waggons that have been built have had strong draw-gear; within the last twelve or eighteen months they have altered 550 with strong draw-bars; an accident like this might happen at any time; every precaution has been taken to prevent accidents; the Commissioners are putting down special machinery to deal with it as quickly as possible; I have never heard of a deputation waiting on the Commissioners; I know a number of brakes have been ordered from England; I don't know if a deputation waited on the Commissioners in September about automatic brakes; there is no goods train in the world controlled with automatic brakes; there was a trial made some years ago with the automatic brakes; I remembered trials were made five or six years ago between the Westinghouse brake and the Vacuum brake.

*By Mr. Kenny:* In two places there are 1 in 33, and several grades 1 in 40 between Kelso and Katoomba, but they are very short pieces; in a great many cases we run double trains between Penrith and Katoomba, but we have an assistant-guard, because it is an exceptionally difficult part of the line; more empty trucks go eastwards from here than go westward.

*By Jury:* I think it a great mistake to use double coupling; there have been instances where both centre couplings and side-chains broke; the break in this case was caused by recoil.

*By Mr. Webb:* You always feel a recoil; I attach no blame to Guard Davies; I have heard of representations for assistance to guards; I have not seen it in the Press.

*By Mr. Kenny:* I don't think the side-chains would have held if they had been hooked; formerly both centre couplings were used; the train in question was a mixed train; no greater precaution is taken in a train like this; links frequently break through rough shunting; we cannot take any extra precaution more than we do; these side-chains are done away with in England; there are heavier grades between Penrith and Katoomba than between Kelso and Katoomba.

*By Jury:* There is a bond in other colonies to be signed before you enter a goods train.

*By Mr. Webb:* We have between 4,000 and 5,000 old waggons, and during the last eighteen months 550 have been altered, and we are altering them at the rate of 1,000 a year, and that will be doubled with the new machinery; on the passenger trains we have screw coupling side-chains, and Westinghouse brake; guards are always expected to keep other guards, and in order to utilize, we send them as assistant-guards.

*By Jury:* I don't think if they had had six assistants it would have done any good.

*Mr. Thompson:* I have heard the evidence of Davidson, Palmer, and Brady, and still say it must have been caused by a jerk; I have known Davies as a very intelligent man; there is no order to the contrary of not using side-chains; I think Davies' evidence about an assistant-guard is incorrect.

Taken on oath before me, this 29th day of April, 1890,—

W. A. STEEL, Coroner.

DAVID KIRKCALDIE.

Police Court, Bathurst, 30 April, 1890.

Adjourned inquest from the 29th instant.

*David Kirkcaldie,* recalled, on oath, says:—There were other orders issued beside order No. 8; this order does not supersede any rules and regulations excepting so far as relates to the central draw-bar; I remember general order No. 4, relating to screw couplings and side-chains; there was no order ever issued from my office authorizing the disuse of side-chains, and where possible they are used; it does happen that screw couplings are used between vehicles, one only of which are fitted with side-chains; in this case the side-chains would be used by hooking into the screw couplings; it is the only way they could be used.

*By Mr. Thompson:* General order No. 4 relates to screw couplings, and screw couplings were used on the stock trucks on this train in question; the side-chains are not intended to apply to the rule referred to; it is a rule of the Department to make all orders explicit; I don't remember whether there was an assistant-guard at the accident at Bell, as I was out of the colony; No. 23 down train was a fast through goods train; I have never heard an instance where a goods train has been brought up a grade 1 in 40 with side-chains; I can't speak from memory about the accident at Harden, on the 22nd June, 1889; I could not tell how it occurred, whether it was a centre-chain that broke, or whether the end was drawn out of the waggon; I have no doubt that a notice of that accident was brought before the Commissioners; it would be a private inquiry about the break at Harden.

*Mr. Kenny:* The trucks are only supposed to be marked with a cross when they have been fitted with strong gear; I am surprised to learn that the men think they are forbidden to use side-chains.

*By Jury:* The side-chains would not be as effective as if they were used opposite each other as when coupled to the centre coupling.

*By Mr. Webb:* I don't think the side-chains would be any use.

*By Jury:* I think it has been the custom for men to couple the side-chains to the centre-chains.

*By Mr. Webb:* The carriage on which this bar produced was fixed was not marked with a cross.

*By Mr. Thompson:* The side-chains have not been removed from the old trucks, but the new ones have not side-chains.

*By Mr. Kenny:* The side-chains that have been thrown aside are from off the old trucks that have been broken up.

DAVID KIRKCALDIE.

Taken on oath before me, this 30th April, 1890,—

W. A. STEEL, Coroner.

William

*William Thow*, on oath, states:—I am Locomotive Engineer on the New South Wales railways; I have charge of the rolling-stock; I have been in this position in this Colony nearly twelve months; when I came here I found the rolling-stock in a somewhat decayed condition, and have used my best endeavours to remedy this; we have changed a great many axles, and have strengthened about 450 waggons since I came here; it was in process of being done before I came here—about six or twelve months before; this work is proceeding as rapidly as possible; we are putting fresh plant down, a new steam-hammer, and we are building a furnace for the purpose of increasing the output of new draw-bars; about 4,000 were considered to be defective when I came here; the other repairs to the vehicles are extremely heavy; we have now workshops full repairing trucks, carriages, &c.; I estimate the weight of No. 26 train to be about 190 tons, exclusive of the engine; the haulage power of the engine would be something over 200 tons up the grade in question; the load was a fair one; the weight of the part that broke away was about 160 tons; the resisting power of the broken bar equals 28 or 30 tons, assuming the iron to be of good quality; one of the continuous draw-bars, of equal diameter to the one produced, would have been subjected to the same strain under the same conditions; I think that the broken draw-bar, if it had not been subjected to any severe jerk, would have been sufficient to hold the train together; in order to haul 160 tons up the grade the force passing through the bar is not quite 4 tons; there must have been some unusual strain to have broken the bar produced; this bar appears to be fair iron; it is following a natural law of decay, as all iron does, after being in use for some time; I think the strain must have been caused by a recoil of the train; when the engine-driver stopped his engine with the brake, the vehicles which were not braked ran forward upon the engine, compressing the buffers as they did so, and when they began to recoil the strain brought upon the bar by the recoil of the buffers was sufficient to snap it; we are not putting side-chains where we are putting stronger draw-gear; the side-chains are not being used in England now; the side-chains cannot be tightened up in going round curves, and there is no strain on them unless the draw-gear breaks; if the main draw-gear breaks the strain is so great on the side-chains that they snap; I do not think each chain in a case like this would bear more than a strain of 8 tons; I do not believe the side-chains would have held the trucks on the train which broke away; the strain was, in my opinion, too great; the weight of the van was a little over 12 tons, and the power of the brake was equal to skidding the wheels of a van weighing 10½ tons; this is a high proportion of brake power; this brake was just about the same as the mountain brakes, the same power; the brake on the train, No. 26, was a very good one; I understand the principle of the couplings of trains, and am conversant with the rules and regulations of the Department; the strong coupling ought to have been thrown over the hook of the waggon next to the one that became detached, over the weaker draw-bar; the side-chains, I take it, would be attached to the strong chain from the draw-gear; rule 372 provides that the side-chains were to be used as effectively as the circumstances would permit; the general order, No. 8, refers. I take it, only to the centre couplings.

*By Mr. Thompson*: The draw-bar broken produced is defective, not sufficiently strong; I think where the accident occurred the line is nearly straight; if the side-chains were of the same length, the strain, no doubt, would take place on each chain at the same time; this would have added a resisting power of about 16 tons; the bar in its present condition would stand a breaking strain of 28 or 30 tons; the side-chains have been discontinued in all new stock; the cross mark would show that the waggons were supplied with new draw-gear not requiring side-chains; I think the side-chains not being used on the occasion of the accident was a violation of the rules; to my mind, rule 221 does not convey that the side-chains were to be discontinued; the stronger draw-gear was commenced to be used at the latter end of 1884; there are side-chains on the passenger trains, also the automatic continuous brakes; the passenger trains are all fitted with screw couplings and are of a weaker nature than the ordinary bar; if the train was drawn up very gently there would be no recoil; the mere hauling of the train up the incline would not be sufficient to fracture the bar; the only way to explain the fracture, in my opinion, is a sudden and violent jerk; it must have been subject to a sufficient strain to break it; I detect no flaw in the broken parts of the bar; I do not think the draw-bars frequently break; they do break on all railways; the workshops are full at Eveleigh; we have no steam-hammers anywhere, except at Eveleigh, that would make the draw-hooks; a full load would be about 200 tons; the guard would have a fair idea of the weight of the trucks he has every means of ascertaining the weight.

*By Juror*: I have been connected with railways for thirty years in Great Britain and South Australia, from the time I was 17 years of age.

*By Mr. Kenny*: The haulage of the strong draw-gear will be and is from 48 to 50 tons; the side-chains and the bar produced would draw up steadily, without any jerk, a weight of 600 or 700 tons; if there had been no jerk the side-chains would probably have held the train, that is, if the train had been drawn up very steadily.

*By Mr. Webb*: If the side-chains had been fastened there would have been a severe jerk on these chains after the breakage of the bar; side-chains are not used on the waggons of the London and North-western Railway; I attach no blame to Guard Davies; I believe he acted up to what he thought was intended by the circulars.

*By Mr. Thompson*: The whole weight of the train would be on the draw-bar; this bar would hold the weight of the train, and a good deal more under ordinary traction; side-chains have been done away on most of the leading railways in England.

*By Mr. Kenny*: The side-chains were done away with in January, 1889, in this Colony, on trucks on which the strong gear has been fixed; there are some very steep grades in England—several 1 in 40.

*By Juror*: I have known strong bars to break in all parts; the side-chains were attached to the waggons in which the new draw-gear had been fixed—those made between 1884 and 1889.

W. THOW.

Sworn at Bathurst, this 30th day of April, 1890, before me,—

W. A. STEEL, Coroner.

*George Farquhar*, recalled, states:—I have the books which show the running of the trains; I produce them; No. 26 is a through train; on the 1st April this train had two guards; 17th April, two guards; 22nd April, two guards; 23rd and 24th, two guards; and on the 25th, the night of the accident, one guard; on these occasions, when there were two guards, the second guard was returning, either to his home or to take charge from another point.

*By Mr. Thompson*: I produce the book showing the time-table for April, 1889; train No. 40, I find that two guards travelled on the 1st, 2nd, 4th, 5th, 6th, 9th, 11th, 12th, 13th, 15th, 16th, 17th, 18th, 19th, 20th, 22nd, 23rd, 24th, 25th, 26th, 27th, 29th, 30th April, 1889; I cannot say why there was only one guard on the 3rd and 10th April, 1889; this train was a pick-up in April, 1889; this is the reason there were two guards; pick-up trains going out now do not take two guards; No. 40 ran as a pick-up for a considerable time before April last year; the second guard was in many instances returning to his home; I have had no instruction to send an assistant-guard with No. 26 train; I do not send an assistant-guard with the guard of 23 for the purpose of assisting the guard; during February, 1889, the train was run as a pick-up; in February, 1888, it was running as a pick-up and numbered 10; in October, 1889, she was running as a through train; I produce the guard's book for this month; she carried two guards on the 1st, 2nd, 3rd, 4th, 7th, 8th, 11th, 12th, 13th, 14th, 15th, 16th, 21st, 24th, 25th, 26th, 28th, 29th of this month; on the 30th October thirteen trains went away, all carried only one guard, with the exception of one they all went eastward.

*By Mr. Webb*: I take November, 1889, and find that on the 7th there were ten trains, and only one assistant-guard, and he was returning.

*By Mr. Thompson*: I cannot say how it was the train carried two guards nearly every day in October, 1889; the assistant-guards were returning as assistants on their way home; they were run as assistants because they were not required for other work.

*By Mr. Webb*: October is generally a month of heavy traffic; the trains would not wait for these assistants if they were not in readiness to proceed.

GEO. FARQUHAR.

Sworn at Bathurst, this 30th April, 1890, before me,—

W. A. STEEL, Coroner.

*William Francis Schey*, on oath, states:—I am aware that representations were made to the Commissioners that the practice of coupling with centre couplings and no side-chains was dangerous to the public safety; I brought under the notice of the Commissioners the fact that a train had broken away at the Fish River just prior to the deputation that waited on the Commissioners; a train travelling from Harden to Goulburn had broken away near the Fish River bank, and had run back a distance of about 4 miles; the train consisted of twelve trucks and a brake-van; ten of the trucks, a passenger carriage, and a brake-van became detached by the breaking of the centre coupling; the special point made upon was that

that an order had lately been issued that side-chains were not to be used ; and the employees expressed this opinion concerning it, " That it is desirable in the interests of the travelling public, and the railway employees in general, that the Commissioners be interviewed or communicated with respecting the Acting Traffic Manager's order regarding the coupling of vehicles in use for the carriage of coal and goods, as it is contrary to the rules laid down in the book of rules and regulations ; and further, that we are of opinion that sooner or later some serious accident will happen owing to the disuse of the necessary couplings " ; the Chief Commissioner told us that the Commissioners were about to fit automatic continuous brakes on all goods stock, and that would cure the risk ; a remark was further made to him as to what might occur in the interval, to which he replied that we might remain satisfied, as the responsibility on the shoulders of the Commissioners was much greater than rested on ours ; this is substantially what took place between the Commissioners and me ; I know that it is a matter of general complaint among the goods guards that the assistants have been done away with ; my service ended in August, 1886 ; I had been seven years on the railways ; up to this time, as far as my knowledge went, it was the custom to have two guards on all goods trains, except under exceptional circumstances ; I referred to order No. 3 when we waited on the Commissioners ; Mr. Eddy said he did not know anything about the order, and did not say that it had not the effect of doing away with the side-chains ; in my opinion it is the general opinion of the guards that the order does away with the side-chains ; No. 221 was also referred to at the deputation.

*By Mr. Webb :* I was stationed part of the time at Darling Harbour, at Granville, and at Parramatta ; as a labourer at Darling Harbour, as a porter at Granville, at Parramatta the first portion of the time as a goods clerk, and the latter part as parcels clerk ; I was specially engaged at shunting at Granville.

WM. F. SCHEY.

Sworn at Bathurst, this 30th April, 1890, before me,—

W. A. STEEL, Coroner.

*Isaac Hadden, on oath, states :—*I have been an acting-guard between six and seven years between Penrith and Bathurst ; No. 26 has been running all this time ; as a rule there were always two guards ; the practice has been discontinued ; I was employed as assistant-guard ; had to work up here and back ; I never returned as a passenger ; before leaving Penrith I was marked down as No. so-and-so up and No. so-and-so down.

ISAAC HADDEN.

Sworn at Bathurst, this 30th April, 1890, before me,—

W. A. STEEL, Coroner.

*Charles William Lawes, on oath, states :—*I am a guard, running between Penrith and Bathurst about eight years ; I have frequently run No. 26 train of late, odd times by myself ; formerly I had an assistant-guard ; this was the rule ; I am acquainted with order No 8 ; if there are side-chains we used them ; if a vehicle having the strong gear is attached to a vehicle having the weaker bar and the side-chains we use or attach, if possible, the side-chains ; I believe the purport of the order is to do away with side-chains.

*By Juror :* If I had been guard of No. 26 at the time of the accident I would have coupled the trucks as they were coupled.

*By Mr. Webb :* Of late years it has been the custom to keep assistants back, so that they can travel by certain trains.

*By Juror :* There are many instances where the train has been carried by the side-chains after the centre coupling has given way.

C. W. LAWES.

Sworn at Bathurst, this 30th April, 1890, before me,—

W. A. STEEL, Coroner.

*Charles Davidson, on oath, states :—*I found the end of the broken bar about 1 foot from the rail, and about the length of a rail from where the mark appeared made by this draw-bar.

*By Juror :* I found it on Sunday afternoon, at 3 o'clock.

C. DAVIDSON.

Sworn at Bathurst, this 30th April, 1890, before me,—

W. A. STEEL, Coroner.

## The Secretary to the Railway Commissioners to The Under Secretary of Justice.

Government Railways of New South Wales,

Sir,

Secretary's Office, Sydney, 15 May, 1890.

In reply to your letter of the 8th instant, referring to the verdict and rider of the Jury in connection with the accident at Bathurst, whereby Rebecca Franklin met with her death, I am directed to say that the rider appears to have been framed in consequence of a complete misapprehension of the Jury of the facts regulating the traffic management of the New South Wales Railway Service.

The Jury say " they are of opinion that the safety of the travelling public and the railway employees has been endangered by the discontinuance of the use of side-couplings, whilst the weak gear is in operation, and recommend the use of side-couplings be resumed pending the fitting of all rolling stock throughout the Colony with strong gear." This implies that something has been done which lessens the safety of the travelling public, whereas there is no foundation for such an imputation, as evidenced by the report herewith from the Chief Traffic Manager.

The Jury further say they recommend " that the practice of carrying assistant-guards on all goods trains be resumed." In this respect also the Jury has been under a misapprehension, as from the Chief Traffic Manager's Report, it will be seen that no change has been made in the mode of running goods trains ; and that there has been no alteration in the number of guards accompanying trains for the past ten years.

I am to add that the Commissioners regret the evident desire of certain persons who attended the inquest to influence and mislead the Jury in regard to the management of the Railway Department, and which interference resulted in the rider accompanying their verdict.

I have, &c.,

H. M'LACHLAN,  
Secretary.

[Enclosure.]

Sir,

Chief Traffic Manager's Office, Sydney, 6 May, 1890.

I beg to report, for the information of the Commissioners, that no order has ever been issued, or even contemplated, authorizing the disuse of side-chains on vehicles of any description where they are provided. And the general practice has been that where waggons with the old or light description of draw-gear have been attached to the new vehicles, which are provided with strong centre draw-gear and without side-chains, to place the coupling of the strong on the draw-hook of the light draw-gear, and to place the hooks of the side-chains on the latter in the centre chain of the other or stronger gear.

With

With respect to the assistant-guard question, I am in a position to state that no alteration has been made in the practice for the past ten years at least. Except between Penrith and Katoomba, where the gradient is of an exceptionally long and severe character, it has not been customary to provide assistant-guards for through goods trains.

Where assistants have been employed on through trains it has been simply to utilize the services of men returning to their homes after having run either as head or assistant-guards in the opposite direction, or when on their way to a station to take charge of a train.

The practice has been to provide assistant-guards only on local or "pick-up" trains which have a considerable amount of work to do at stations in transit.

I have, &c.,  
DAVID KIRKCALDIE,  
Chief Traffic Manager.

The Secretary for Railways.

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Sydney : Charles Potter, Government Printer.—1896.

[9d.]

1890.

## LEGISLATIVE ASSEMBLY.

## NEW SOUTH WALES.

## RAILWAYS.

(PAPERS RELATING TO CHARGES MADE BY THE COMMISSIONERS AGAINST MR. SCHEY, M.P., IN REFERENCE TO ACCIDENT NEAR BATHURST.)

*Ordered by the Legislative Assembly to be printed, 20 August, 1890.*

TRANSCRIPT of Interviews, Minutes, Correspondence, Investigations, Resolutions, &c., between the Railway Commissioners of New South Wales and the Representatives of the New South Wales Amalgamated Railway and Tramway Service Association, and of the last named body, having reference to the position of the Association and of the General Secretary thereof, towards, and relating to, the late Railway Accident at Bathurst, on 25th April, 1890.

On 20th May, 1890, while the Annual General Meeting of the Association was in session, a special messenger delivered the following letter to the President:—

“ Dear Sir, New South Wales Railways, Secretary’s Office, Sydney, 20 May, 1890. .

“ I am directed by the Railway Commissioners to say that they would like to have a few minutes conversation with yourself, Mr. Schey, and two or three other members of your Council, and would be glad if you could come down this afternoon, as one of the Commissioners will be leaving town to-night and will not be back for some days.

“ Yours, &c.,  
“ H. M’LACHLAN,

“ Secretary.”

“ Mr. H. C. Hoyle, President,

“ Railway and Tramway Association, Temperance Hall, Pitt-street.”

The letter having been read to the Conference and received, the following resolutions in regard thereto are transcribed from the official Minutes:—

“ Resolved,—That so much of the Standing Orders be suspended as will admit of the letter of the Railway Commissioners being dealt with.

“ Resolved,—That the Executive, together with Messrs. Young and Dean, attend to the Commissioners.

\* \* \* \* \*

“ Resolved,—That this Conference do now adjourn, to allow the Delegates to wait on the Commissioners.

“ Conference rose at 4 p.m.”

A few minutes later the deputation was ushered into the presence of the Commissioners, who then addressed the deputation as per following copy, furnished to Mr. Hoyle, President of the Association, in answer to his request on behalf of the deputation for same, a week or so after it had occurred.

On receipt, the Executive of the Association handed it over to Mr. Schey, the General Secretary, to reply to, before going into a searching investigation into the grave charges made therein against Mr. Schey. His reply is attached to the report in parallel columns.

Office of the Railway Commissioners of  
New South Wales,  
Sydney, 20 May, 1890.

Mr. President and Gentlemen,—

After very careful consideration, I have come to the conclusion that this list of grave charges will be best answered, for the sake of accuracy, and rendering it capable of being easily understood, by adopting the parallel column method, which I have accordingly done.

NOTES of interview between the Railway Commissioners and Representatives of the Railway and Tramway Association, *re* relationship of the Society and the Commissioners.

*Present*:—The Railway Commissioners; Mr. Hoyle (President of the Association); Mr. Schey (General Secretary of the Association); Representatives of the Amalgamated Society.

The Chief Commissioner stated that the Commissioners had deemed it advisable to ask the representatives of the Association to meet them, in view of events which had recently occurred at the Coroner’s inquest which had been held at Bathurst in connection with the breakaway of a goods train at Raglan on the 25th April last.

(1) The Commissioners felt compelled to ask whether the position taken up by the General Secretary of the Association at the inquest was one that the Association intended to take up in connection with the Railway Commissioners—that was, to appear as prosecutors, to misrepresent orders, and to do everything that could be done to fix blame where blame was not attached. *It went so far as that, as the*

(2) *whole proceedings showed it was not a question of getting evidence.* Of course he was speaking of Mr. Schey's action, and referred to him as their representative and not as a Member of Parliament. He held two positions, and the Commissioners had their views about that also; but in this matter he (the Chief Commissioner) was simply dealing with Mr. Schey as the representative of the Association. (3) He knew nothing whatever of the accident itself, but went into the witness-box as a witness against the Railway Com-

missioners (4) and gave the lie direct to him, as the Chief Commissioner for Railways, in connection with

a certain (5) order, which order had no importance in connection with the case at all. It had never been submitted to the Commissioners, and if it had it would have been approved, because it was simply a

(6) repetition of an order which, as he would show, had been issued before they took office, and which had nothing objectionable in its provisions. This order had been referred to by a deputation which waited upon the Commissioners, when they (the Commissioners) stated that they had no knowledge whatever of the order; and, notwithstanding this, Mr. Schey stated, and he was specially recalled by

counsel to again make the statement, that (7) "he had very good grounds for knowing that the Chief Commissioner was well aware of it, although he had informed the deputation that it was not a fact that he knew the order had been issued." Then statements were made by Mr. Schey to people that the result of the inquest would get the Commissioners into trouble, especially the Chief Commissioner; and this, it must be remembered, was at a place where there was a strong feeling against him personally, and the Commissioners as a body, for doing their duty in transferring workmen to other places where they could be employed with greater advantage to the Department. (8) Within an hour or two of the accident it was stated that a verdict of manslaughter would be brought against myself, although the cause

of the accident was unknown. (9) The Association newspaper also, detailing an interview with the Commissioners on the subject of side-chains, was distributed in Bathurst, and extracts published in the Bathurst papers, all apparently with one object. The counsel employed by the Association also tried to influence the jury (10) by saying that he (the Chief Commissioner) had shown great callousness in not being present at the inquiry. But how were the railways to be administered if the Commissioners were to go to every inquiry? There was one, for

(1) Of course I cannot presume to say what course or position is likely to be taken up by the Association in any future case; but, so far as this Bathurst case is concerned, I, as General Secretary, certainly *did not* appear as *prosecutor*; *neither did I misrepresent any order*, nor did I in any way *endeavour to fix blame on any one*. I acted throughout with the fixed purpose of eliciting the whole truth, or as much of it as circumstances rendered possible; and if the evidence elicited had the effect of fixing the blame in any particular direction, I submit that I am in no way blamable for it.

(2) What this is intended to convey, I am at a loss to understand, and can therefore say nothing in regard to it. This remark seems to me to require a further definition and explanation.

(3) *I gave no evidence as to the circumstances of the accident.* I went into the box merely to prove the fact that the deputation of employees waited on the Commissioners in August, 1889, to draw attention to their opinion of the dangerous practice of disusing side-chains and of using single coupling only.

(4) I certainly did not give the lie to the Chief Commissioner; I simply told the truth, as my oath bound me to do; and I submit that I cannot be blamed if that should contradict the statement of any person whatever.

(5) As to the order (221, I presume), I have my opinion as to its importance, which certainly does not coincide with that of the Commissioners. It is certainly not my business to inquire whether such order was submitted to the Commissioners for approval or no; neither can I have anything to say as to whether it would have been approved of or no, if it had been so submitted.

(6) As to its being a repetition of a previous order,—that is true, but with this qualification: that the previous order (No. 8) was never fully issued, but was withdrawn and cancelled within a week of its first issue, and was never acted on at all. Everyone can have his own opinion as to whether the provisions of the order were objectionable or not, and the Association certainly did think them objectionable, for they waited on the Commissioners in August last and expressed the very strongest objections.

(7) This is variously stated by various newspapers. The *Bathurst Free Press*, which gave the best and fullest report, and whose leading articles on the matter were favourable to the Commissioners, reports me as saying, "I have the best of reasons for saying that the order was issued by immediate authority of the Commissioners, yet I have told the jury that he (the Chief Commissioner) said he knew nothing about it." This I believe to be quite correct, and I have already fully explained the circumstances, and my reasons, both in the public press and to Mr. Eddy personally. (As see copy correspondence marked "X" attached to these papers.)

(8) If this statement were made, it is a thing incidental to all such occurrences; but it was not made by me, as I did not arrive in Bathurst for about thirty-three hours after the accident, and then went immediately to bed for another five hours or so, and I did not say so afterwards.

(9) I took six copies of each of three issues of the *Review* to Bathurst with me, out of which I brought back more than half, giving the remainder to the local press; but not until after the jury had returned their verdict. Of course, many men there had already the *Review* in question in their possession.

(10) I did not suggest this to the Association's solicitor, and, of course, cannot direct any such person as to what he should say in his address to the jury. No solicitor would submit to such dictation, and certainly I had no idea of interfering in that way.

instance, being held at Maitland now, which should have been settled in three hours; but Mr. Kirkealdie had already been there for a week, and, from information to hand, it appeared he might be there until the end of the present week. If the Commissioners attended to all these cases, how could the administration go on? What greater attention could have been paid than was, in sending the three principal officers of the railways (the Chief Traffic Manager, the Locomotive Engineer, and Engineer for Existing Lines) to attend the inquiry? (11) The whole of the examination and address of the Counsel for the Association revealed the strongest animus against the Commissioners personally, he having been directed, apparently, to make a direct attack upon him (the Chief Commissioner), and endeavour to influence the jury to bring in a verdict adverse to the Commissioners. (12) Was that calculated to make cordial relations between the Commissioners and the Association? He did not say it would make the slightest difference. They would do their duty in every respect to the staff; but it was not the fair play Englishmen should expect, and it was to him degrading that he should have to defend himself, and he thought it wrong that the Association should have taken up the position of attempting (13) to show to the country that he had failed to state the truth, as, if such was the case, he was not fit for his position. Then again, it appeared in the last issue of the Association paper (14), and the paper misrepresents the verdict of the jury when it states, "The verdict, condemning as it does the imperilment of human life by single couplings only." As a matter of fact it did nothing of the sort. The verdict simply said what the Railway Commissioners say, as he would show presently, the rider to the verdict of the jury being, "The safety of the travelling public and the railway employees have been endangered by the discontinuance of the use of side couplings while the weak gear is in operation, and recommend the use of the side-chains be resumed, pending the fitting of all rolling stock throughout the Colony with the strong

gear." That (15) was exactly the order of the Railway

Commissioners. The jury thought it unnecessary for side-chains to be used when the strong gear is in opera-

tion. (16) Mr. Schey seemed to be trusting to Mr. Midelton, and to believe him before the Chief Commissioner, as in the Association paper he states:—"Mr. Midelton, who was Locomotive Engineer at the time the order was issued, states just as emphatically that the Chief Commissioner gave him the order personally, and that he executed it against his own better judgment, and with fear as to the consequences"; (17) but, as a matter of fact, Mr. Midelton did not utter one word of objection when the subject was under discussion, and Mr. Kirkealdie, the Chief Traffic Manager, who was also present, said he remembered distinctly that (18) Mr. Midelton stated at the time that he saw no use for side-chains with the strong draw-gear. The Chief Commissioner did not recollect that, but he knew

The solicitor conducts the case, and must be left to use his own judgment as to his address.

(11) This is a matter of opinion, and I do not coincide with the opinion expressed by the Commissioners, and need only add that no instructions of the kind insinuated were given by me to the Association's solicitor. Most assuredly there was no idea of making any special attack on the Chief Commissioner. See 10 and 45.

(12) This would appear to me to indicate that suppression of the truth, when so desired, is expected as the price of cordial relations. I have never understood that I was to govern my official actions by any such consideration.

(13) No such attempt was made. I cannot be held responsible if the sworn evidence contradicts any statement which may have been made by any person.

(14) The *Review* does not misrepresent the verdict of the jury. The verdict, of which I attach a copy, certainly does condemn this disuse of side-chains, and the sentence in the *Review* is synonymous with the corresponding sentence in the jury's verdict. The jury found that public safety was "endangered"—"That the deceased, Rebecca Franklin, met her death at the Russell-street crossing, on the 25th April instant, caused by an accident through the breaking away of part of No. 26 up train, which collided with No. 28, leaving Bathurst Station; and the jury further find that the safety of the travelling public and the railway employees has been endangered by the discontinuance of the use of side couplings while the weak gear is in operation, and they recommend the use of the side couplings be resumed, pending the fitting of all rolling stock throughout the Colony with the strong gear; and they further recommend that the practice of carrying assistant guards on all goods trains be resumed; and the jury desire further to exonerate Guard Davis and Driver Palmer from all blame in the matter."

(15) This was not the order of the Commissioners. See 20 and 21. They ordered side-chains to be taken off vehicles with strong draw-gear, while the jury recommended that they be replaced on all vehicles until all were fitted with the strong draw-gear. The strongest proof of this is found in the fact that side-chains are being replaced on all vehicles, in accordance with the recommendation of the jury.

(16) I did not trust to Mr. Midelton. Both See 22. statements, directly contradictory, were made in the public press, and the *Review* simply drew attention to and contrasted them, and said, in relation thereto, "It is not our province to decide."

(17) Here Mr. Eddy admits that the subject See 5, 19, 20, 30. was discussed with Mr. Midelton prior to his leaving office.

(18) If Mr. Midelton did say what is alleged, it certainly does not say that he said side-chains were of no use while weak draw-gear was still in use, which was the case at the Bathurst accident, and apparently the record referred to in No. 20, presently considered, was disobeyed by some person as to the "chains."

that not one word of objection was raised. (19) The original minute taken down at the time of the Northern Inspection Tour in January, 1889, when the question was discussed with the officers, which he now quoted from the original record book, was as follows:—“The Commissioners decided (20) that side-chains should be discontinued on all vehicles fitted with the strongest draw-gear, chains to remain on those vehicles having the light draw-

gear until such gear is replaced. (21) Now, that was exactly the verdict of the jury. Then the Commissioners had an interview with representatives of the Association in August last, when the matter of side-chains was mentioned, and the following minute was written:—(21 a) “The deputation drew attention to a circular which had recently been issued by the Traffic Manager, instructing the men, even when side-chains were provided, that they were not to be used. The centre coupling might at any time snap, and they thought that the side-chains should be used for the protection of the men, particularly as in many cases the trains running in the distant districts were mixed trains. They had several instances, one particularly of a train arriving at Harden, where the trucks were held in three places by the side-chains only.” (22) The Commissioners then stated that they were unaware of the order, but promised to look into the question, and shortly after-

wards (23) they had a meeting with the officers, and it was found that no such order had been issued.

(24) There was evidently some misapprehension in Mr. Schey's mind with regard to the whole matter. He did not wish to say that it was intentional; but there was a misapprehension in his mind as to the meaning of the order No. 221 (which was evidently the one referred to by the deputation), which was simply a re-issue of the order (25) of the 11th February, 1888, which simply deals with the double

shackling of the waggons. (26) The question was first raised in 1885 by a memo. of Mr. Loughrey's recommending the discontinuance of the double couplings, which was endorsed by Mr. Scott asking for an order to be issued. Copy of memorandum given below.

“Memo. to Locomotive Engineer.

“Sir,

“I have to report, for your information, that the practice of double coupling the centre chains on our goods stock is still continued, even with the last new couplings, which were made considerably stronger than the old ones, and were intended to be used singly.

“As the couplings are apt to be damaged in this way, I think an order should be issued to the effect that whenever the new couplings are in use they should only be single coupled.

“E. A. LOUGHREY.”

“I forward these reports for your information. I trust that you will issue an order to prevent the double coupling of the strong couplings in the future.—W. SCOTT, 4/9/85. Traffic Manager.”

(19) This was therefore six or seven months before the issue of Traffic Order 221. See 17, 5, 20.

(20) The Commissioners here admit that a mechanical order was given to remove these side-chains from vehicles with strong draw-gear, thus doing the very thing which, as soon as carried out, caused the issue of Traffic Order 221 in July, 1889, and the deputation to point out the danger and objection in August, 1889. See 5, 15, 17, 19

(21) As already shown, this order and the verdict of the jury are not the same, but radically different. See 15.

See 24.

(22) They have been unaware of the actual issue or wording of Traffic Order 221; but, as above, they have already admitted giving the very mechanical order which caused the state of things here brought under notice by the deputation. See 6, 17, 19, 20.

(23) If such were found, when we had already explained to the Commissioners that the employees at large understood order 221 as complained of, why were we not informed that we had misread the order; and as it was known that it was so misunderstood, why was not another order issued, making the exact meaning of 221 clear to all persons.

(24) There was no misapprehension on my part. If I did not understand Traffic Order 221, neither did the men at large. It was they who complained; I acted only as their mouthpiece. See 21a.

(25) This order of 11th February, I have already explained, was never acted upon, and was cancelled within one week of its first issue. Mr. Goodchap saw that it was not only dangerous but contrary to the Regulations, and so had it immediately cancelled. See 6, 27.

(26.) This is not correct; the question was first raised some years before 1885—in 1883, I think.

" Government Railways,  
 " Locomotive Engineer's Branch,  
 " Junco Station, 28 August, 1885.

" Memo. to Locomotive Engineer *re* Double Coupling  
 of Trucks.

" I NOTICED a few days ago that our travelling water-tanks, furnished with continuous draw-gear, the new standard hook, and 1½-inch couplings, were double coupled. If I remember aright, the 1½-inch couplings and new hook were intended to do away with this.

" I should be glad if you would give me some information on the subject.

" T. A. SOWELL,  
 (*pro* J. CLOSE)."

(27) A lot of correspondence passed on the matter, ranging over 2½ years, the order finally being issued in February, 1888, and repeated by Mr. Kirkcaldie in July 1889. There are no papers showing how the order came to be reissued, and the reason for it cannot be traced, but it would probably be in consequence of some of the inspectors seeing the waggons double shackled being a source of weakness, and drawing attention to the matter.

(28) That was the story of the order concerning which so much had been said; and after all it had no bearing on the question of side-chains in any shape, as it simply dealt with the mode of using the two main chains. The side-chains, as he had shown, have not been disused except in the case where the strong draw-gear had been put in. Tests had been made as to the breaking strain of the draw-gear. Some of the strong draw-bars stood a test of 42 tons, whilst the side-chain on the truck concerned in the Bathurst accident broke on a strain of 7½ tons. These tests were made by the use of a machine which brings the strain gradually upon the iron; and the strain upon the side-chains would not be so severe as in the case of the Raglan accident, where the chains would have been subjected to a sudden snatch. Cases might be brought forward where, with a falling or an easy gradient, or where the parting had been effected without any severe jerk, side-chains have held; but that had no bearing on a breakaway on a gradient of one in fifty when the strain must have been so great; and this has been proved by Mr. Thow, by actual tests. The Association paper goes on further to state:—  
 " Neither is it our province to decide on whom must

rest the responsibility of issuing (29) General Order 221, which is the cause of the disuse of the side-chains. The Chief Commissioner states emphatically that he gave no authority for the order, while (30) Mr. Midelton, who was Locomotive Engineer at the time the order was issued, states just as emphatically that the Chief Commissioner gave him the order personally"; so that the man who was put up to give him (the Chief Commissioner) the lie direct, and on whose authority he was held up to every man as unfit for his position, was Mr. Midelton, who was further said to have been the Locomotive Engineer at the time the

(27) I repeat, G. Order No. 8, of February, 1888, <sup>Sec 6 & 25.</sup> was never acted on. The double coupling was continued until the issue of G. Order 221, in July, 1889. I have already given the reason above. The former Commissioner would not sanction such an order. <sup>Sec 21a.</sup> Whatever may now be contended, it is patent to all that the men understood the order 221, as doing away <sup>Sec 21a.</sup> with side-chains, and if not aware of it before, the Commissioners were certainly aware of the order and the way it was construed, and also that the side-chains were being disused in consequence of such order. This was plainly told to the Commissioners by the Association deputation, in August, 1889, eight months before the Bathurst accident. Again, the <sup>Sec 5, 15, 17, 19, and No. 6.</sup> Commissioners admit that they had a consultation with the officers, in September, 1889, when they saw the order 221, and notwithstanding what the deputation had pointed out, they found no fault with its provisions (*vide* Commissioners' Report to Minister on the accident). Surely then, from September, 1889, the order 221 existed with the full knowledge, authority, and concurrence of the Commissioners. Again, side-chains were taken off many <sup>Sec 20.</sup> trucks, thus rendering it impossible to use them in a great many cases.

(28) With these tests I have nothing to do. It is within the knowledge of a large number of our guards here, that side-chains have held heavier trains than the one which broke away at Raglan, and on heavier grades than the one at Raglan: witness the accident at Singleton, on 28th May, 1890. I can quote several other instances. All the sworn evidence at the inquest proves that there was no "sudden snatch."

(29) I have already abundantly shown that this <sup>Sec 16 & 21a.</sup> order (221) was the cause of the disuse of side-chains.

(30) Mr. Midelton was Locomotive Engineer at <sup>Sec 17.</sup> the time the mechanical order to take off the side-chains was issued. Mr. Eddy has already admitted that fact, and states that Mr. Midelton raised no objection. Traffic Order 221 was merely the result of what had been done to the trucks, and which naturally took some time to carry out; and, as already admitted by Mr. Eddy, the order was given to Mr. Midelton, who was Locomotive Engineer

See 20.

order was issued. As a matter of fact Mr. Midelton left the service on the 1st April, 1889, months before

the order 221 was issued, so (31) that simple fact shows that Mr. Midelton is not to be relied upon. Regarding the statement previously referred to in the Association paper as to (32) Mr. Midelton having carried out the order about side-chains against his better judgment, was there any man, in any position, worthy of the name who would do anything to

See 17 and 80

imperil public safety without putting on (33) record his objections? Mr. Midelton was the technical adviser of the Commissioners, and if he had any objections to any course being followed, he should have written back a minute stating he considered it unsafe; he did not do so, as he was a consenting party in the discussion. (34) Then with regard to the alleged statements from the staff, as to the risk of running without side-chains, we have the direct assurance of the officers that they have not had one word of complaint from any man on the subject, therefore if the men had any feeling surely they ought to have gone to their own officers. (34) He did not believe in a system by which the staff would go to people other than their officers regarding the work, and if that is the way matters are to be conducted, the railways could never be managed properly. Then a further matter

was taken up at the Bathurst inquiry (35) as to assistant-guards being knocked off. He said with all seriousness that since the Commissioners had been in office they had been untiring in their efforts to press

the officers (36) in the direction of safe working. For instance, with regard to increased appliances, they authorized, on going over the Illawarra line, the introducing special signal-boxes for the block system instead of allowing the system they found in operation of the station-masters working the block to continue, and on this and other lines the cost of increased staff was between £5,000 and £6,000 annually for signalling alone, and, as they mentioned last night, where 28 miles of block working existed when the Commissioners took office there was now 194 miles worked under the block system. They had done everything to increase the safety of working since they took office, but notwithstanding all that had been done the Association, (37) through their representative at the inquiry, endeavoured in all ways to fix the blame upon the Commissioners.

See 18, 10, 48.

Mr. Commissioner Fehon stated that they should quite understand the spirit in which they had been asked to call. The Commissioners felt they had no explanation to make, but it was simply with a desire that cordial relations (38) should exist between the society and the Commissioners that they deemed it wise that the interview should take place. The Commissioners have their duties to fulfil, and there should be no such spirit of hostility (39) to them as was shown at the Bathurst inquiry.

See 18, 10, 48, 87

The Chief Commissioner stated the principal point that they wished to know was, if it was by the instructions of the Association that Mr. Schey's action was taken (40). The Commissioners had no desire to limit fair inquiry, as their instructions to their counsel and the officers who attended the inquest were that everything should be done to bring out the actual state of things, and that he took to be the object of the inquiry, and no one had more interest than the Railway Commissioners to see

at the time. The record is in January, 1889, while Mr. Midelton was Locomotive Engineer. He left in April, 1889. The record is turned into an order (221) in July, 1889; the objection is in August, 1889.

(31) This has no bearing whatever on Mr. Midelton's reliability. He did not make the statement, but the writer of the article.

(32) Of course on this matter I can say nothing, but it was universally understood, when the Board took office, that it was not healthy for any officer to raise any objection or protest to any order given him by the Commissioners.

(33) Here again Mr. Eddy fully admits his responsibility for the mechanical order, of which traffic order 221 was merely the natural sequence. No. 20 says, "The Commissioners decided, &c., &c."

(34) We have on this point direct assurance that representations were made to the responsible officers on the subject of order 221 and its effects; that they were pooh-poohed, and no notice taken of them. Therefore, of course, no record can be found of such, and no officer would condemn himself by remembering any such circumstance after the accident.

They did not go to "other people." Surely they went in proper departmental fashion when they respectfully represented the matter to the Commissioners failing the lower officers, a practice, it must be observed, which Mr. Eddy sedulously commends when speaking publicly.

(35) I did not, nor did the Association, ever lay it at the door of the Commissioners that these assistant-guards were taken off the trains. When in the box at Bathurst, and asked the question as to whether complaints on this head had reached the Commissioners, I distinctly said I could not say that they had, as many complaints had a habit of stopping short before they reached the Commissioners.

(36) With all this I have nothing to do. I admit at once that I believe not only that these statements are quite correct, but that the Commissioners have evinced every desire to make the railway work and travelling as safe as possible in the directions indicated.

(37) I have already pointed out that I did not do so, and must again disclaim any such intention.

(38) No one has striven harder after cordial relations than myself, and, certainly, I have not been the first to rupture them.

(39) I again repeat that there was no such spirit of hostility as is here attributed.

(40) On this point I leave the Association itself to decide. I need only point to my duties and instructions under Association rules 23 and 93; also to the plenary authority from the Council under which I have always acted in all such cases. The Council also have approved, by resolution, of my actions at this Bathurst inquest, and I could also remind you of other consultations and authorities having reference to this class of cases.

that the truth was arrived at (41). To show their wishes in this matter, in connection with the Farley accident, a request was made to Mr. Thow by a deputation of the drivers that one of their number should be allowed to go and sit by the side of the drivers' counsel to prompt him in questions as to the rules and regulations, so as to ensure everything possible being brought out on behalf of the driver concerned. Mr. Thow, knowing the spirit of the Commissioners, said certainly permission would be granted. We had nothing to hide, and in every inquiry that is conducted fairly the Commissioners knew that they would stand with clear consciences. He was afraid that they might go away without understanding the matter, and that was the reason in asking them to come (42), so that they could really ascertain whether Mr. Schey appeared at Bathurst, taking the line of action he did, at the instance of the society, so that the society should appear as prosecutor; putting in the general secretary as a witness, although he knew nothing whatever of the merits of the case, to give the lie direct to him as the Chief Commissioner, and that the counsel for the Association should urge the jury to fix the responsibility on him in the first place (43), and also on the Commissioners, although, as he had shown, what the Commissioners had done had not had one fraction of weight in connection with the matter, and they were

simply the administrators of the Railways (44), and not the executive officers, who could be held personally responsible for the carrying out of the details of the working.

(41) This is entirely foreign to the matter under discussion, and I have therefore nothing to say to it.

(42) I have already traversed the whole of this matter. I repeat that I proffered no evidence on the facts of the accident, and what I did give was not proffered at all but given at the request, and in answer to, questions of the Association's solicitor, who must be permitted to conduct any case committed to his charge as he thinks best.

(43) This is not correct. Mr. Thompson, in commencing his address to the jury, said "He must state at the outset that he was not present, as some persons might think, to endeavour to fix the blame of this dreadful occurrence on the shoulders of any particular person, 'Nothing of the kind.'"

(44) On this I have nothing to say, but, of course, we all have our own opinions on the matter.

In conclusion, I have only to say that I think, in view of the foregoing, that the serious charges made against myself must fall to the ground. Of course, a portion of them are nominally directed against the Association, but, after all, only through the way in which I have administered its affairs. The whole thing therefore is, I take it, directed personally against myself. I need only add that, had I so chosen, I had abundant facts in my possession which, if produced at the coronial inquiry, would have badly damaged and discredited two of the principal departmental officers who went into the witness box, and who certainly had no more right than myself in the box, for if, as Mr. Eddy contends, I knew nothing of the accident personally, neither did they, but no objection is raised to their going into the box and giving evidence, some of which, at all events, was deliberately untrue. I have to say, therefore, that everything was not done either to prosecute or discredit the Department or the Commissioners. I now leave the matter confidently in your hands, feeling that I have fully vindicated the position of the Association as well as my own in the foregoing pages.

Copy of correspondence marked "X," and referred to by that designation in No. 7 of foregoing papers. The correspondence fully explains itself:—

Sir,

2 May, 1890.

I do myself the honor to enclose herewith a copy of a letter which I have this day addressed to the editor of the *Australian Star* for publication. Reference to Mr. Angus will corroborate the statement which I have made therein as to the explanation of the answers given by me to questions asked.

I deem it due to you, as to myself, to make this explanation to you as well as to the public Press.

Regretting that such a construction should have been put upon the words used,

I have, &c.,

WM. F. SCHEY,

General Secretary.

E. M. G. Eddy, Esq., J.P., Chief Commissioner for New South Wales Railways.

[Enclosure.]

The Bathurst Accident.—An Explanation.

Sir,

To the Editor, *Australian Star*.

2 May, 1890.

I notice in your "Current Topics" of last night that I am represented as having made "a most serious charge against Mr. Eddy" in my evidence at the late inquest into the Bathurst disaster. I admit that the evidence bears that construction; but had I been permitted to explain, as I did immediately afterwards to the Departmental Solicitor, Mr. S. E. Webb, and to Messrs. Angus and Kirkealdie, my meaning would have been at once clear. I said I was of opinion that general order 221 had been issued by the authority of the Chief Commissioner, as undoubtedly it was, because no traffic manager,

manager, or any officer of similar grade, under our system, has power to issue any such order without the authority of the heads of the Department. At the same time it is perfectly possible that Mr. Eddy was quite ignorant of this and many other orders which have been issued under his authority. Thus the "serious charge" vanishes into thin air. These things are necessarily so, and I had no intention of imputing untruthfulness to Mr. Eddy.

Thanking you in anticipation,

I am, &c.,  
WM. F. SCHEY,  
General Secretary.

Bathurst Accident.

Sir,

5 May, 1890.

I have received your letter of 2nd May, but I cannot think you really expected that I could accept any "explanation" of the statement you made with so much deliberation on *oath*, and which, no doubt, influenced the verdict of the Coroner's Jury.

The statement was absolutely false; yet you practically reiterate it in your letter above referred to.

I am, &c.,  
E. M. G. EDDY.

W. F. Schey, Esq., M.P., Secretary, N.S.W. Amalgamated Railway and Tramway Association.

Bathurst accident.

Sir.

9 May, 1890.

I do myself the honor to acknowledge the receipt of your letter of 5th inst., in reply to mine of 2nd idem, both dealing with the above subject.

I deeply regret that you should have considered it necessary to impute to me so grave an offence, as you virtually do by drawing my attention to my evidence on *oath*, and by then declaring that such a statement was absolutely false.

I am far from imputing to you a desire to be offensive or insulting to me, as I still consider that you are under a misapprehension of what really did occur, and of the effect of my evidence; and I am sure that your sense of what is right will induce you to withdraw this imputation, which is necessarily offensive, even though not intended to be so, if I can convince you that I have in no way departed from the truth in my evidence.

On the 16th August, 1889, a deputation of the railway employees waited upon yourself and your respected colleagues, and were courteously favoured with the opportunity of discussing many matters which they considered of moment to them. Amongst others, the subject of centre couplings only was dealt with, and the attention of the Commissioners drawn to the then recent Rule or General Order 221, which virtually does away with side couplings; and the interview on that point terminated by your promising to look into the question and by your saying that without knowing the facts you could not say that you would countermand the order.

I now assume that the portion of my evidence to which you take such grave exception is that in which I say, "I have the best reasons for saying that the order was issued by immediate authority of the Commissioners."

If I am correct in my assumption, will you permit me to point out that as you and your colleagues were then vested with supreme authority in such matters, no one in the Department could have ventured to promulgate so serious an infraction on previous rules without some knowledge or authority or acquiescence on the part of the Commissioners.

In the interview referred to you did not appear to be aware that there was so grave a difference between some of the Rules and Regulations guiding guards on trains and that comparatively new Rule or General Order 221, yet you did not in any way lead your deputationists to believe that the rule or order had been issued without sufficient authority, though you said you knew nothing of it.

Surely, therefore, it must be admitted that I am right in stating that I have the best reasons for saying that the order was issued by immediate authority of the Commissioners; and yet, immediately afterwards, in reply to your solicitor, in stating that he (meaning yourself as Chief Commissioner) said he knew nothing about it, which I do not for a moment dispute.

I beg you to observe that I do not say that I know this, but my reasons are so plainly the natural inference arising out of what had occurred, that I cannot help feeling amazed that you have not seen that this is the true way of reading the matter.

In my previous letter to you I referred to my having stated in explanation what my reasons were both to Mr. Webb (who prevented me stating them on oath when I wished to do so) and to Mr. Angus; and the reasons were that I was perfectly satisfied that no traffic manager, or any officer under you and under our system, could have power of his own motion to issue such an order or rule.

If you take any exception to any other part of my evidence, or if I am incorrect in supposing that the portion quoted is that which you consider open to so grave a charge, I beg that you will state it—so that I may have an opportunity for reply; as I am sure that your sense of justice will incline you to what appears to me a fair and right course.

I regret that anything should have arisen to disturb the otherwise friendly relations between myself, as the accredited official of the Railway and Tramway Service Association, and yourself; and I have every hope that a little further explanation will pave the way to a restoration of such relations.

I have, &c.,  
WM. F. SCHEY,  
Gen. Sec.

E. M. G. Eddy, Esq., J.P.,  
Chief Commissioner for Railways.  
Sydney.

Sir,

13 May, 1890.

I have to acknowledge the receipt of your further letter regarding the Bathurst accident, but the action you took on behalf of your society, at the inquiry, was so extraordinary and without justification that I must decline to correspond any further on the subject.

I am, &c.,  
E. M. G. EDDY.

W. F. Schey, Esq., M.P.,  
Secretary, New South Wales Amalgamated Railway and Tramway Association.

The day after the deputation, viz., on 21st May, Mr. Hoyle was sent for privately by the Chief Commissioner, who showed him a private report which had been received by him from the solicitor and departmental officers who attended at the inquest at Bathurst on behalf of the Commissioners. [*Copy of this report is attached in full further on, and is marked A.*] This report detailed other and still more serious charges against Mr. Schey, and was shown to Mr. Hoyle by the Chief Commissioner in strict confidence. Mr. Hoyle, feeling that, in justice to all concerned, such further charges should be thoroughly investigated, wrote to the Commissioners on 5th June, asking for a copy of such report, for the purpose of enabling such inquiry to be made. On 9th June the Secretary for Railways furnished Mr. Hoyle with a copy of the said report, at the same time stipulating in a "private" letter that the same should be used only for "the purpose of confidential inquiry," and that it should not be "made public." Mr. Schey being informed of the receipt of such report, at once informed Mr. Hoyle, in the presence of a witness, that he had already had a copy of such report in his possession for nearly a week, and was also prepared with an ample refutation of all it contained. On investigation this was found to be true, Mr. Schey having obtained possession of it in the following way:—

In the course of an ordinary letter to Mr. Schey, under date 16th May (thus being before the conference, deputation, &c.), Mr. Alfred G. Thompson, the solicitor at Bathurst, who represented the Association at the inquest, wrote: "Can you not get the report on the inquest as furnished by Webb, Kirkcaldie, Angus, and Thow? It is a tissue of lies, and will go far to show how little confidence can be placed in any report they may prepare.—I can. The Coroner, any of the jurors—in fact, the whole panel if necessary—with Kenny" (another solicitor) "and myself to give the lie direct to most of the statements. Let me have a line to-morrow as to chances of getting this document before the public." This aroused Mr. Schey's suspicion, who, seeing that the remarks could not apply to the departmental report on the accident, which had been laid before Parliament, and that he was unaware of any other report being in existence, at once wrote to Mr. Thompson for further information and explanation. Mr. Thompson then said that he had a copy of the report in question, which he would send to Mr. Schey, together with refutations of the statements made therein. This he did, forwarding the papers, covered by a letter of explanation, on 5th June. Thus the report and the refutation were in Mr. Schey's hands four days before the copy furnished by the Commissioners reached Mr. Hoyle. The following is the report referred to, and is marked A, and is the document previously referred to in these papers by that designation:—

Railway Department, Office of Engineer for Existing Lines, Sydney, 2 May, 1890.

INQUIRY into accident at Bathurst commenced at Hospital on Saturday, when the various parties were represented by Mr. Palmer, solicitor, instructed by Mr. Thompson's clerk. On this occasion Mr. Schey was not present.

On Monday morning Mr. Schey appeared at the inquiry, instructing Mr. Thompson, as we were informed, on behalf of the Railway and Tramway Association. Mr. Thompson also appeared on behalf of Guard Davis and Driver Palmer.

During the progress of the inquiry Mr. Schey instructed Mr. Thompson both as to the mode of conducting the inquiry and as to the questions that should be asked, in almost every instance his questions being directed particularly in attempting to attach blame to the Department generally, and to the Commissioners in particular.

His instructions in this respect at length became so irksome to his solicitor that he was imperatively ordered to desist from this course of procedure.

In attempting to attach blame to the Department, Mr. Schey went into the box himself, and detailed at great length a conversation which he said he had had with the Chief Commissioner at one or two interviews, tending to show that the Chief Commissioner was aware of the defectiveness of the rolling stock of the order dated 10th February, 1888, and that this order had been issued under his direct instructions, though the Commissioner had asserted, when a deputation of the railway employees waited upon him, that he had no knowledge whatever of the order.

On being recalled, Mr. Schey reiterated the statement having reference to the Chief Commissioner's personal knowledge of the order, stating that he had very good ground for knowing that the Chief Commissioner was well aware of the order, notwithstanding that he had informed a deputation that he had no knowledge of it.

During the progress of proceedings Mr. Schey distributed liberally a newspaper published, we believe, by his Association, which contains a long account of the meeting of the Commissioners with the deputation above referred to, and *he got* the various local papers to insert this report in *extenso*.

So persistent were the attempts of counsel and Mr. Schey throughout to attach blame to the Commissioners, and particularly to the Chief Commissioner, and also to the heads of the various departments, that at last the foreman of the jury rose in his place, and in open Court called the Coroner's attention, and the attention of counsel, to the fact that the inquiry was one being held to inquire into the cause of the death of Mrs. Franklin, and not as to the working and management of the Railway Department and the conduct of the Chief Commissioner or other Commissioners, and those remarks were endorsed by two or three other jurymen, who said they considered a great waste of time was being carried on by this course of procedure; and this matter went so far at last, that, after the remarks of the foreman of the jury, the Coroner himself stated that he considered matters *irrelevant* to the inquiry were being introduced unnecessarily, and apparently with an object.

On Monday, after the morning sitting, during lunch-hour, Guard Davis, who was the guard in charge of the train which was wrecked, stated to the Commissioners' solicitor, and to one or two of the officers of the Department, that he had no knowledge that such a course of examination was to be pursued, and he was very much annoyed at Mr. Schey for instructing the solicitor as he had done, and that until the questions were asked he had no knowledge whatever what questions were to be asked, or of the course that was to be pursued. Again, several other times during the inquiry Guard Davis expressed his disgust and disapprobation of the course which was being pursued by his counsel, and informed several parties that so far as he was concerned he repudiated having given any instructions for such a course of procedure, and that he did not see that he could in any way be held responsible for it, as the instructions were wholly Mr. Schey's. Several other railway employees stated outside Court to officers of the Department concerned in the inquiry that Schey seemed to have a particular "edge" on the Commissioners, and that he had expressed himself as being certain that the finding of the jury would get the Commissioners into trouble, especially the Chief Commissioner.

The counsel appearing for Mr. Schey and Davis appeared to find himself in a very awkward position, considering the position taken by Davis and that taken by Schey, and asserted in the commencement of his address that he did not desire to attach the blame to the Commissioners, or to the Chief Commissioner, or to anyone, in fact; still the whole burden of his address was to the effect that the Commissioners had been grossly negligent, and that Mr. Eddy had shown an utter want of feeling and consideration for human life in connection with this matter by remaining absent from the inquiry, and by merely sending three officers of the Department.

He urged the jury, in very impassioned language, to add a rider to their verdict which would fix the blame of this accident on the shoulders of the Chief Commissioner in the first place, and of the Commissioners in the next place. During the whole of the inquiry Mr. Schey's conduct and behaviour was indicative of the keenest feelings of animus towards Mr. Eddy and the officers of the Department. Whenever any circumstance was elicited tending in any way to make a point against the Department or against Mr. Eddy, Mr. Schey would throw himself back in his chair and laugh and nod at the representatives of the Department in a way which indicated as plainly as words could speak, "I have got you on that point."

During Mr. Thompson's address his conduct in this respect was very unseemly, and, also, his manner when he went into the box as a witness indicated the strongest ill-feeling and animus towards Mr. Eddy in particular, though this ill-feeling seemed to extend in some measure to the other Commissioners and the officers of the Department present.

When the jury went to view the couplings of the train at the station, Mr. Schey accompanied them, with others, and whilst the jury were inspecting the identical couplings which were the cause of the inquiry, Mr. Schey perched himself on top of the truck, over the couplings, and persisted in interfering with the members of the jury, and in pointing out the various difficulties and improbabilities and other matters tending to show that the contention of the officers of the Department was not possible, to such an extent that the foreman of the jury on two occasions literally sat on him.

S. W. WEBB.

J. ANGUS.

DAVID KIRKCALDIE.

W. THOW.

Referring to the statement of Mr. Schey, that the Chief Commissioner was aware of the issue of the order dated July, 1889, I may point out that the general order was merely a reissue of an order issued on the 10th February, 1888, by my predecessor months before the present Commissioners assumed office, and was issued entirely on *my own responsibility*, and without reference to any of the Commissioners.

DAVID KIRKCALDIE.

The following is the covering letter, written by Mr. A. G. Thompson, when forwarding the report, and previously referred to:—

W. F. Schey, Esq., M.L.A., Sydney,—

Bathurst, 5 June, 1890.

Dear Sir,

In reply to your letter of 26th May last, I have to state that I have had the report signed by Messrs. Webb, Angus, Kirkcaldie, and Thow, perused by eleven of the jurors, and so that no doubt may exist as to their opinion of its untruthfulness, a document has been signed by ten of the number, which I have annexed to the copy report, and forward herewith for your use.

As to the portions of the report dealt with by the jurors, I will have little to say beyond the fact that I not only agree with what is stated, but go further and state emphatically that the report in those particulars is wilfully false. The remarks alleged to have been made by me in my address to the jury are without the slightest colour of truth, and in that I am supported by the jurors, by many who heard me, and by the reports of my address contained in *The Times* and *Free Press*.

With regard to what is reported of statements made by Davis, I can only say that in my opinion the whole is untrue, but I am not in a position to give the *best evidence* of the untruthfulness of what is said by Davis, although I could give cogent reasons for my opinion. Davis himself, however, would, I feel sure, add his share of denial of this fabrication.

I will not dwell upon what is stated with regard to yourself. Let it suffice for me to say that as to your conduct during the inquiry, and as to my having asked you to desist from irksome instructions to myself, the statements made are utterly false.

Now with reference to the whole report. Does it not seem an appalling state of things that three officers at the heads of various branches of our great Railway Service should have deliberately affixed their signatures to a document which is absolutely, wilfully, and grossly untrue from beginning to end.

What confidence can the public place in future in any report of the result of any departmental inquiry emanating from men who could degrade themselves by the issue of an undignified, childish, and withal grossly-perverted document such as that under consideration.

Apart altogether from the attack upon yourself, or the untruthful references to me, there is underlying the whole matter a principle, viz., the credibility or otherwise of responsible public servants, whose characters for reliability and integrity should be unassailable and invulnerable qualities, which, if open to doubt, should render them unfit for their positions. As to the other gentleman signing the report, it is a matter for his own personal consideration. If he chooses to affix his signature to a document which he knows to be misleading and untrue, he is not answerable to the public; but it is not so with the others, who are the servants of the public.

I may mention that I have spoken to the newspaper proprietors, who deny the statement that you "got them to publish the report of the deputation which waited on the Commissioners." You will observe that only ten jurors have signed the document annexed to the report; of the other two, one declines to sign, and the other is away from Bathurst.

Trusting that what I have done may be of some service to you and to the public whom you desire to serve.

I remain, &c.,

A. G. THOMPSON.

In refutation of the statements made in the report as to the actions and words of the Coroner and jury, the following is the refutation signed by ten jurors, referred to in Mr. Thompson's letter, which also explains why the other two jurors did not sign also:—

We,

We, the undersigned jurors, who sat as such at the inquest on the body of the late Rebecca Franklin, who was killed on 25th April last, through the breaking away of part of the No. 26 up-train which collided with No. 28 leaving Bathurst station, having read the copy report herunto annexed, have to say with regard thereto :—

1. It is not true, as stated, that "the foreman of the jury rose in his place, and in open Court called the Coroner's attention and the attention of counsel to the fact that the inquiry was one being held to inquire into the cause of the death of Mrs. Franklin, and not as to the working and management of the Railway Department, and the conduct of the Chief Commissioner or other Commissioners; nor is it true that such remarks were endorsed by two or three other jurymen, who did not say that a great waste of time was being carried on by this course of procedure."
2. It is not true that "the Coroner himself stated that he considered matters irrelevant to the inquiry were being introduced unnecessarily, and apparently with an object."
3. Mr. Thompson did not say in his address "that the Commissioners had been grossly negligent, and that Mr. Eddy had shown an utter want of feeling and consideration for human life."
4. Mr. Thompson did not urge the jury in "impassioned language to add a rider to their verdict which would fix the blame of this accident on the shoulders of the Chief Commissioner in the first place, and of the Commissioners in the next place, but he did say that he hoped the jury would return such a special verdict as the evidence warranted."
4. Mr. Schey's conduct during Mr. Thompson's address was not unseemly, as he listened attentively, having his hand to his ear the whole of the time. Mr. Schey's conduct during the inquiry showed great earnestness, but in no way was his conduct unseemly.
5. It is not true that at the station the foreman of the jury "literally sat on him," meaning Mr. Schey.

JAMES KEHAHER.	R. W. WATERS.
W. MACKIE.	WALTER HALL.
ALFRED W. AVERY.	P. J. PARKER.
ALFRED JONES.	R. B. KENNA.
FREDK. LUMLEY.	WILLIAM PASCOE.

Further information being asked concerning the charges in the report that Mr. Schey unduly interfered with coupling operations, &c., &c., and that "the foreman of the jury literally sat on him" (Mr. Schey), Mr. A. G. Thompson wrote again, as follows :—

W. F. Schey, Esq., M.L.A., Sydney,—

Bathurst, 10 June, 1890.

Dear Sir,

In reply to yours of 6th instant, I have to state that I was present at the railway station with you when the couplings were being examined by the jury, and I assure you that you did not interfere with the jury, and the foreman of the jury did not complain of your conduct, or, to use the undignified words of the report, the foreman of the jury did not literally sit on you.

The Coroner being a public officer, I have not asked him to contradict what is said of him, but if he is asked for a report you may rest assured he will deny the statement.

I enclose two letters, one from the editor and general manager of the *National Advocate*, and one from the editor and senior proprietor of the *Free Press*, which will speak for themselves. I trust you will now be able to deal with the report, and that the House may see the importance of the matter.

Yours, &c.,

A. G. THOMPSON.

The following are the two certificates from the Bathurst newspapers referred to by Mr. Thompson in his letter :—

To A. G. Thompson, Esq., Bathurst,—

Bathurst, 10 June, 1890.

Dear Sir,

If it has been reported that Mr. Schey induced the various local papers to insert a report from the *Railway and Tramway Review*, during the inquest in connection with the recent railway accident at Bathurst, so far as this journal is concerned, the report is altogether without foundation. An extract from the report was published in the *Free Press*, but that was taken from the *Sydney Daily Telegraph*.

Yours, &c.,

C. & G. S. WHITE.

The *National Advocate*.

To A. G. Thompson, Esq., Bathurst,—

Bathurst, 10 June, 1890.

Dear Sir,

If it is alleged by anyone that Mr. Schey requested the *National Advocate* to publish anything in connection with the late Bathurst railway accident, I desire to give the statement an unqualified denial. No such request was made by Mr. Schey, either as regards reprint or any other matter.

I am, &c.,

FITZ-ALAN JAMES.

Further, in relation to the charges made in the report that "Mr. Schey freely distributed a newspaper, and got the Press to publish matter condemnatory of the Commissioners, &c.," Mr. Schey desires to add to the foregoing denials the fact that not only did he not attempt to "noble" the Press, as charged against him in the report, but that Messrs. Angus, Kirkcaldie, and Thow did most certainly attempt to "noble" such local press, as they invited the representatives of the whole of the Bathurst Press to dinner at Hurley's "Royal Hotel," where said officers not only treated said pressmen to an excellent dinner, but to champagne, cigars, &c., *ad libitum*.

To refute the statements made by the report as to the "disapproval and disgust of Guard Davis at the course taken by Mr. Schey and the Association solicitor," a copy of that portion of the report was submitted to Guard Davis, who wrote as follows :—

Penrith, 7 June, 1890.

In reference to the report laid before the meeting on the 7th June, 1890, which refers to my actions during the inquiry into the lamentable accident at Bathurst, I did say I was not aware what course of examination would be pursued, or what questions would be asked. I did not say I was annoyed with Mr. Schey instructing the solicitor as he had done.

I did not express my disgust or disapprobation of the course which was being pursued by my Council, nor did I say the instructions were wholly Mr. Schey's.

Nor did I hear Mr. Schey express the opinion that the jury would get the Commissioners into trouble. Nor do I think Mr. Schey desired any such verdict.

Yours respectfully,  
E. B. DAVIS.

As to the opinions expressed by other employees, and the employees at large, which the report states are or were condemnatory of the course of action pursued by Mr. Schey and the solicitor who appeared for the Association, acting under Mr. Schey's instructions, the following are deemed amply sufficient to refute any such imputation:—

At a meeting of the Council held on Monday, May 12th, after hearing Mr. Schey's report on the matter, and the steps he had taken, the following resolution was unanimously carried:—"That the action of the General Secretary be approved and ratified."

At a Meeting of the Penrith Branch of the Association held on Saturday, 7th June, it was resolved that the Branch Secretary furnish Mr. Schey with a copy of the vote of thanks accorded to him by the members of the Penrith Branch, on the 3rd May, 1890. Mr. Henry Hoyle and Mr. Schey having paid the Branch an official visit, Mr. E. B. Davis, who is a member, and who was the guard of the train which was wrecked at Bathurst, spoke at some length, complimenting Mr. Schey for the action he had taken at the recent inquiry held at Bathurst *re* the accident to his train, and he asked, as a member of the Penrith Branch, that the members should express their approval of his action. It was then resolved "that a hearty vote of thanks be accorded to Mr. Schey from the members of the Penrith Branch for the action he took at the recent inquiry held at Bathurst?" This was carried unanimously, and with acclamation, there being present fifty to sixty members. The minutes of that meeting were read and confirmed at the meeting held on 7th June, when the following resolution was carried unanimously, "That the members of the Penrith Branch of the Association approve of Mr. W. F. Schey's action *re* the investigation recently held at Bathurst *re* the accident to Guard Davis' train, that they consider that Mr. Schey acted in accordance with the rules of the Association, and that he still retains the confidence and esteem of the members of the Penrith Branch of the Association as their General Secretary."

Mr. E. B. Davis, guard of the train that was *wrecked* at Bathurst, was present at the meeting. He stated that he did not say those things at Bathurst during the inquiry which the report to the Commissioners says he did. The Bathurst Branch met on Saturday, May the 3rd. The following resolution was carried unanimously by the twenty-six members present, "That this Branch approves of the course of action pursued by the Branch officers, and also the action of the General Secretary in reference to the recent accident at Bathurst."

On Saturday, 7th June, the Bathurst Branch met again, and the following resolution was passed by the unanimous vote of the twenty members present:—"That this meeting approves of the steps taken by the General Secretary at the inquiry in reference to the late accident at Bathurst, in so far as the employees were concerned, and we believe that his motive was to elicit the fullest amount of evidence necessary to show the cause of the accident."

At the regular monthly meeting of the Sydney Branch, held in the Wesleyan School-room, Regent-street, Chippendale, on Thursday, 3rd July, the following resolution, of which due notice had been given, was discussed:—

"That this meeting of the members of the Sydney Branch of the Railway and Tramway Service Association hereby expresses regret that the General Secretary, Mr. Wm. F. Schey, should have taken so prominent a part in condemnation of the management of the railways by the Commissioners, more especially with reference to the recent accident at Bathurst. Furthermore, this meeting is of opinion that the best interests of the Association would be served if Mr. Schey would endeavour to work more in sympathy with the Railway Commissioners."

"That the foregoing resolution, if passed, be forwarded on to the Council."

And being negatived, only a couple of hands being held up in favour of it, the standing orders were then suspended by resolution, so as to admit of the following resolution, which, having been discussed, was carried unanimously, amid great cheering, there being about 200 members present:—

"That this meeting of the Sydney Branch endorse the action of Mr. Wm. F. Schey, General Secretary, at the recent accident at Bathurst, and desires to place on record its confidence in his administration of the office of General Secretary."

In the meantime, the matter of the accident having been referred to in Parliament, and Mr. M'Millan, the Colonial Treasurer, having stated that Mr. Hoyle, the President of the Association, had expressed at a deputation to the Commissioners that he (Mr. Hoyle) entirely disapproved of Mr. Schey's course of action in reference to the inquest into the late Bathurst accident, and also that he (Mr. Schey) had gone to Bathurst without his (Mr. Hoyle's) knowledge and consent, the following refutation was drawn up and signed. A copy of the proceedings of such interview was afterwards furnished by Mr. M'Millan to Mr. Schey, thus putting beyond doubt as to what interview was referred to by Mr. M'Millan.

New South Wales Amalgamated Railway and Tramway Service Association,  
Sydney, Friday, 6th June, 1890.

We, the undersigned members of this Association, having seen in the press that Mr. M'Millan stated in Parliament that, in an interview between the Railway Commissioners and Mr. Hoyle, he (Mr. Hoyle) stated that Mr. Schey went to Bathurst to attend inquest at that place concerning late railway accident at that place without his (Mr. Hoyle's) knowledge, and that he (Mr. Hoyle) entirely disapproved of Mr. Schey's actions and sayings in that case, beg to declare:—

1. That the interview in question took place at the special request of the Railway Commissioners, and was between the Railway Commissioners and a deputation of seven members of this Association.
2. That we whose names are affixed hereto were such seven members.
3. That we heard all conversation which took place.

4. That Mr. Hoyle did *not* say that Mr. Schey went to Bathurst without his knowledge or consent.
5. That, on the contrary, Mr. Hoyle distinctly said that Mr. Schey *did* consult him prior to starting for Bathurst.
6. That Mr. Hoyle *did not* express either disapproval or disgust at the actions or sayings of Mr. Schey at the Bathurst inquest.
7. The Commissioners having made several grave charges against Mr. Schey, Mr. Hoyle did say that "If Mr. Schey were guilty of the things charged against him by the Commissioners, he (Mr. Schey) had undoubtedly exceeded the wishes of the Association."
8. We cannot agree that such expression can be in any way construed into disapproval, as the charges are now being investigated by the officers of the Association, and, up to the present, Mr. Schey has not been found guilty of the charges made.
9. When such investigation is completed a full report will be communicated to the Railway Commissioners.

H. C. HOYLE, President.  
 WILLIAM H. MANUELL, Vice-President.  
 J. REID, Vice-President.  
 T. PICKLES, General Treasurer.  
 W. W. YOUNG, Delegate.  
 GEORGE DEAN, Delegate.  
 WM. F. SCHEY, General Secretary.

P.S.—As our deputation was not informed by our Commissioners, prior to being interviewed, for what purpose we were called, and as no direct questions were asked of our President, but simply a reply to our Chief Commissioner's charges, the whole substance of what transpired between the Commissioners and our President is contained in clause 7, which I distinctly understood; and, so far as any expressions of disgust, such never transpired. I affix my name to clauses 1, 2, 3, 4, 5, 6, and 7, which was the substance of what I understood at this meeting of our deputation with the Commissioners.—G. DEAN.

When the copy of the Report reached Mr. Hoyle from the Commissioners, he laid same before the Executive, who decided to get some evidence independent of that in Mr. Schey's possession, and which they had not seen. Mr. Hoyle accordingly wrote to Mr. A. G. Thompson, solicitor, Bathurst, as follows:—

The Bathurst Accident.

Dear Sir,

18 June.

I regret to say that serious complications have arisen in connection with the late lamentable railway accident at Bathurst, in which the Railway and Tramway Association is concerned.

The Railway Commissioners have made the following charges against Mr. Schey, for which, of course, they hold the Association responsible:—

- 1st. That Mr. Schey so instructed you that all the blame in connection with the accident should be fastened on to the Commissioners, and that, if possible, a verdict of manslaughter should be secured against them.
- 2nd. That Mr. Schey's conduct was most insolent towards the witnesses for the Department, so much that the foreman and another of the jury publicly protested.
- 3rd. That you yourself found it necessary to publicly protest against Mr. Schey's conduct towards yourself, and found it necessary to order Mr. Schey to allow you to conduct the case your own way, which protest was made within the hearing of the Court.
- 4th. That when the jury were viewing the coupling operations, Mr. Schey stood at the end of one of the trucks, and interfered in the most unjustifiable way with the coupling operations.
- 5th. That Mr. Schey's conduct was the subject of common talk in Bathurst after the inquiry.

The Railway Commissioners have laid the abovementioned charges before me in my official capacity as President of the Association, and they further infer that the Association has taken up an antagonistic position towards them.

You will observe that the charges are very serious as far as the Association is concerned; I will therefore be glad if you will give me your opinion unreservedly on the clauses herein named, as we are desirous of making the fullest inquiry into the whole matter, to enable the Council of the Association to come to an impartial decision on the matter.

Soliciting an early reply,

I remain, &c.,

H. C. HOYLE,  
 President.

A. G. Thompson, Esq., solicitor, Russell-street, Bathurst.

NOTE.—I will be glad if you would furnish me with the names and addresses of the gentlemen who were on the jury.

And eliciting the following reply:—

Bathurst, 21 June, 1890.

H. C. Hoyle, Esq., President N.S.W. Amalgamated Railway and Tramway Service Association, Sydney,—

Dear Sir,

I have to acknowledge the receipt of your letter of 18th instant, which reached me yesterday morning, and to which I would have replied by return post had time permitted.

I regret that the serious complications you refer to have arisen, and can only say that while the charges made against Mr. Schey remain uncontradicted, it is quite natural that the Railway Commissioners should regard the attitude of your Association, of which Mr. Schey is General Secretary, as antagonistic.

I feel assured that the charges made against Mr. Schey are based upon a report furnished a few days after the inquest at Bathurst by Messrs. Webb, solicitor for the Commissioners, Kirkcaldie, Thow, and Angus. A copy of that report was supplied to me forthwith, but not by Mr. Schey, nor with his knowledge. My astonishment at its contents was followed by indignation, when I found it bore the signatures of the three gentlemen last named, inasmuch as it was an invention, to put it mildly, from first to last, and entirely unsupported by facts. I at once obtained and have since forwarded to Mr. Schey overwhelming refutation of the allegations in the document.

I will endeavour to reply to the charges set forth in your letter *seriatim* :

1. I have carefully perused the instructions I took in writing from Mr. Schey, and there is not one word reflecting upon the Commissioners—and I assert that Mr. Schey did not at any time instruct me to fix the blame on these gentlemen nor upon any of them.
2. Mr. Schey's conduct was not insolent towards the witnesses, and the statement that the foreman and another of the jury publicly protested, is a wicked and deliberate falsehood.
3. I did not and had not the least occasion to complain of Mr. Schey's conduct towards me. I would not have submitted to conduct of the kind alleged against Mr. Schey for one instant.
4. Mr. Schey did not interfere unjustifiably with the coupling operations.
5. I cannot say whether Mr. Schey's conduct was common talk in Bathurst after the accident or not, but I can say this, that I never heard any persons expressing opinions adverse to Mr. Schey's conduct, although personal references of an uncomplimentary character have been freely made with regard to other persons concerned in the inquiry. I attach as a rule very little importance to "common talk."

I may add that, so far as Mr. Schey is concerned, I have no interest to serve. My services have been paid for in the ordinary way. Anything I have done since the verdict was given has been done as a matter of duty, and in no way as a matter of business. I find that Mr. Schey has been grossly maligned. All that he did was conscientiously performed as the trusted servant of the Association with the single object of eliciting the truth; having in view as an all pervading incentive the protection of railway employees, and as a natural consequence of such protection the safety of the travelling public.

I enclose the names and addresses of the jurors as requested. If I can give any further information or assistance I will be happy to do so.

Yours, &c.,

A. G. THOMPSON.

Mr. Hoyle then wrote to Messrs. Kelaher and Pascoe, two of the jurymen, and also to Guard Davis, making inquiry as to the truth of the statements made by the said report. He received the following replies :—

To H. C. Hoyle, Esq., Sydney,—

Bathurst, 27 June, 1890.

Dear Sir,

With reference to your note of the 24th instant, regarding Mr. Schey's conduct at the Bathurst railway inquiry, I have no hesitation in saying that the charges made against him, as quoted in your letter, are a tissue of misrepresentations, and have no foundation in fact. I have no acquaintance with Mr. Schey; in fact, have never spoken to him, consequently have no interest to serve. I believe the expression of opinion I have given will be borne out by nine-tenths of my brother jurymen.

I have, &c.,

JAMES KELAHER.

The executive of the Association met from time to time, thoroughly going into and investigating the whole matter. At a meeting held on 25th June, the investigation being finished, the following resolutions were passed :—

1. Resolved,—That after going very carefully into the whole matter, we find that the evidence produced by the President and General Secretary completely refuted the whole of the charges made against the General Secretary by the Railway Commissioners.
2. Resolved,—That this meeting recommends to the Council that the whole of the papers, &c., be printed for the information of the Railway Commissioners and all concerned.

At this meeting there were present, Messrs. Hoyle, Manuell, Reid, Pickles, Dean, and Schey. The whole of the papers were then taken to Bathurst, and submitted to Mr. Young, who, on 27th June, minuted his entire approval of all that had been done and proposed by the executive.

At a meeting of the Council, held on Monday, 30th June, the executive presented their report, when the Council passed the following resolutions unanimously :—

1. Resolved,—That recommendations of executive *re* printing be carried out, and that a special meeting of the Council be summoned to deal further with the matter.
2. Resolved,—That, in the opinion of this Council, the whole of the charges made against the General Secretary have been entirely disproved.

Mr. Schey then submitted the whole of the papers to Mr. R. W. Thompson, M.L.A., the Association solicitor, for his advice on the question of publication. Mr. Thompson advised as follows :—

Sydney, 2 July, 1890.

W. F. Schey, Esq., M.L.A., General Secretary, N.S.W.A.R. and T.S. Association,—

Dear Sir,

I have perused carefully all the papers submitted to me by you with respect to the Bathurst accident, with a view of advising your Council as to the best course to adopt to keep that body, your executive, and yourself not only free from blame but from any chance of legal proceedings, either of a civil or criminal character, by the publishing some of the documents placed before me for perusal.

Indisputably some of them are libellous, though I assume that they are absolutely true, and capable of proof up to the hilt, and by their publication, whoever assisted or assented in any way in their publication, would render himself liable to action, or prosecution, provided such publication were made before they became public property.

As the very fact of an action or prosecution being commenced must damage not only the man against whom it is brought but the Association generally and its officials, even though I might safely predict a successful issue for our side, I strongly advise that there be no publication until that step can be taken safely, or with comparative safety.

They can be published safely after they have come before the House on a motion for production, and with comparative safety if that motion is negatived, but the papers in the meantime have been in the hands of the Commissioners.

Your Council can however with safety, in my opinion, submit copies of all the documents attested to the Commissioners: Firstly, because they are *prima facie* privileged communications, coming from a body of men having an interest in the subject under discussion to the heads of the department to which those men belong; and, secondly, because to a great extent they are a reply to accusations already levelled against a responsible officer belonging to that body, and invited by the letter of the Commissioners.

I advise, therefore, that such copies be so submitted, and that immediately thereupon that a motion be tabled in the Assembly asking for their production, and that thereupon, whether they be produced or not, your Council take such action as they deem advisable.

I am, &c.,  
R. W. THOMPSON.

The executive, having previously met and resolved to recommend to the Council compliance with Mr. Thompson's advice, a Council meeting was held on Monday, 7th July, when Mr. Thompson's advice having been read, it was resolved,—

“That the advice tendered by the Association solicitor, Mr. R. W. Thompson, be acted upon, and that action be continued on the lines therein indicated.”

A special Council meeting was then summoned for Monday, 14th July, to finally deal with the whole matter, when the executive submitted the following report:—

#### Bathurst Accident.

To the Council of the Railway and Tramway Service Association,—

Gentlemen,

The executive of our Association do ourselves the honor to report that having carefully gone through the papers containing the charges made against the General Secretary, Mr. Schey, by the Railway Commissioners, and the report made by certain officers of the department reflecting very seriously upon the conduct of the General Secretary of our Association in connection with the inquest on the late Mrs. Franklin, arising out of the abovementioned accident, and having also carefully perused the report of Mr. A. G. Thompson, the solicitor employed on behalf of the Association, and the documents accompanying that report and some other documents bearing upon the matter, we have come to the conclusions as follows:—

- 1st. That the General Secretary in this matter acted after consultation with the President, Mr. Hoyle.
- 2nd. That, in so doing, he in no way exceeded the authority given to him to act in similar circumstances.
- 3rd. That he acted in the interests of our Association and the members personally concerned in this particular matter.
- 4th. That the imputations and accusations made against the General Secretary, Mr. Schey, are not only not proved but in our opinion are absolutely disproved by the overwhelming evidence disclosed by the documents submitted to us, and without reference to Mr. Schey's version of the matter, in which we have now every reason to place the utmost reliance.

In conclusion, we beg to express our strong desire to bring about the most harmonious relations between the Railway Commissioners and the Association, as we are convinced that the best interests of the department can only be served by the existence of such relations.

We have, &c.,  
H. C. HOYLE, President.  
W. H. MANUELL, Vice-President.  
J. REID, Vice-President.  
T. PICKLES, General Treasurer.  
G. DEAN, Delegate.  
W. W. YOUNG, Delegate.

After fully considering the whole matter the following resolutions were carried unanimously, there being twenty members of the Council present:—

1. Resolved,—That this Council, having thoroughly investigated the whole matter, and made searching inquiry, hereby adopt the report of the executive on the matter of the charges made by the Railway Commissioners against the General Secretary, Mr. Schey, and thoroughly endorse all the findings of such executive.
2. Resolved,—That a copy of the whole of the papers be sent to the Railway Commissioners, with a covering letter from the General Secretary.
3. Resolved,—That the draft letter, as read by the General Secretary, be approved as the covering letter for the purposes of the foregoing resolution.

Accordingly, on the 16th July, a full copy of all these papers was transmitted to the Secretary for Railways for the Commissioners, covered by the annexed letter, which is the one approved by the above-quoted resolution of the Council of the Association:—

New South Wales Amalgamated Railway and Tramway Service Association,  
Head Office, Corner Elizabeth and Bathurst streets, Sydney, 16 July, 1890.

Sir,

I do myself the honor, by direction of my Council, and in compliance with a promise already made in respect to the matters arising out of the late lamentable accident at Bathurst, to submit, for the consideration of the Railway Commissioners, the following replies to the two questions submitted by the Commissioners to the deputation of this Association on 20th May last, and subsequently submitted in writing by yourself on behalf of the Commissioners:—

1. That, in the course which was taken by myself, as the General Secretary of the Association, in proceeding to Bathurst, and in instructing Mr. A. G. Thompson to act on behalf of the Association, I so acted after consultation with the President, Mr. Hoyle, and with his full assent, and that our action in the matter has been ratified and approved by the Council.

I am desired to add, very respectfully, that the Council trusts that a perusal of the correspondence and documents which accompany this letter will not only justify them, but myself, in the course which was so taken, and thus ratified, and exonerate me from the imputation or accusation of having gone out of my way to attack or annoy the Railway Commissioners.

2. As to whether the Association or its council would adopt a similar course under similar circumstances is a question which the Council is not prepared to answer directly; but I am requested to say, with very great respect, and with an earnest desire on the part of the Council, as representing the Association, and as charged with its interests, to be in absolute accord with the Commissioners, that they trust that, as in the present matter, they will succeed in convincing the Commissioners that no wrong has been done to those gentlemen in the exercise of the high, onerous, and responsible duties cast upon them, and no offence intended to be offered to them, either officially or personally, in all future questions of a similar character arising, and in which the Council deems it right to act, or take part, that their action will be such as will be in no way wrongful or offensive or open to adverse criticism; and they trust that in any case, if a misconception arise, or any apparent ground of complaint is given to the Commissioners, they may be at once fully and fairly apprised thereof.

With regard to the documents above mentioned, and which are the outcome of the report of Messrs. Webb, Angus, Kirkcaldie, and Thow, I am desired to request that the Commissioners will peruse them as not only a justification of the action actually taken, but as a denial of all the alleged offensive conduct on my part, as to which the Commissioners most justifiably took grave exception, and as to which I am permitted to add I have given a most emphatic denial ever since I heard of it.

It has been noted by the Council that the copy of the report as furnished by you is requested to be treated as private, but I am desired to say that a copy was in the possession of the Council before the office copy was received, and was in course of being dealt with.

The Council, in conclusion, desire me to say that they trust that this matter, which has given them both personally, as officers under the Commissioners, and officially, as members of the Council and Association, very considerable trouble and anxiety, is now satisfactorily dealt with as far as they are concerned.

I have, &c.,

WM. F. SCHEY,  
General Secretary.

H. M'Lachlan, Esq., Secretary for Railways.

We, the undersigned, hereby certify that we have seen and read the original documents, of which the above are copies, and we further certify that these papers are true copies of the originals.

E. CHURCH,  
N. E. VIEUSSEUX,

Type-writers, 3, Barristers' Court, Elizabeth-street.

1890.

LEGISLATIVE ASSEMBLY,  
NEW SOUTH WALES.

**RAILWAYS.**

(FURTHER CORRESPONDENCE RESPECTING THE RAILWAY ACCIDENT NEAR BATHURST.)

*Ordered by the Legislative Assembly to be printed, 27 August, 1890.*

The Secretary for Railways to The Under Secretary for Finance and Trade.

Sir,

Government Railways of New South Wales,

Secretary's Office, Sydney, 27 August, 1890.

With reference to my letter of the 21st instant, forwarding a paper relative to the Bathurst accident, with a request that it might be placed before the Honorable the Minister, with a view to its being laid upon the Table of the Legislative Assembly, and printed with the papers on the same subject placed upon the Table by Mr. Schey, M.P., on the 20th instant, I am directed by the Railway Commissioners to inform you that the paper referred to contained a complete refutation of the statements made by Mr. Schey, Secretary of the Railway and Tramway Association, being a *verbatim* report of the Chief Commissioner's remarks to a deputation consisting of the President, Vice-President, and other members of the Association and the Secretary; and that while making the remarks it was impossible to avoid allusions to Mr. Schey's utterances in Parliament in his capacity as one of the Members for Redfern.

It having been ruled that the paper could not be laid on the Table of the House, the Commissioners deem it proper to state in broad terms that the document presented by the Association to them, and which has been laid upon the Table, is in many respects untrue and misleading, and was evidently prepared for the purpose of creating an adverse feeling towards the Railway Commissioners; and further, the paper on which the whole of that document is based was signed by many of the jurors under a misapprehension as to the real issues, and is completely refuted by the statements of the Coroner, the foreman of the Jury, by some members of the Jury, by the officers of the Court, and other residents of Bathurst, who at the same time most distinctly confirm the report of the officers of the Department.

In conclusion, I am to ask, in order to prevent the whole matter being misunderstood, that the Minister will be pleased to lay this letter upon the Table of the House, with a request that it may be printed with the papers relating to the Bathurst accident which have already been placed before Parliament.

I have, &c.,

H. M'LACHLAN,  
Secretary.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(PAPERS, &c., IN CONNECTION WITH ACCIDENT AT COOLABAH.)

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*Ordered by the Legislative Assembly to be printed, 5 August, 1890*

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Minute by The Secretary for Railways.  
Accident.

I HAVE the honor, by direction of the Railway Commissioners, to forward herewith, for the information of the Honorable the Minister for Railways, copy of the Report of the Board appointed to inquire into the accident to the down Western mail on the 28th ultimo.

H. M'LACHLAN,

The Under Secretary, Finance and Trade.

Secretary, 17/6/90.

Seen.—W.M.C.M., 18/6/90.

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Accident to Down Western Mixed Mail at 431 miles 33 chains, between Coolabah and Glenariff, on 28th May, 1890.

Gentlemen,

Sydney, 3 June, 1890.

In accordance with your directions, we have held an inquiry into the cause of the accident which occurred to the down Western mail at 431 miles 33 chains on Wednesday last, the 28th ultimo, and have now the honor to submit our report thereon.

The train, as is well known, runs as a "mixed" train between Nyngan and Bourke, and on the date named left Coolabah at 2.30 p.m., made up as follows:—

Engine No. 120, weighing 52 tons, 1 tank truck, 6 loaded D trucks, 2 loaded L trucks, 2 loaded G trucks, 5 empty cattle waggons, 1 second class bogie carriage, 1 first class bogie carriage, 1 bogie brake-van; weighing approximately 226 tons, exclusive of the engine—the load for this class of engine being 245 tons when working the mixed mail trains on that part of the line.

The first intimation of anything having gone wrong was at 431 miles 30 chains, where there are distinct indications of a vehicle having left the rails, and immediately afterwards the whole of the following vehicles except the brake-van became derailed as well.

The speed at the time of the accident is estimated to have been between 25 and 30 miles an hour, 29 miles an hour being the time-table speed.

Four passengers, who were travelling in the second class carriage, sustained injuries, but, with the exception that one young girl had her leg broken, all were of an unimportant character.

Considerable damage was done to the rolling stock, the cost of replacing and repairing which is estimated at £800 approximately.

In the permanent way 7 rails were bent, and 25 sleepers, 8 fish-plates, 566 fish-bolts, and 570 screws and spikes broken, the cost of which is £40 approximately.

Evidence.

## Evidence.

*Thomas Mannix*, ganger, states:—I have been nearly six years in the service, and have been ganger for twelve months; I have been in charge of the length from 427 miles to 433 miles 50 chains since the 1st September, 1889; I was on duty yesterday, the 23th May, and while at work with my men at 431 miles 67 chains, shortly before 3 p.m., I saw the down mail train approaching and stepped back to let it pass, and the moment I did so I saw a lot of gravel flying from the wheels of the vehicles; I immediately saw that something had happened, and held up both my hands and shouted to the driver to stop; the engine was passing me at that moment; I did not see the driver, as I was on the fireman's side; I could see the fireman, and he was in the act of firing up; I do not think that either the driver or the fireman saw me, at all events they gave no indication of having done so; I cannot say whether the engine was steaming at the time, but I should say that the train was travelling at a speed of from 27 to 32 miles an hour when the engine passed me; I saw that the train had parted about 30 chains before the engine passed me; the previous evening I packed up three joints at 431 miles 33 or 34 chains, but I am satisfied that I left the road in perfect order; that portion of my length has never given me any trouble.

THOMAS MANNIX.

*Michael Slattery*, fettler, states:—I have been six years in the service, and have been in the length from 427 miles to 433 miles 50 chains for the last fifteen months; I was on duty on the 23th May, and was at work with my mates at 431 miles 76 chains, and between 2:30 and 3 p.m. I saw the down mail train approaching; I stepped aside to let it pass, and, just as the engine was passing me, I saw fish plates falling from the rails and gravel flying from under the vehicles; seeing that there were only a few trucks attached to the engine, and no brake-van, we all held up our hands to warn the driver or fireman; I was on the driver's side, and saw him, but do not think he saw me; I was excited at what I saw, and cannot say whether the engine was steaming at the time; immediately afterwards the engine and trucks began to slacken speed and pulled up within a distance of 17 to 20 chains; subsequently, I saw a number of trucks and passenger carriages off the rails, but cannot give any idea of the cause of derailment; I was at work all day yesterday, prior to the accident, about 431 miles 76 chains; two or three days previously we packed some sleepers somewhere about the spot where the accident occurred, but did not perform any other work of importance at that particular place; I consider that the road was in very good order where the derailments took place; when the engine passed me, I could not tell at what speed it was travelling.

MICHAEL SLATTERY.

*John Southall*, fettler, states:—I have been upwards of four years in the service, and for the last two years in the length from 427 miles to 433 miles 50 chains; I was at work with my mates on the 28th May, within 3 or 4 chains on the Sydney side of the 432nd mile-post; between 2:30 and 3 p.m. I saw the down mail train approaching; it was then about 15 chains from where I was at work; I stepped aside to let the train pass, and first heard a peculiar rumbling noise, and then saw a truck off the rails; at that particular moment I could not see that the train had parted, but I immediately held up my hands and shouted to the fireman; he was then firing up the engine, and did not see me; the driver did not see me either, so far as I know; to the best of my belief the train was then travelling at a speed of about 30 miles an hour; I cannot say whether or not the engine was steaming; subsequently I saw that the train had parted, and that a number of vehicles had got off the rails; I have not done any work for some days to the permanent way in the immediate vicinity of where the trucks got off the rails; I consider that the road was in very fair order; I may add that I was standing on the fireman's side when the engine passed me; the ganger and Slattery were on the same side; Acourt was standing on the driver's side.

JOHN SOUTHALL.

*Frank Acourt*, fettler, states:—I have been seven years in the service, and for the last eighteen months on the length from 427 miles to 433 miles 50 chains; I was at work on the 23th May at about 431 miles 73 chains with my mates, and between 2:30 and 3 p.m. I saw the down mail train approaching, it was then about 15 chains from the place where I was at work; I thought I saw some lumps of coal falling from the trucks, and I stepped further back from the line than usual so that I might not be struck; I was on the driver's side; I could see gravel flying from under the vehicles, and I at once drew the driver's attention to it as the engine passed me, he saw me do so, and at once looked back, and to the best of my knowledge stopped the train; I cannot say whether or not the engine was steaming at the time, but I should say that it was travelling at a speed of 25 miles an hour or perhaps a little over; I do not think the driver knew any trucks were off the rails until I signalled to him; at that particular moment I was not aware that the train had parted, but immediately afterwards I saw that there was not a brake-van behind the trucks, and I looked back and saw the remainder of the train some distance off; the ganger and I went back to the rear portion of the train and saw that it was wrecked; the evening before the accident my mates and I packed some sleepers somewhere about the spot where the trucks got off the rails, but I consider that the road was left in perfect order; I could not see the engine-brake handles from where I stood.

FRANK ACOURT.

*Richard Joseph Cosgrove*, states:—I have been twelve years in the service, and for the last eight years have held the position of guard; I was in charge of the mail train from Girilambone to Bourke on the 23th May; when we left Coolabah at 2:30 p.m. my train was made up as follows—Engine and tender, water tank, six D trucks, two L's, two G's, all loaded, and five cattle trucks empty; when we reached somewhere about 431½ miles I noticed the luggage tumbling about and immediately afterwards I was knocked down myself; I attempted to get up and was knocked down again; I got up again and looked out and saw the passengers leaving the carriages; I at once got out myself and for the first time saw that an accident had occurred, and that a number of trucks and the two passenger carriages were off the rails, the brake-van kept the rails; I saw that the trucks and the second class carriage were very much damaged; by that time they were at a standstill, and when I looked forward I saw the engine about a hundred yards

in

in front steaming ahead, with several trucks behind it; when I was first knocked down in the brake-van I should say that we were travelling at from 25 to 30 miles an hour; I did not hear the driver sound his whistle for the brakes; I did not see either the driver or fireman looking back; no jerking was felt by me during the journey.

R. J. COSGROVE.

*William Walker*, states:—I have been in the service between seven and eight years, and with the exception of four or five months, have been driving all that time; previously I had had three years' experience as driver on the North British Railway in Scotland; I have been principally employed driving live stock and goods trains but have occasionally driven the mixed mail train between Nyngan and Bourke; I ran that train on the 28th May; left Coolabah at about 2.35 p.m. with four vehicles less than my full load; the first thing I noticed after leaving Coolabah was some fettlers at work on the line close to the level crossing at mileage 431, 77 chains; they signalled to me look back and I did so and noticed that the third waggon from the engine was off the rails, and that the train had parted, the rear portion of it being about  $\frac{3}{4}$  of a mile behind the place I stopped at; I walked back and saw that the rear portion was wrecked; I should say that I was travelling at a speed of 30 miles an hour when we passed the spot where the vehicles left the rails; I had been running without steam for some distance and am of opinion that I put on steam again somewhere about the place where the derailments took place; I have no difficulty in graduating the application of steam on my engine; I did not feel any jerk when I applied the steam; my fireman began to put on some fire as I opened the regulator; the engine I had (No. 120) is in very good order—one of the best in the district; I had the air-brake on the tender and the donkey was working well, the air gauge showed a pressure of about 50 lb.; I cannot account for so many vehicles having become detached from my train without my knowing it; I had looked back several times while running down the bank and saw all my train intact, but I did not look back about the spot where the accident occurred; I felt the engine give a lurch somewhere about the spot where the accident occurred, and I remarked to my fireman that that was a soft part and it was time it was attended to but I took no further notice of it at the time; it did not occur to me after the lurch to look back so see whether all the train was following; when I got to Byrock, about 6 p.m., I asked one of the drivers (Perkins is his name) whether he knew of any bad spots on the line between there and Coolabah, and he replied that there was a bad part at the bottom of the gradient just somewhere about where the accident occurred; I cannot account in any way for the accident.

WM. WALKER,  
Driver.

*George Edis* states:—I have been about six years in the service, and have been acting temporarily as fireman, on and off, for the last four months; I was firing on the mixed mail train from Nyngan to Bourke on the 28th May—engine No. 120; I cannot say at what time we left Coolabah, nor what load we had on; I was employed firing several times after leaving Coolabah until the accident occurred; I cannot say how often I looked back after leaving that station, perhaps twice; I was not aware of anything being wrong until the driver called to me to stop just as we were passing the level-crossing gates; I was putting some fire on at the time, and I at once threw down the shovel and applied the engine-brake as hard as I could, while the driver applied the air-brake on the tender; prior to that I should say that we had been travelling at the rate of 25 miles an hour at the least; we had been running without steam for some time previously, but it had been reapplied before the driver called to me to apply the brakes; when I looked back I saw that a truck was off the rails close to the engine, and the rear portion of the train in the distance, but I thought there was nothing wrong further than the parting of the couplings; I remained in charge of the engine while the driver went back to the rear portion, and when he returned he told me it was wrecked; I did not notice where the driver put on steam again; I did not feel any jerk when he did so; just before I applied the brakes the driver remarked that that was a bad bit of road; I felt the tender give a lurch just then, but it was not of such a character as to cause me to look back to the train; I cannot account for the greater portion of the train becoming detached and being left behind without my knowing it, nor do I know what caused the accident; I should say that we travelled very nearly half a mile after the driver made the remark about the bad spot in the road until he told me to put the brakes on.

GEORGE EDIS.

*John Bentley Hyslop*, carriage and waggon examiner at Nyngan, for eighteen months, states:—I examined the down mixed mail yesterday, the 28th inst., the trains consisted of—4 D trucks of coal for Coolabah, 1 D truck of goods for Coolabah, 2 trucks of goods, 4 empty cattle waggons, 1 L truck of coal for Byrock, 1 G truck of coal for Byrock, and other trucks; I carefully examined every waggon with respect to wheels, axles, drawgear, and springs, everything was in first-class order as far as could be seen; I have no reason to think that the L trucks with spiral springs are not as safe as other trucks with the elliptical springs.

JOHN B. HYSLOP.

#### CONCLUSION.

We are of opinion that the accident was not caused by any defect in the Permanent Way (which appeared to be in perfect order), but that it was due to some sudden failure of one of the waggons on the train. It is impossible, however, to say which waggon with any degree of certainty, owing to the extent of the wreckage, but from our inspection of the latter we are inclined to think that L truck, No. 25, was the first to leave the rails.

It is shown, in evidence, that the driver applied steam to his engine somewhere about the spot where the accident occurred, and it was most probably a jerk occasioned thereby which, combined with the oscillation of the L truck, caused that truck

truck to become derailed; that this resulted in the breakage of the coupling connection between L 25 and cattle waggon No. 198, which was immediately in front of it, and that then L 25 was pushed aside by the waggons which followed, and which were themselves derailed and upset.

It was also, we think, the jerk occasioned by the derailed trucks and the breakage of the coupling referred to, combined with a sudden increase of speed consequent upon the sudden lightening of the load on engine draw-hook that caused L 29 to leave the rails.

We cannot understand how it was that the driver and fireman failed to notice that they had left about two-thirds of their load behind them. In his evidence the driver states he felt a lurch when passing over the spot where a vehicle first mounted the rail, which he attributed to a bad place in the road, and that neither he nor the fireman thought it necessary to look back. This lurch, we believe, was in reality the jerk consequent upon the parting of the train.

Moreover the driver steamed on with a derailed truck, L 29, until signalled to stop by the permanent way men who were at work upon the line, nearly  $\frac{3}{4}$  of a mile beyond where the accident occurred.

DAVID KIRKCALDIE.

C. H. STANGER.

J. B. SUTTOR.

The Commissioners for Railways.

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#### Minute by The Secretary for Railways.

I HAVE the honor, by desire of the Commissioners, to report, for the information of the Honorable the Minister, that the down mixed mail-train from Nyngan to Bourke became derailed at 2.50 p.m. yesterday at 431 miles 35 chains.

The following passengers have been injured:—Miss Low, fracture of left leg between knee and ankle, right leg slightly bruised; Mrs. Low, injuries to left ankle; Mrs. Miller, slight injuries to lower extremities.

One first-class bogie carriage, one second-class bogie carriage, and eight trucks have been very much damaged. The cause of the derailment cannot yet be stated. Medical assistance from Bourke and Dubbo was obtained as speedily as possible and the injured persons attended to.

The Chief Traffic Manager, Mr. Kirkcaldie, Dr. Woodward, Railway Medical Officer, and Mr. Stanger, Inspector, Locomotive Department, left by mail-train last night for the scene of the accident. About half-a-mile of line is damaged, and passengers from the up mail-train from Bourke to-day will, in all probability, have to be transhipped. A large gang of men is already on the spot putting the road in order, and it will be cleared, it is expected, by to-night. An inquiry will be made in the matter, and further information forwarded.

The Under Secretary for Finance and Trade.

H.M.L., 29/5/90.

Seen.—W.M.M., 13/6/90.

[One Plan.]

# Sketch of Railway accident at 431<sup>m</sup>s 33<sup>chs</sup> near Coolabah on 28<sup>th</sup> May 1890

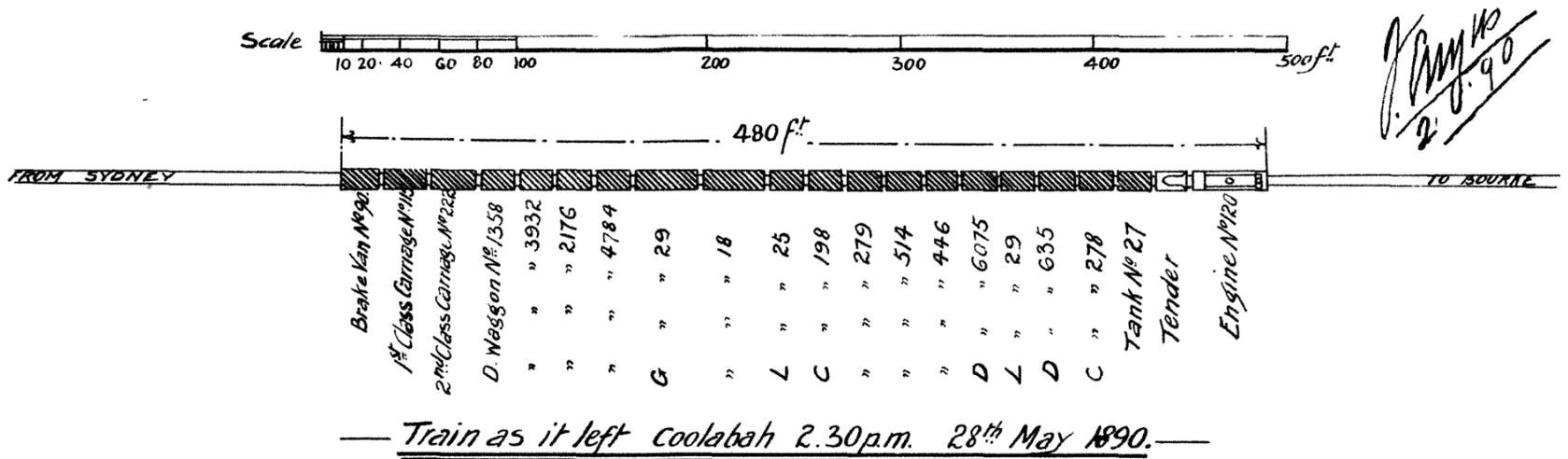


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY NEW SOUTH WALES

A

## Sketch shewing rear end of Train after accident at 431<sup>m</sup>s 33<sup>chs</sup>

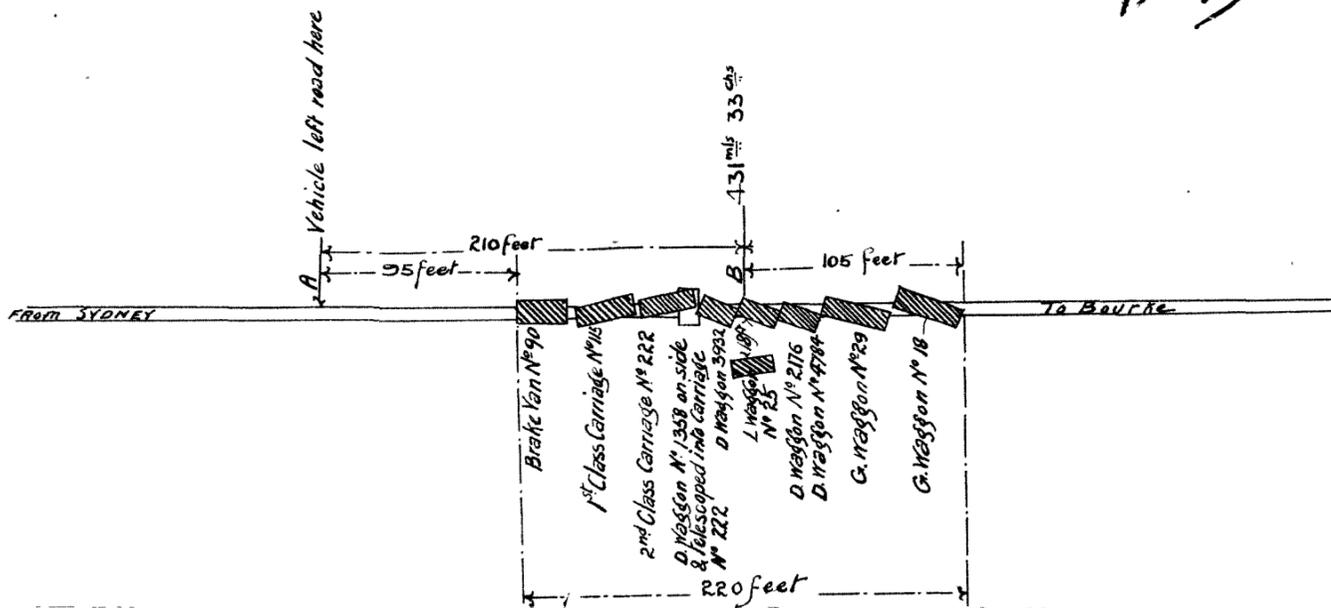


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY NEW SOUTH WALES

B

## Sketch shewing front part of Train after accident at 432<sup>m</sup>s 10<sup>chs</sup>

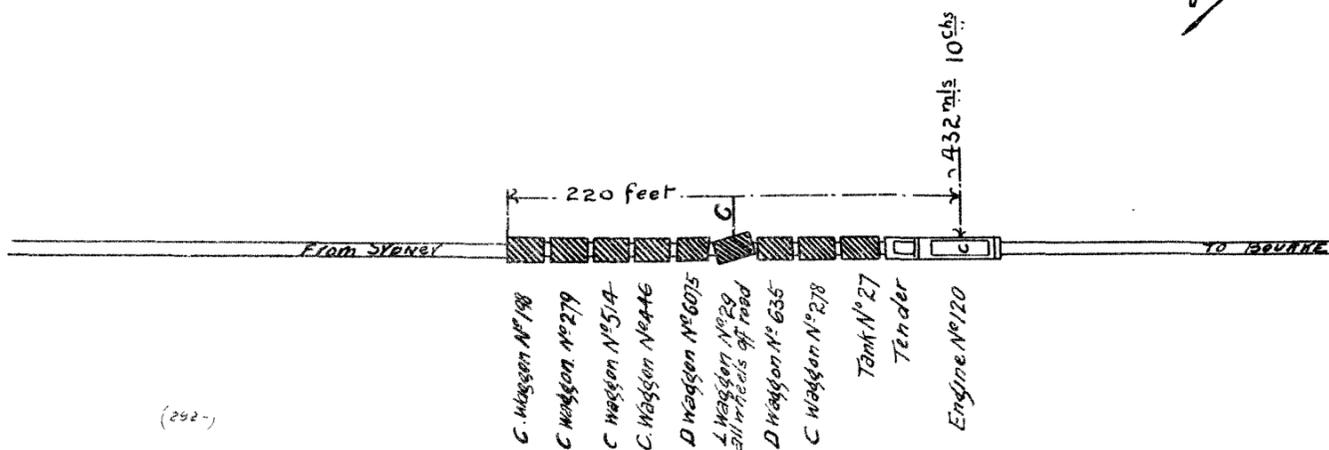


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY NEW SOUTH WALES

C

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(REPORT OF BOARD OF INQUIRY ON ACCIDENT AT FARLEY STATION.)

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*Ordered by the Legislative Assembly to be printed 26 June, 1890.*

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Accident to No. 25 Down and No. 10 Up Northern Mail Trains at Farley Station,  
13th May, 1890.

Gentlemen,

We have the honor to report that in accordance with your instructions we have held an inquiry into the cause of the above accident.

These trains should, according to time-table, have crossed at Lochinvar, but in consequence of the down mail being 30 minutes late on the night in question and the up mail running to time, it was determined to bring the up mail on to Farley and cross there.

The trains were made up as follows:—

*Down Mail.*

Engine No. 418 (class C), weighing 59 tons, 1 horse-box, 1 carriage truck, 1 second bogie carriage, 1 sleeping car, 1 first class bogie carriage, 1 6-wheeled composite carriage, 1 mail-van, and 1 brake-van; weighing in all  $153\frac{1}{4}$  tons, exclusive of passengers, luggage, mails, &c. The whole of the train, with the exception of two vehicles, was fitted with the Westinghouse Automatic Brake. The engine was fitted with hand and the tender with air brakes. The driver had 19 tons of hand-brake and  $58\frac{1}{4}$  tons of air-brake power at command, total  $77\frac{1}{2}$  tons brake power.

*Up Mail.*

Engine No. 181 (class C), weighing 59 tons, 2 composite carriages, 1 sleeping car, 1 mail-van, 1 first class bogie carriage, and 1 brake-van; weighing in all 143 tons, exclusive of passengers, luggage, mails, &c.

The up mail was the first to reach Farley Station at 12.9 a.m., and according to the evidence it had not been many seconds at the platform when the driver hearing and seeing the down mail approaching at a speed which caused him to think that it could not be pulled up in time to avert the accident, sounded his whistle for the brakes to warn the down train, and commenced to back his own train, but had not gone more than 4 or 5 yards when his engine was struck by the engine of the down mail at a speed estimated at from 10 to 12 miles per hour. The point at which the two trains met is about 21 yards inside the home signal.

A young man, named Bernard M'Fadyen, who was travelling in the horse-box next the engine, was killed, together with the horse he was in charge of, and the horse-box itself and the carriage truck next to it were totally demolished. There were also nine passengers more or less injured.

The injury to the engines is not great. The approximate amount of damage to rolling stock and permanent way is £300. Evidence.

## Evidence.

*To Mr. Kirkcaldie:—David E. Palmer, night officer, Farley, states: I have been in the service about seven years, and have held my present position nearly four years eight months; my hours are 6 p.m. to 6 a.m., and I came on duty at the usual time on Monday, 12th May; when I took charge from the station-master the whole of the signals were at danger; I could see the whole of them distinctly, except the up distant signal, the repeater of which showed that it was at danger too; from the time I came on duty to the arrival of the up mail two down trains and one up train had passed my station, the first being No. 19 passenger, which passed at 6.10 p.m.; I lowered the signals for that train to come into the station, and placed them at danger the moment it passed them; the next train was the No. 29 down goods, at 8.55 p.m.; in that case too I lowered the signals, and am perfectly sure that I placed them at danger the moment the train passed them; the signals stood at danger from 8.55 p.m. until the wreck of the damaged train had been cleared away the following morning; I was in and out the office all the evening of 12th instant, and repeatedly saw the green back lights of the down distant and home and up-home signals; about 10.30 p.m. I walked down the line in the direction of the up distant signal until I could see the back green light, and then returned to the station; the last time I saw the green back light of the down distant signal was at 12.8 a.m.; I am aware of the importance of this statement, and am perfectly sure that I saw the green back light at that particular time; the reason I remember it so well is because the up mail was coming into the station, and I knew that the down mail had left West Maitland station at 12.5 a.m.; there was a fog at the time, but not dense; not sufficiently dense to interrupt my view of the down distant signal; knowing that the up mail was coming in, and down mail had left West Maitland station, I kept up distant signal at danger for the purpose of ensuring the driver of up mail coming in steadily, which he did, not overshooting the platform; when up mail arrived at platform I was opposite the levers, and as soon as the train had passed up home signal I placed it at danger; I received line clear report from the driver, and went along the train calling out name of "Farley," handed the mail guard post-bags, and gave the cash to train guard; I then ran to the points to hold them while up mail backed into the loop; the points are 107 yards from the platform; assistant guard Went was on the platform; I told him to bring train back into the siding, which he did; the train had started to come back, but none of the vehicles had entered the points prior to collision taking place; the force of the concussion had the effect of driving the up mail back into siding about 50 yards; Went had a lamp in his hand when I saw him on the platform, showing a white light; of this I am positive; my lamp also showed a white light; I did not give the driver of up mail any signal with my lamp; when collision took place I remained holding on to the points until Mr. Brett called me into the office, where I stayed for about quarter of an hour, sending telegrams to West Maitland for doctors, and to the District Superintendent, Mr. Robinson, as instructed by Mr. Inspector Brett; Mr. Brett told me then to go down to the engine, get the West Maitland staff, and send it back to that station; I went down to the engine, and heard Guard W. Downie tell Mr. Brett he had sent a man back to West Maitland with the staff; after that I did not leave the office more than twice until about daylight; the engine of up mail stood well within the down home signal when it stopped; I spoke to Guard Downie about the signals; he asked me if I had the down distant signal at danger, and I replied yes; the station-master, Mr. Crothers, was in and out of the office all the morning; I had no conversation with the station-master about the signals, but about messages only; I do not remember seeing Assistant-guard George Irwin that morning; I did not ask anyone any questions about the signals, and am quite sure there was no fog sufficient to intercept my view of the green back light of the down distant signal that night; I am equally sure there were no green lights at the station; Mr. Brett took charge of the place after the accident; the up-mail arrived at Farley at 12.9 a.m.; it remained not more than a quarter of a minute before starting to back; it was hardly moving before down train struck it.*

*To Mr. Thow: The distance (50 yards) the up-mail was driven into the siding was attributable to the combined movement, i.e., the concussion and backing of train; in admitting the up-mail into platform I acted in accordance with rule 74.*

DAVID E. PALMER, 24/5/90.

*To Mr. Kirkcaldie:—George Ernest Crothers, station-master, Farley, states: I have been at Farley five years in the capacity of station-master, and in the service altogether seven years; my usual hours of duty are 6 a.m. to 6 p.m.; I left the station for a short time at 6 p.m. on 12th May, leaving it in charge of Night-officer Palmer; when I left the signals were all at danger and the lights all in; I returned to the station at a little after 7 p.m., to proceed to Maitland in a goods train; I noticed the signals down home and down distant were both standing at danger, showing clear red lights front and green at the back; I have not the slightest doubt about this; I returned from West Maitland to Farley by mail train, which left West Maitland at 12.5 a.m. on the morning of the 13th instant; I travelled in a second-class carriage, the fifth vehicle from the engine, I think; when leaving West Maitland I did not notice whether it was foggy or not, but if it had been dense I should have noticed it; I noticed by my own watch that down mail left West Maitland at 12.5 a.m.; about Maitland Colliery I heard the driver whistle to challenge the down distant signal; I looked out of carriage when train was about 10 yards Maitland side of down distant signal, which was then showing a red light; I realize the importance of this statement, and am perfectly sure the light was a clear red one; there was no compound light; I did not look back to see what the signal showed after train passed it; I have no idea what the rate of speed was passing the down distant signal; I heard no whistling again until about a second before the collision; just prior to this I had seen the down home signal from a distance of about 150 yards, and it showed a red light also; I am unable to say at what rate the train was going then; immediately after the second whistle I felt a slight bump, as though the train had been pulled up suddenly; after train had come to a stand I got out of carriage, which was over the bridge, and proceeded as quickly as possible to the wreck; it was slightly foggy then; I could not call it a heavy fog; I did not look back to the down distant signal; I noticed nothing resting on the distant signal wire, but something between the down home signal and the platform—some of the wreckage resting on the wires; I did not look at my watch at the time of the accident, but consider it was between 12.9 and 12.10 a.m.; I met Mr. Brett at the wreck; he asked me where I had come from, to which I replied, "By No. 25 down"; he then asked me how the signals were, or if I had noticed them, meaning both down distant and home; I replied, "They are right—both at danger"; no further conversation ensued; I then went to the station office, and sent the necessary telegrams*

telegrams to Mr. Robinson, District Superintendent, for accident van, and to Maitland for medical assistance; I spoke to night-officer Palmer, telling him to remain in the office and attend to telegrams; nothing took place about signals.

*To Mr. Thow:* I am quite satisfied, in my own mind, that the signals were right.

*To Mr. Kirkcaldie:* I had a few words with assistant-guard George Irwin about half an hour after the accident; the first time I had spoken to him to my knowledge; he was on the Maitland end of platform; he asked me if I could get a sofa for an injured man to lie on; he said nothing about having been down near the down distant signal.

*To Mr. Thow:* After the accident I spoke to Farnham, driver of down mail, advising him to sit down, as he was limping about the platform; I asked him if he was badly hurt; he replied he did not think so; there was nothing in his manner to indicate that he was not sober; he appeared perfectly sober; I do not recollect having any conversation with the fireman; I did not know when I left West Maitland, that the mail trains were to cross at Farley; I am sure that I saw the down home signal from a distance of about 150 yards before reaching it; the light was clear and bright; the oil used is kerosene, which gives a brighter light than colza.

*To Mr. Kirkcaldie:* I am quite sure that I did not see any lights, hand-lamp, or any other about the station; I merely looked at the signals; when speaking to Farnham, he said nothing about the down distant signal showing a white light, nor did I say anything to him about having passed a danger signal.

G. E. CROTHERS.

*To Mr. Kirkcaldie:—William Downie,* guard of the down mail on 12th May, states: I have been in the service over twenty years, and have been running as guard on passenger trains for three or four years; on the 12th May, mail train left Newcastle 10.57 p.m., arriving at West Maitland at 11.58 p.m.; assistant guard was Wm. T. Evans; I left West Maitland at 12.5 a.m. on 13th instant, and train travelled at the usual speed; at West Maitland I noticed there was a slight fog, not dense enough to obscure signals to any great extent; between West Maitland and Farley I was very busy arranging parcels, luggage, and bills; after leaving West Maitland I did not hear any whistle until near the down distant signal, when driver challenged it; I did not look out at the time, being so busy; I felt no check on the train at the time, neither did I look at the distant signal; but soon after the whistle, knowing that we could not be far from Farley, I looked out of the small side window of brake-van and noticed the home signal at danger; train was then from 100 to 150 yards away from home signal; there was no perceptible difference in the train's speed than just the ordinary running; I saw from the distance stated the home signal, showing a bright red light; it was foggy then, but to no great extent; I saw the signal clearly when I looked for it; at that time I saw no other lights about the platform, *i.e.*, before the accident; when seeing the home signal at danger I did not keep on looking at it, but turned my attention to other duties, having confidence in the driver keeping train well under control; I had every confidence in the driver; I have never had any occasion when going into a station to apply the air-brake from the brake-van; the manipulation of that brake being always left to the driver; when the two trains met I heard and felt the bump; I am satisfied that when this took place the engine of down mail had passed the home signal about 21 yards, as stepped by me; I know that something serious had happened, and made all haste to attend to the requirements of passengers; Inspector Brett was the first employee I saw after the accident; I cannot be sure, but I think he spoke to me about the signals; he said shortly afterwards that they were at danger; he then told me to send back the staff to West Maitland, which was done; I took steps to protect the train, as required by rule 388; I do not remember having any conversation with station-master nor driver about the state of the signals; the night officer (Palmer) distinctly told me the signals stood at danger; about 9 minutes after the accident I saw assistant-guard George Irwin, who was rendering assistance generally; I remarked to him "This is a bad job"; he said nothing about who was to blame; so far as I can remember he was at the scene for some time; about 9 minutes from time of accident Irwin approached me from Farley side; he said nothing to me about having been down or going down to see the down distant signal; he was at wreck for some time afterwards; besides sending Evans to West Maitland with the staff about 20 minutes after the accident; I also sent assistant-guard John H. Went in the direction of Maitland with a red hand lamp; but seeing Went shortly afterwards I asked him had he carried out my instructions to protect train on the West Maitland side; he replied he had got Irwin to do the duty for him; I told Went that I did not think it was right, and sent him back again to make sure that all protection was afforded; I did not look at my watch at the time of the accident.

*To Mr. Thow:* As guard of a passenger train I know that it is my duty to keep an eye to signals, and be acquainted with the rules relating thereto; I am aware of the provisions of rule 69; I think that guards are called upon to act under the rules 69, 306, 461; I did not carry out rule 380 on approaching Farley; I have heard 381 rule read, which refers to brake or brakes, and particularly the last clause of it, which requires guards to apply their brakes whether they receive signals from driver or not when they see danger signal ahead, or any obstruction; I understood at West Maitland from the night-officer that the mail trains would cross at Farley on the morning of 13th; he having told me so; the night-officer at West Maitland told me the driver had the staff, and the mail trains would cross at Farley; knowing that the trains would cross at Farley I did not look out for the down distant signal at Farley because of other duties requiring my full attention; I could have looked out to see the distant signal, in accordance with rule 380, had I not been so terribly engaged; there was an air-tap in the brake-van; I did not apply it when I saw the home signal at danger, not having received any signal whistles from the driver, and naturally thinking the road was clear; I know the last clause of rule 381, but did not apply the brakes, not thinking the application of the brake necessary, no warning whistles having been given by the driver; I had every confidence in my driver, and considering the distance from station, when home signal was noticed at danger by me; I thought the driver was able to pull up clear of any obstruction; I noticed the danger signal at 100 or 150 yards, but did not continue watching it, as I turned round to attend to other duties required of me in the brake-van; I consider the air-tap is put in van for public safety in cases of emergency; I would apply this brake under the following circumstances; seeing any danger ahead; a danger ahead I would consider to be passengers getting out of train in motion, or any circumstances of that kind calling for instant action; fixed signals are used to indicate "danger," or "all clear"; when a home signal stands at danger, I consider that it is a sign of danger ahead, and a train is not supposed to pass it; when seeing danger-signal ahead I did not act on rule 381, as I consider the

the driver had ample time to pull up, were there any danger ahead, and I gave my attention to the other duties, the extent of which can be supported by other guards (mail), not knowing but that my driver had the clear road; I did not neglect to carry out rule 381 on this occasion under the circumstances; I did nothing to carry out rule 381, with regard to putting on the brake or brakes, *i.e.*, hand or Westinghouse as the driver applies the latter from the engine independently of the guard; in the matter of protecting train after the accident, I put down fog signals myself, and sent Assistant-Guard John H. Went to rear of train with hand signal lamp showing red; after Went's unexpected return, I cannot say whether he still had this lamp, but fancy not, and think he had given it to Irwin; about twenty minutes after the accident, Evans went to West Maitland, with the staff, and Went was sent with red hand signal, about ten minutes afterwards; about three to five minutes after the accident, I looked back and saw a green back light to the down distant signal; I am quite sure of this; I never told Assistant-Guard Irwin anything about the signals, and am positive that I did not tell him the distant signal was half down when we passed it.

W. DOWNIE.

*To Mr. Kirkcaldie:—William Thomas Evans* states: I have been in the Service four years on the 21st of this month; I am porter, but usually go to Lochinvar with down mail, and return by up mail to assist; I went out to assist the guard of down mail on the 12th May; I did not notice time of departure from Newcastle or arrival at West Maitland; after leaving there, I was very busy sorting parcels, &c.; I noticed a sort of fog at Maitland, more particularly at East Maitland; after leaving West Maitland I did not hear the driver give any whistle, nor did I notice the distant signal when passing it, being so busy; I did not notice the home signal either, and the first intimation I had of the accident was the sudden stop; I thought a coupling had broken, but did not think there was any other accident until about ten minutes after; immediately the train stopped, Guard Downie left the van and went forward; when leaving the van, I went to the opposite side from platform where passengers were calling me; they said some were injured; it was not until about twenty minutes after the accident, that I saw Guard Downie again, and he told me to go to West Maitland with the staff, which I went to do, but meeting three porters and a policeman about 700 or 800 yards on the Maitland side of the Farley distant signal I gave the staff to Porter Greig; when walking down the line it was very foggy; I carried a hand signal lamp showing white; when I got out of van first the fog was pretty thick, but it subsequently got thinner; the men I met were carrying lamps; I saw the lights at a distance of 150 yards; after giving Greig the staff, I returned to Farley; one of the three was Mr. Phillips; the other I do not know; I know Assistant-Guard Irwin, whom I saw after my return from Maitland colliery; I had not seen him anywhere previously; I think it was close to the engine of the down mail where I first saw Irwin; I did not speak to him unless it were to say "Good night"; when I saw the men coming from Maitland the fog was about the same as on arrival at Farley.

*To Mr. Thow:* When going from Farley with the staff, I walked between the rails; I saw nothing resting on the signal wires; I saw no one between the vehicles of the down train and the distant signal.

W. T. EVANS.

*To Mr. Kirkcaldie:—William Edwards*, guard of the up mail train on the morning of 13th May, states: I have been over twenty-six years in the Service, and been running trains for about twenty years; running mail trains about ten years. From Singleton and at all stations to Lochinvar inclusive I gave the right away signal to driver; I did not see Went, who was acting as my assistant, with a green lamp at any time that night; I left Lochinvar at 12.0 midnight, and came on at the usual speed; I heard driver challenge the distant signal, which was seen by me to be red; he slackened speed; I did not apply the brake; train passed the distant signal at about 15 miles an hour; when train passed the distant signal the driver steamed away again, but at all times had his train under perfect control; I did not alight from the train when it reached Farley; Mr. Inspector Brett got out; Assistant-Guard Went got out of van immediately on arrival at Farley with lamp in his hand showing white; he got out at platform; I heard two short whistles from the engine of my train; immediately Mr. Brett got out on the platform; he had no lamp in his hand; I was just in the act of putting Farley cash in the box when I was knocked down by the down mail running into my train; at that time my train had begun to move backward; the van was just clear of northern end of platform; when the collision occurred and I had picked myself up, I left the van with a lamp showing a white light; I could then see the carriage next the engine was off the road, and in a slanting position; I then called out to Night-Officer Palmer to leave the points and get to his office at once, which he did; I then went along the train opening doors which were shut, to see if anybody was hurt, until I came to Driver Sanderson, whom I assisted from engine to the station; when this was done I went to see the wreck; it was not very foggy when leaving Lochinvar; when I first saw the up distant signal at danger I considered we were about half a mile from it; when leaving the van at Farley, it was not very foggy; I could plainly see the back light of the up home signal, which I should think is somewhere about 400 yards away; I could also see the back light of the down home signal when approaching the platform, and about 100 yards away; immediately I got out of van I saw the back light of the down home signal showing a green light at a distance of about 80 yards; when I alighted my van was standing in siding clear of the points, and I could then see the back light of the down home signal at Farley Station; it was very foggy at that time—the fog coming over in gusts; I did not attempt to look at the back light of the down distant signal nor the levers; I did not hold any conversation with anyone about the position of the levers; only Mr. Brett and Assistant-Guard Went were travelling in break-van with me that night; I did not speak to Mr. Brett, the Station-master or night officer about the signals, nor did I hear any mention of them; my train was driven back about 50 yards into siding by the collision with down mail; I saw Assistant-Guard Irwin at Farley; he did not travel in my van so far as I could see; I cannot remember where or when I saw him after the accident, but I think it was he who called out immediately I got out of van that Driver Sanderson was dead; no conversation ensued after that; up mail arrived at Farley at 12.9 a.m.; the train had not stopped half a minute before we got the alarm; I have never at any time applied the Westinghouse brake when coming into a station, always leaving that to the driver; I have applied it at Wallsend when the engine has been disconnected from the train.

*To Mr. Thow:* I don't remember rule 381; seeing a danger signal ahead I do not think I would apply the brake if I saw that the air brake was in proper order by the pressure in my van, and if the driver were travelling cautiously; I do not remember any other rule than 67 which justifies a train being brought into a station by hand signal, the fixed signals showing danger; I would not allow a train to pass  
home

home signal at danger at a speed greater than 5 or 6 miles an hour; I do not think the latter part of rule 381 is carried out by guards in practice in all cases; I have only been able to point out one rule, *i.e.*, 67 which justifies a driver passing a home signal at danger.

*To Mr. Kirkcaldie:* As a matter of fact I have never known a guard to apply the Westinghouse brake when approaching a station, and I would not apply it unless I saw an obstacle in the way, or something to be avoided.

WILLIAM EDWARDS.

*John Herbert Went*, acting assistant guard, Murrurundi, states: I have been in the Service about seven years, and was acting as assistant guard on up mail on 12th May; I travelled from Murrurundi; I have no recollection, nor do I believe that I gave the right away, to driver at any station from Singleton and Lochinvar inclusive; I am almost sure that I did not give the right away at Lochinvar; we arrived at Farley at 12:9 a.m., according to the clock there; I did not notice either of the up signals on coming into Farley station; on arrival of train I put out a parcel, and walked along the platform with a lamp in my hand, showing a white light; of this I am perfectly sure, as I looked at the light before getting out of the van; I could not say whether it was foggy then or not; it may have been, but I did not look for it; besides myself there were in the van on arrival at Farley, Guard W. Edwards, Inspector Brett, and Assistant-Guard Geo. Irwin; I did not notice any of them get out when I alighted; I passed Night-Officer Palmer as I walked to southern end of the platform; he came past on his way to Lochinvar end of platform, to the points, with a lamp in his hand, showing white light; I am sure it was a white light; Palmer told me to call the train back, while he went to the points; I called train back after walking a bit nearer to engine by waving a white light; previously to this I noticed the back light of down home signal showing a clear green light; this I had noticed immediately I got out of my brake-van; the distance walked to Sydney end of platform was about 12 or 15 yards from levers; I had given signal to driver to come back before getting that distance away; while walking, as stated, I heard Driver Sanderson give two short sharp whistles, which attracted my attention, as I thought something was wrong; after these whistles sounded I saw the down mail approaching about 20 yards away; I had not seen it previously; I could not form any idea at what speed the down mail was coming; the accident then occurred; the engine of up mail was about 10 or 12 yards inside home signal; when trains struck I stood about a second, then went to look at the levers, which all showed danger; from the time of the accident until I saw them no one could have touched them; just after I saw the position of levers Inspector Brett came up and asked me how the levers were; I replied, "All up"; I did not attempt to look for the back light of the down distant signal, and cannot say whether it was foggy or not, as I did not look or take any notice at any time on the night in question; Mr. Brett told me to stand by the levers, and see that no one touched them, which I did until a man with a cut in his head came up after five or six minutes and asked if I could do anything for him; I took him into the lamp-room, and dressed his head; I then went to look at the up mail; while standing guarding the levers no one passed me; I did not see Assistant-Guard Irwin pass me; about half an hour after the accident a man called to me to bring a light to where a horse was; it was then I saw Irwin again, but did not have any conversation with him; I then, at request of Guard Wm. Downie, went down to rear of down mail with a red hand-lamp; I went a good three-fourths of the distance between the distant signal and van, about 1:30 a.m.; some men passed me on their way to the wreck, but I did not take notice of them; they held lanterns which I saw about 30 or 40 yards from me; after standing awhile protecting down mail, about 2 a.m., Geo. Irwin came up to me from the direction of Farley; I believe he had a lamp; he said something about a big piece of wood being on the plank near the signal wires, and asked me if I saw it; I replied "Yes; I think it is a piece of a buffer"; feeling cold, I asked him would he protect the train, and I would go back to the wreck; he complied and held a red light; while standing guarding the train I could see the home signal and back light of distant signal which showed green; I saw no one with a green light, either on the arrival of up mail or after; I am not quite sure it was between half-past 1 and 2 when Irwin came to me as I stood protecting the down mail, but somewhere about that time as closely as I can judge.

*To Mr. Thow:* I do not think Irwin was among the men who passed me on their way to the wreck, but he may have been, as I did not see their faces; I saw Irwin when down at the horse; three or four minutes after seeing Irwin I went in the direction of the down mail van when Guard Downie asked me to go and protect the train; before meeting the three men on the line, as stated, a woman passed me walking along the line—no one else; the piece of timber referred to as seen by me was inside the home signal; brake-van on up mail was a long one with ladies and gents' compartments at the end; assistant-guard Irwin travelled in the luggage compartment; I believe he got in at Singleton; I think the guard could have seen him; the time I stood at the levers was about five or six minutes, during which time Guard Downie did not come to me; Guard Downie requested me to go back to protect down mail at a time not less than three-quarters of an hour after the accident; I cannot say anything nearer as to the time; I am quite positive that when I went to protect the train, as stated, I could plainly see the home signal and the back light of down distant signal; after relieved by Irwin I went back to the station and saw Guard Downie who asked me why I had left my post; I told him Irwin was there and he said "Are you quite sure of that?" I replied "Yes."

J. WENT.

*James Whybourne*, night officer, West Maitland, states: I have been nine years in the Service, about five years as night officer; I have been not quite five weeks at West Maitland as night officer; down mail arrived at West Maitland on the night of the 12th instant, at midnight, and left at 12:5 a.m.; I handed the staff to the driver of the down mail on arrival, but he let it fall; it was then handed to Porter Groig to give to the driver; train was thirty minutes late leaving West Maitland; up mail was running to time; by that I expected trains would cross at Farley; I got the operator to ask the question of Lochinvar, and reply came that he was going to see if arrangements could be so made to cross at Farley; I did not speak to the driver of down mail at all, only to the guard saying to get away as quickly as possible, as the driver had the staff; I believe I passed a remark to Guard Downie that the trains would cross at Farley, but am not positive; at 12:10 a.m. I heard that a collision had occurred at Farley; I called at High-street to get medical men; got the staff together and sent them out to collect as many permanent way men as possible; I then called Mr. Ferris, station-master, who got up and came to the station with me; he then took

took charge, and I took a cab to Farley, as the cab was going out; it was very foggy in places, especially in the low-lying ground; I could see lights distinctly at near 400 yards; about quarter to 1 I arrived at Farley; fog was heaviest in the hollow close to Farley Station; I was not in a position to see the distant signal when passing along in a cab, but could see the carriage-lights of train from the hill quite 150 yards away; I was not in a position to see the tail-lights of train, but could see the home-signal light quite 150 yards away; this light was red; on reaching Farley Station I saw Mr. Crothers, station-master, Inspector Brett, and Night-officer Palmer, and spoke to them about what was the best thing to do; I asked Palmer how the signals were, were they at danger; he replied, "Yes"; I was at Farley about two hours; I did not see Assistant-guard George Irwin; the fireman of down mail came off engine and asked me to send a wire to Singleton for relief, as he was unable to proceed further.

*To Mr. Thow:* I had no reason to suppose he was under the influence of liquor; he seemed quite smart and active.

J. WHYBOURNE.

*To Mr. Kirkcaldie:*—George Irwin, assistant-guard, Newcastle, states: On the night of 12th May I was returning from Singleton as a passenger in B van of up mail; besides myself there were in the van Guard W. Edwards, Assistant-guard Went, and Mr. Brett; Guard Edwards started the train from Singleton, and Whittingham and I noticed that he gave the right away at all places; I cannot say whether Went repeated it at any place; I did not see Went use a green light at any of the stations so far as I can remember; the up mail left Lochinvar to time at midnight; I heard the driver challenge the distant signal which was at danger at Farley; the driver slackened speed before he came to the distant signal and got his train well under control, in fact he had to steam to get into station; when we came in view of the home signal at Farley I saw that it showed a green light, and the train ran into platform; I did not get out of van on arrival at platform; Assistant-guard Went got out of van as soon as train arrived at platform; he had a lamp in his hand showing a white light; I am quite sure it was a white light; a few seconds afterwards Mr. Brett got out, and immediately called out, "Look out boys, she's into us"; I went to look out of door of B van, but did not alight; when the collision occurred I fell in the van, and then got out; the driver had given two short sharp whistles and backed the train a few feet into siding before the trains struck; I did not notice how far the up mail was driven back by the impact; I got out of van at the northern end of platform, and noticed it was foggy at Farley side, but not much at Lochinvar side; when I saw the back light of home signal it was showing a green light, but, being misty, not altogether clear, still I could see it; I then went to inquire of down mail, and saw the number was 418; I thought the driver was — Wallace, and seeing Fireman Buchanan asked who was driver of down mail; some one called out it was "Jack Farnham"; I went along the down mail and saw a piece of wood lying upon the distant signal wire; as to the weight of the wood, I do not think it was as heavy as a sleeper; it was lying north end of the second bridge; I did not speak to anyone else; to the query whether anyone was hurt, I received the answer "No"; I believe I saw Guard Downie coming along the down mail train, but would not be certain; I cannot recollect what remarks I made to him; I did not see the station-master at that time; I have never walked along the line between Farley and West Maitland before; to get along over the bridge I had to hold on to the footboards of carriages; passengers wanted to get out of down mail, but I advised them to stay; I went right down the line to the level crossing on the Farley side of distant signal; I could then see a white light in the distant signal; I would not say it was a round white light, although it was a distinct white one; I could also see the signal-arm, because of a fire burning brightly at the Maitland colliery; it was not very foggy at this particular place; it was heavier near Maitland, also between where I was and Farley; the extreme end of arm of distant signal was about a foot from the post; I was over a hundred yards, say 150 yards, from the distant signal; the colliery is, I should say, more than 300 yards from the signal; I should be surprised to hear that the distance was 700 yards; when down near the distant signal, about five or six minutes after the accident, there was very little fog; I am quite sure that I saw the arm of distant signal, as previously stated, although such a distance away; I did not go beyond the level crossing to see what sort of a light was showing from the distant signal; I could see from where I stood the red light of home signal—that is, from a distance of over 400 yards; from the time of the accident until the time I started to go to see the distant signal not a minute elapsed; on the way I touched the piece of wood resting on the signal wires with my hand, and gave it a kick with my foot; I had a hand-lamp with me, which would not burn; I got down to the level crossing referred to within five or six minutes of the time of the accident; I gave the wire a pull, *i.e.*, a straight pull, and then looking saw a green light; I then went back to the scene of the accident, not meeting any one on the Maitland side of van; on arrival at the train I met a commercial traveller—the first one I addressed after return, but did not speak about railway matters; this was about twelve minutes after the accident; the railway men I then saw I cannot distinctly remember, but think they were Downie and Went; I had a conversation with Downie, but am not sure whether it was at this particular time or not; I remember asking Downie how the signal, meaning the distant signal, was when he passed it, and he replied, "Half-down"; this conversation occurred about half-an-hour after the accident; after that I went back to train, when some ladies expressed a wish to get out; I persuaded them to stay, but they insisted upon getting out, and I assisted them; I then went down again to see the man who was injured; he complained about pains in the chest; I told him I would look out a place for him to lie down; I saw the station-master, Mr. Crothers, somewhere about the engine; I returned to the wreck about three-quarters of an hour after the accident; about an hour after the accident, knowing the accident train had been telegraphed for, and not knowing any one had been sent back, I went a second time to the level crossing, and there met Assistant-guard Went, who informed me Guard Downie requested him to comply with rule 388; I asked Went if he had put fog signals on the line; he said, "Yes"; also said that he felt cold, and asked if I would take his place; I think I mentioned to him about the piece of wood on the signal wire; he replied, "Oh, that buffer"; I said, "No, there was something else besides that"; he then left, and I stayed; I do not remember telling him that it was the second time I had been out to that spot that night; I remember telling him "That signal was down"; he said, "No"; I did not tell him that I had seen the back light of the distant signal, or that I had found it necessary to pull the signal-wire to place it at danger; I remained until break-down train arrived about 3.15 a.m.; Went had put two fog signals south of where I stood; when the driver of break-down train went over the second one he stopped; I then went down and brought up the train; it was about 5.30 a.m. when I first spoke to Mr. Brett, who called to me when I was on the platform, about 10 yards away, to get the engines ready; Mr. Brett travelled to Waratah in the sleeping-car, then got out and came in  
break-van,

break-van, where he travelled to Hamilton; I had no opportunity to speak to Mr. Brett; I saw Mr. Crothers, but had no further conversation than arranging a place for the injured man; nothing was said on either side about cause of the accident; I did not see Night-officer Palmer to speak to after the accident; I did not see Guard W. Edwards from time of accident until day-break, and did not say anything to him as to the cause of the accident; I arrived in Newcastle at 7:20 a.m., and signed off in the guards' book, then made out my time and occurrence sheet; I spoke to Driver Farnham when he was walking round the engine somewhere about fifty minutes after the accident; I asked him how he managed it; I said, "How did you manage this, Jack?" he replied, "The distant signal was off for me; I had the staff; I could not see the home signal until I was very close to it, it was so foggy; I applied my brakes, but unfortunately it was too late"; the answer I gave him then was, "From what I have seen there is something in it," meaning I had seen the distant signal showing a back white light; I went out from Newcastle again, running the 9:50 p.m. special on Tuesday 13th, and got back on Wednesday night about 10:45 p.m.; next time of leaving Newcastle was 5:15 p.m. next day, Thursday 15th, and got back 9:15 Friday evening; I was in Newcastle Tuesday and Thursday, yet made no mention of the foregoing; I came to Newcastle about 4 p.m. on Tuesday 13th, and saw that I was to run No. 29 goods 7:15 p.m.; I arranged with Mr. Marchant, station-master's clerk, to send word to the guard who was to run the stock special to come and run No. 29 in my place, as I was feeling a bit sore about the shoulder, and the stock train would be an easier one for me; when I got home I sat down to write a report of what I had seen, when I received word that there was a relative of mine dead at Dungog; that is the reason I did not make a written report that day; I did not avail myself of any opportunity to make a verbal report to any of the officers as I consider that I was occupying rather a curious position; on Wednesday night 14th I was sent for to go and see Driver Farnham; I went next morning to his house at 8:45, when I told him exactly what I saw about the signals; I then came to Newcastle and made inquiries as to the whereabouts of Mr. Robinson, District Superintendent; I saw Mr. Marchant, but made no communication to him; on Friday Mr. Robinson called me, when I made a statement to him; I intended to see the Superintendent that evening about the matter; I intended making verbal report to Mr. Nield, acting station-master, but was thwarted by some one coming up claiming his attention; Farnham told me he would call me to make a statement at the inquest.

*To Mr. Thow:* I made my written statement on the Saturday following the accident, after seeing Mr. Robinson; I referred in it to seeing the distant signal showing off; I cannot exactly account for the signal showing white light, but think it was the timber lying on the wire; I saw the signal showing a white light and the arm down after I had moved the piece of timber; when I pulled the wire and looked round I saw a green light; I pulled the wire in a straight direction with my back to the signal, pulling it from Farley station; I think I got it in about a yard, but cannot say exactly how much, perhaps 2 or 3 feet; when I pulled the wire it slackened up, and seemed to back towards the distant signal; in pulling the wire I do not think my hands would slip that much; there was a blaze from the furnace at Maitland Colliery, which showed a light all round; this light was not immediately behind the signal, which is situated on higher ground than the colliery; the height of the flame or blaze which showed me the arm of the signal I cannot give; I cannot say whether it was coming out of a chimney or not; I made one written report only of what I had seen; I wished to have advice from Mr. Robinson before making my statement, simply because the driver and fireman belong to another department; I heard that I would very likely get into trouble and get dismissed if I stated what I had seen; I do not care to say who told me this; I would rather suffer; it might do that man an injury; I refrained from reporting earlier because I thought what I had to tell would support the driver who belonged to another department; I wished advice from my superior officer, Mr. Robinson, but could not succeed in seeing him at Newcastle; from Tuesday until Friday I failed to report the occurrence to any of my superior officers, thinking I might get into trouble with my own department; when I made up my mind after seeing Farnham I went to Mr. Robinson and found he knew the circumstances, which I related again; among the majority of the men here there is an idea that they would get disliked by their superior officers if they told the truth respecting matters concerning the men of another department, if by doing so it would implicate any of the traffic men; I do not care to mention the names of any others who hold this idea; I have been in the service since July, 1883.

*To Mr. Kirkcaldie:* I do not know of anyone having got into trouble through telling the truth, implicating any employees in either branch; I think it very likely that the other men would say they never made such a statement if I give their names; I decline to give the names of any of these men, although it has been pointed out to me that the statements made are sweeping and damaging to the men in the Traffic Department; my idea was that I might be disliked by my superior officers if I made any report about the discovery I had made, if I did so without first getting advice from them; to my knowledge no one else other than Guard Downie, who said it was half down, and Driver Farnham, who said it was off, saw the signal as I saw it that night; I have read the evidence wherein Guard Downie says he did not see the distant signal on the morning in question, and although hearing Downie's evidence that he did not see the distant signal at all, I still repeat that Downie told me on the morning of the accident that the signal was half down.

G. IRWIN.

*To Mr. Kirkcaldie:—John M. Phillips, porter, West Maitland, states:—*I have been in the service nine years, seven years of which have been served at West Maitland; I do night duty, and was on on the night of 12th May; I saw down mail pass; it left West Maitland at 12:5 a.m. on 13th instant; it was very foggy when mail train left; at the time one could see a light about 150 yards away; after train had left I heard of the accident at Farley, which occurred about 12:15 a.m.; night-officer then gave me instructions to call the men together, and set off to Farley as soon as possible, which we did; Porter John Tulip, James Greig, Constable Hickey, and myself, left about 12:25 a.m. for the scene, proceeding along the line, and calling up three permanent-way men along the road; I could see the Farley down distant signal about 200 yards before I came to it; it was showing a full danger signal; I walked on to the scene of the accident, arriving there about 12:50 a.m.; on the road I met the assistant guard of No. 25 down mail about midway between West Maitland and Farley; he was carrying a hand-signal lamp showing a white light, which we could see about 150 yards off; he was carrying the West Maitland and Farley staff back to West Maitland; Assistant-guard Evans handed over the staff to Porter Jas. Creig, who took it  
back

back to West Maitland; Evans then accompanied us to the scene of the accident; before reaching Farley, and just as we were going into the small cutting, about 350 yards from Farley home signal, we could see the home signal, showing a red light, although not so plainly seen, as the tail lights of the down mail; I saw Assistant-Guard George Irwin at the wreck a few minutes after our arrival (say fifteen minutes); the time would be a little after 1 a.m.; he was standing somewhere about the home signal; we had no conversation about the signals whatever; I think the fog was most dense between the distant and home signal when we were on the road to Farley; still I could see the red light in the home signal about 350 yards away; the fog was drifting a good deal on the night of 12th May, and morning of the 13th.

JOHN M'PHILLIPS.

*To Mr. Kirkcaldie:*—Arthur Lane, fireman, states: I have been about eight years in the service, firing nearly six years; ago, twenty-nine years; I was firing on up mail on night of 12th; my mate told me we were running to time on leaving Lochinvar; when we came in sight of the Farley distant signal, about 200 yards, I saw the red light very distinctly; we slackened speed and had the train well under control; we had to steam to get into the station; when getting into Farley station, the home up signal showed a green light, and we drew up to the platform, on which I saw no one; I saw the back light of the down home signal, which showed green; our engine stood about 10 or 12 yards inside the home signal, not half a minute; I could not see the back light of the down distant signal; it was so foggy, that it was useless looking for it; the first I saw of the down mail was the head lights about 10 or 12 yards beyond the home signal; I could not see at what rate of speed the down mail was travelling, as my driver was making all speed to get back into siding; it was after we stopped at station that I heard a whistle from down mail; my driver, after this, and before I saw the lights of down mail, sounded his whistle for the brakes; I turned on the sand because our engine gave a slip; I then jumped off on the side opposite the platform; next thing I knew was the down mail had struck up train; when our engine stopped again after being struck it was about 7 to 9 yards from platform, northern end; I saw no one on the Farley platform, or anywhere else, with a hand-lamp before the accident.

*To Mr. Thow:* I heard the engine of down mail sound the ordinary whistle; I was looking ahead when I saw the head-lights of engine of down mail about 10 or 12 yards from home signal; I could not see them further off because of the thick fog; our engine was reversed and had started to go back under steam at the time of the collision; I have no idea how the regulator was shut; it was shut when I got on the engine, which was stationary; I am almost sure it was the driver who had pulled the regulator back; from my position on the engine it was not possible for me to see a hand-lamp on the station; on my engine there were two head lights, both on the buffer beam, and burning brightly; some of the vehicles on up mail were derailed; a bogie carriage next the tender was off the line altogether, *i.e.*, all the wheels at the Lochinvar end of platform; I did not notice any mark on the ballast showing where the carriage had run; I think this carriage must have got off at the points leading to cattle siding, and any marks shown on the ballast might be caused by my drawing the carriage up to platform before it was again put on the rails.

ARTHUR LANE.

*Driver William Robert Sanderson* states: I was driver of the No. 10 up mail on the night of the collision at Farley; left Lochinvar about 12 (midnight), and reached Farley at 12.9 a.m.; up distant signal was at danger, so I ran with caution up to the home signal, which was showing a green light; I was at platform about one minute when I heard No. 25 approaching; No. 25 was about 100 yards distant when I first noticed it, and I at once commenced to clear, by backing my train into siding; I gave two short whistles before I commenced to back; almost immediately my train was struck by No. 25, both engines colliding, buffer to buffer; the night officer must have had the loop points set for me to run back, as my train went into the siding all right; cannot say at what rate No. 25 was travelling; I did not notice the down distant signal; I do not think it could be seen from the platform, owing to the fog; the down home showed a green back light, and I noticed it as soon as I reached the platform; the fog was thicker on the Maitland side of Farley than on the Lochinvar side; did not see the night officer touch the leavers after my train arrived; did not hear No. 25 whistle; my train was struck on the Lochinvar side of the home signal; I do not think my train stood more than half a minute at the platform before I set back, and I had gone back about half the length of the engine before the down mail struck me; I set back of my own accord to get out of the way of the down mail; I did not get any hand signal to do so; I did not notice anyone on the platform with a hand-lamp.

W. SANDERSON, 21/5/90.

*To Mr. Kirkcaldie:*—Walter Brett, inspector, states:—I was travelling in up mail in brake-van on the night of 12th May from Scone; besides myself there were in the van Guard Wm. Edwards and Assistant Guard John H. Went; Assistant Guard Irwin might have been there but I did not see him; I invariably travel in the small compartment, to look out of side windows; up mail left Lochinvar to time, 12 a.m.; I cannot say who gave the rightaway signal from Lochinvar; I cannot remember hearing the driver challenge the Farley distant signal, which I did not see; I cannot remember seeing the home signal either, but I noticed that speed was reduced, and train ran cautiously into station; I cannot say who stepped out of van first at Farley, but as a rule Went always got out first; train stopped about three-quarters of a minute, and then started to go back; I did not hear the down mail whistle; I heard Driver Sanderson, of up mail, give two short, sharp, whistles, which caused me to rush to brake-van door, when I saw the down mail coming from where I stood in the van; down mail appeared to be some distance the other side of home signal; of this I am sure, because I walked quickly along the platform and got as far as the station-master's door before the two mail trains struck; I cannot form an idea as to distance from van to where I saw down mail, but I am certain the train was the other side of home signal, and I should take the distance to be 100 yards to the home signal from where I was; as soon as I saw the down mail I called to the men to look out, and jumped from van to platform; immediately after the collision I went to the signal levers and found Went standing a few paces away; I spoke to him; I fancy I asked him how he found the levers, and practically we looked at them simultaneously and found them all at danger; Went had a hand-lamp in his hand, showing a light the colour of which I cannot remember, everything being done so quickly; I then gave Went instructions to remain near the levers, allowing

allowing no one to touch them ; I then proceeded to see the position of down mail ; on finding it stood on two bridges I called out to passengers to keep their seats ; I should mention here that the moment I got out of van at the Lochinvar end of platform I looked at the down home signal and noticed that it showed a clear green back light ; as I was going along the down mail I noticed it was foggy towards Maitland, but not thick round about Farley ; I looked for the back light of distant signal, but failed to see it on account of the fog ; I think I met the station-master when going along down mail ; I asked him where he had come from ; he replied " Out of this train " ; then I asked him had he noticed the signals in passing them ; he replied " They were both at danger " ; I then went back to station-master's office ; called the Night-officer Palmer, who was up at the loop points ; he came running along the platform ; I gave orders for telegrams to be sent to West Maitland for the doctors, and to Newcastle for the accident van, and to report the collision ; when I saw Night-officer Palmer he had a lamp in his hand, but I cannot remember what light it was showing ; I then gave orders for all the injured people to be brought to waiting-room and attended to ; about twenty minutes after the accident I gave Guard Downie orders to work the staff back to West Maitland ; I have no recollection of speaking to Downie about the signals ; I spoke to Driver Farnham, who said it was a bad job, but nothing passed about the signals ; I saw Assistant-guard Irwin ; I have a slight recollection of seeing him about half-an-hour after the accident ; I don't remember speaking to him then, but between 3 and 4 a.m. I gave him orders about the train that was being worked back to West Maitland ; he made no communication to me about the signals ; I have no recollection of seeing him on our way to Newcastle ; when next I saw him, for the first time after the accident it was Saturday ; I remember seeing the night-officer (Whybourne), and Porter M'Phillips who came from Maitland.

*To Mr. Thow :* As soon as I looked out of van of up mail I saw the down mail approaching ; I spoke to Driver Farnham ; I have no reason to believe that he was under the influence of liquor ; I went to the doctor (Dr. Russell, I think) having heard some rumours that Driver Farnham was under the influence of drink, and I asked the doctor if Farnham was the worse for liquor, and he replied, " I don't know what he may have been, but he is perfectly sober now." Farnham was walking very lame, holding his hip, when I spoke to him.

*To Mr. Kirkcaldie :* I cannot say who gave rise to the rumours ; Farnham being badly hurt probably had something to do with these rumours ; I cannot say how long after the accident it was when I spoke to Dr. Russell ; I did walk a distance of about 100 yards behind the down mail, and from that point looked for the back light of the down distant signal, but failed to see it on account of the fog ; this was after I had told Downie to work the staff back to West Maitland.

*To Mr. Thow :* Standing at a distance of about 412 yards from the distant signal, at which I looked for the second time, but failed to see the back light, on account of a belt of fog ; I would not consider it necessary to put fog signals at the distance signal, because I consider that had I been on the other side of the signal I could have seen the large light in front of the signal.

*To Mr. Kirkcaldie :* Where I was standing about 100 yards behind down mail there was no fog worth speaking about at that point, or between that and Farley station ; from that point I could plainly see the red light of the home signal.

*To Mr. Thow :* The grounds on which I arrive at the conclusion that the front of the signal light could have been seen at a distance of 100 yards was because the fog was belty, and I consider the fog was at the Farley side of the distant signal ; I was led to this conclusion from general conversation with different people about the fog being belty and in patches ; I took no steps to find this out, having no time, and I accepted the statement of Mr. Crothers, station-master, Farley, as to his seeing both distant and home signals at danger ; the conditions under which I would use fog signals would be when a signal could not be seen at a distance of 40 or 50 yards ; I took no steps to see whether the Farley down distant signal could be seen at a distance of 40 or 50 yards ; station-masters should use fog signals when they cannot see the fixed signals at a distance of 40 or 50 yards ; on this particular night I think fog signals were unnecessary, because I could see hand signal lamps about 300 yards outside the down home signal at Farley, and I called Guard Downie's attention to the light ; as near as I can tell, the down mail ran past the home signal at a speed of 15 miles an hour at Farley ; when I asked Fireman Buchanan what light he saw at the distant signal he replied it was a green light ; I then asked Buchanan if he did not know that the distant signal showed only red and white ; he said he got a green light ; the next day Mr. M'Carney and I looked at the spectacles which were both red on the distant signal ; I then called Buchanan over and told him to inform Mr. M'Carney what light he got from this distant signal ; Buchanan then said he got a green light, but it was further away, near to the platform.

W. BRETT.

*To Mr. Kirkcaldie :—John Farnham, driver of the No. 25 down-mail on 12th May, states :* I have been upwards of twenty years in the service, driving thirteen years, and running passenger trains occasionally, principally engaged on goods and stock trains ; I understand thoroughly how to manipulate the Westinghouse brake ; on this particular night, 12th May, I had nothing to drink before leaving Newcastle, nor up to the time of the accident ; I left Newcastle at 10:57 p.m., with a train equal to fourteen vehicles, twelve of which were controlled by the Westinghouse brake ; we arrived at West Maitland at 11:58 p.m., and left there at 12:5 a.m. on 13th inst. ; I had no conversation with anyone at West Maitland, and did not see the night officer to speak to ; I was not told at West Maitland that I was to cross the up-mail at Farley ; some night officers tell where we are to cross certain trains, but it is not always done ; we have crossed the up-mail at Farley before, but cannot give dates ; on the previous occasion, when I crossed up-mail at Farley, I was told so at West Maitland, and twice when driving the up-mail I have crossed the down-mail at Farley, and on each occasion I was told so by the night officer at Lochinvar ; it was foggy, but not extraordinarily so, when leaving West Maitland ; we ran at usual speed, and on approaching Maitland Colliery I challenged the Farley down distant signal, which I could not see ; I eased the steam, but did not shut it off altogether ; I eased the speed then from 28 miles an hour to 15 or 16 miles an hour, when crawling up steadily to the distant signal ; this signal I saw when within 20 or 25 yards of it ; it showed a white light ; I saw no part of it red in front, and in passing looked up and saw a clear white light ; I generally look back, although I see a white front light, to see the back light, and I did so on this occasion ; after passing the distant signal I put on light steam, and proceeded on the journey ; when passing the down distant signal, which is on the fireman's side, he was standing on his

side looking out; he was not engaged firing at the time; he made no remark about the signal, but said it was very foggy; after that, when about midway between the distant and home signals, I sounded the ordinary challenge whistle again, without having shut off steam; immediately after I did shut off steam; it was then so foggy in the cutting that I could not see where I was; I did not see the fireman using his hand-brake; after shutting off steam I made one slight application of the air-brake; I did not think we were through the cutting, but after proceeding along my mate said, "For God's sake stop the train;" I could not, at that particular moment, see the light of the home signal, nor the head lights of the up mail; I applied the Westinghouse brake with full force, and my fireman likewise applied his engine-brake; I did not see the home signal at all, but immediately afterwards saw the two headlights of the engine of up-mail, about 60 yards away; the reason I could not see the home signal was because the fog was rising at the time; my fireman applied the sand, which was applied both sides; I was in the act of reversing the engine when the collision occurred, and I was knocked stupid for a few seconds; my hip was hurt badly; after the collision I got off the engine and walked round, and could then see that the horse-box and carriage truck next the engine were smashed up; I looked at the back of the tender, and could see the legs of a man; not being able to stand on my legs or render any assistance, I went on to the platform, where I saw a lot of people; I saw and spoke to Mr. Brett, to whom I remarked that it was a serious job; I saw Guard William Downie a few minutes afterwards, and asked him if he noticed the distant signal; he said he did not, as he was sorting the bills, parcels, &c.; I saw the station-master some time afterwards, but did not speak to him; I saw Night-officer Palmer, but did not speak to him; I saw Assistant-guard George Irwin very shortly, just a few minutes after the accident, say 10 or 15 minutes; he spoke to me first saying, "This is a bad job Jack; how did it happen?" I replied, "The distant signal was showing a white light, and we were travelling with the staff; the night being very foggy I could not see exactly where I was, and was further advanced than I thought I was"; Irwin then said he had every reason to believe the signal was as stated by me, or words to that effect; nothing else took place; I do not remember his giving any reason for the signal showing a white light; it was about 20 or 25 minutes after the accident that I went from the engine to the platform; it was before I went to the platform that I had the above conversation with Irwin; when I went to the platform those who assisted me were a constable and some others, who were not railway men so far as I remember; so far as I am aware I did not ask any of the men on the station what they meant by having the distant signal at all clear while there was a train at the station; when my train struck the up mail we were travelling at the rate of 10 miles an hour; I have got a copy of weekly notice No. 18, dated 6th May; beyond asking the guard whether he had noticed the down distant signal, I had no conversation with anybody else about the signals that morning, except Guard Irwin; I was too unwell to make any report about the accident; I saw Irwin again on Thursday morning, after the accident, having sent for him; what transpired at the interview was the following: I asked Irwin if it was true that he walked down the line and saw the back light of the distance signal showing white light, and he replied "yes," and also said that he had removed a piece of timber from the signal wire; this was all the conversation I had with him; I heard in conversation at my own home on the previous day that Irwin had walked down the line to the distant signal, and that was the reason for my sending for him; I have had no conversation with him since about the accident; I am acquainted with rule 456, and my reason for going into Farley as I did was the fact of the distant signal showing a white light, and I considered the home signal would be the same; after leaving Newcastle on the night in question we stopped at Honeysuckle Point, Hamilton, Waratah, Hexham, East Maitland, High-street, and West Maitland; I found the brake acted well at all these places.

*To Mr. Thow:* The light I saw at the down distant signal was a full white one—no red about it, and the back light of this signal showed full white—no green about it; while the tender was passing the distant signal I looked up and saw it; when looking up and seeing the full white light of distant signal in front of me we were 16 or 20 yards from it; I did not look back at back light of the distant signal after having seen once when the foot plate passed it showing it was white; it may have been 60 or 70 yards or more from the home signal when my mate called out "For God's sake, stop"; at that moment we were travelling 15 or 16 miles an hour; when I looked at my watch at Farley it was 12:11 a.m.; I cannot mention any rule in the rule-book which permits of an engine passing the home signal at danger unless called on by hand lamp; on this occasion I was not called in to Farley by hand lamp; I believe there was a hand lamp being waved, but I did not see it; I cannot say who told me about the hand lamp being waved, but I heard it mentioned; I do not say that the reason I passed the home signal at danger was because I had been waved in by hand lamp; the reason was on account of the fog being so thick in the cutting I had got further advanced than I thought, consequently could not stop outside the home signal; I know the rules and the working of them, also the wording; there are many rules forbidding the passing of home signals at danger, but practically I did not violate the whole of these rules on that occasion; I cannot say that I obeyed any of these rules on this occasion.

*To Mr. Kirkcaldie:* It was about a minute after the accident that I looked at my watch, and it was about 5 minutes from the time I left West Maitland until we struck up mail; the fireman, from his position on the engine, would get a clearer view of both distant and home signals than I could.

*To Mr. Thow:* I am aware that when I look at a signal too close to it that I cannot see the light so well as from a further distance off; I must admit that when I looked up at the distant signal as foot-plate of engine was passing and saw a white light with no green at all; I did not look back after getting further away; I do not consider that the fireman neglected his duty in the breaking of the train in any way; in ordinary cases it is not usual for the fireman to apply the hand-brake some distance back from a station on trains controlled by the Westinghouse brake.

JOHN FARNHAM.

*John Buchanan,* fireman of the down mail, 12th May, states: I have been in the Service over seven years, firing five years nine months; our train left Newcastle about 11 p.m., and stopped at several stations between Newcastle and West Maitland; the Westinghouse brake worked satisfactorily at all these places; I only applied my hand-brake at the platforms so as to admit of the driver releasing the air-brake; I have no idea when we arrived at West Maitland, where I noticed the night-officer holding up the staff; it was not caught in the first instance, but dropped on the platform; I did not see the driver receive the staff, but knew we were travelling with it to Farley; I had a conversation with the night-officer

night-officer at West Maitland whom I told to wire to the Locomotive Department at Singleton, saying I was unwell, and did not think I could go beyond that station; that was all that took place between us; I noticed it was foggy when at West Maitland, but nothing extraordinary; after getting the signal we left there and proceeded at the usual rate; the driver sounded whistle challenging the down distant signal when we were opposite Maitland Colliery and then travelling at about 20 miles an hour; speed was then reduced to 14 to 16 miles an hour; at that particular time I was looking out for signals ahead; I saw the distant signals, but not before train was within 20 yards of it, and the light was white, not full; there was a speck of red on top of the signal, the rest was white; I did not notice the arm of signal; could not see it, being prevented by the darkness and the fog; I said nothing to the driver about this, because I thought from what I saw that it was a clear signal; if I had any doubts I should have drawn his attention; I still kept looking ahead, and did not speak to the driver; I was standing erect, looking towards Farley; next thing I saw was the home signal, which showed a red light; it was very foggy between the distant and the home signal, right up to the latter up to the time I saw it; the home signal was about 50 yards away when I first saw it, and we were travelling about 11 or 12 miles an hour; the first thing I did on seeing the home signal was to say to my mate, "For God's sake, stop her"; I was in a better position to see the home signal than the driver, as it was on my side; I saw the head lights of up-mail before I saw the home signal, and it was the sight of them which caused me to call out to the driver, "For God's sake, stop her"; it was in the interval between seeing the head-lights of up-mail and the home signal that I called out to the driver to stop; I heard two sharp whistles from driver of up-mail; it was not these which caused me to look and see the two head-lights; I saw them before hearing the two short sharp whistles referred to; I then applied the hand-brake; the driver had applied the air-brake before I heard the sound of the whistles; I, immediately after the accident occurred, went and inquired for the men belonging to the other engine; the engine struck inside of the home signal, about 16 to 18 yards from the signal; I inquired of the driver if he was hurt; he replied he did not feel the effects of the concussion at the time; I then went and inquired about the men in the up-mail; I was not hurt; I then came back to my own engine, and remained there for a little while, when Inspector Brett came to me, inquiring how we were; we then went round to the front part of the engine; Inspector Brett remained with me about 7 minutes; I cannot remember whether he said anything to me about the accident, or that I made any remark about the signals; I did not speak to the station-master or night officer; I did not ask any one at the station what they meant by having the distant signal at "all clear," while there was a train at the platform; our guard, Downie, came to me, and I gave him the staff, but said nothing to him; I heard Inspector Brett telling him to go and get the staff; I cannot say that I saw Assistant-guard Irwin that morning; I did not hold any conversation with him; I heard no one speak about the position of the signals; it was very foggy when we got to Farley; I remained there until 8:30 a.m.; the fog was very dense at the time of the accident; it did not seem to clear at all about that time, but kept drifting.

*To Mr. Thow:* I saw a green hand-light either on the platform or under the home signal; it was about 60 yards away; I saw the green light before seeing the red light of the home signal because the fog was lifting at the time; my impression as to the cause of the accident was the green hand signal which I saw first; I did not mention this to anyone at the time; I took no further trouble to ascertain whether there was a green light or not; I did not see the red home signal until we were within 50 yards of it; although many have stated that they could see the green light of home signal more than 50 yards away from Lochinvar side I cannot say why I could not see the larger red light of home signal more than 50 yards away; from the time of passing Homeville Colliery I did nothing but look out for signals; this colliery is between the distant and home signals, so far as I can say, and about 250 yards from the home signal; I still say I did nothing but look out for the home signal, 250 yards away; I looked out for the distant signal when opposite Maitland Colliery, about 300 yards from this signal.

*To Mr. Kirkcaldie:* I do not remember saying anything to Inspector Brett about the signals; I may have said that I saw a green light at the distant signal, but do not remember; I was aware that when travelling on this trip in question there was no green light at the distant signal; I will undertake to say that I did not mention to either Mr. Brett or Mr. Newton that I did see a green light at the distant signal; when I saw the green light on the platform or near home signal I took it to be a signal to come in as it was a waving light.

JOHN BUCHANAN.

*To Mr. Kirkcaldie:—William Henry Blezard states:* I am employed at the Maitland Colliery, and was on night duty on the night of 12th May; on this night it was very foggy; I noticed the Farley distant signal about half-an-hour before the mail train from Newcastle passed; it showed a red light towards Maitland, a clear red light; when the train was approaching I heard it coming, but did not hear it whistle; it was then so foggy that I could not see the signal; I saw the train pass; I looked to see if I could see the signal when I thought the train would be about passing it, but could not see it, and I could not tell whether the train slackened speed or not; at the colliery that night there was no great blaze except from kerosene lamp, unless from the chimney of the boilers, which frequently takes fire; it takes fire nearly every night; about an hour afterwards I looked again and saw the signal, showing red same as before; the fog had cleared away by that time; during that night the fog lifted, and fell frequently; at one time I could scarcely see; at another moment it was quite clear; I could see the red lights (tail-lamps) of the train as it passed me, but that was all; I was then about 60 yards from the line, and that would be 150 yards from the tail-lamps when I saw them; I think the distant signal is about 700 yards from where I was at work that night.

*To Mr. Thow:* When the chimneys take fire the blaze rises about 2 yards above their tops; the blaze is a dull red light, not a big flame, and does not illuminate very much all round.

W. H. BLEZARD.

*To Mr. Kirkcaldie:—David Williams states:* I am employed in the bridge gang, Railway Department; I travelled from Ben Lomond to West Maitland on the night of 12th May in up mail, and was in second carriage from engine awake; I remember the train arriving at Farley, and consider the train was at Farley Platform about half a minute before it started to set back; I heard the train approaching from Newcastle, but did not see it; I did not get out but looked out and saw the night-officer, who was standing

standing opposite the station door calling out "Farley" as the train drew up to platform; then I saw him change the mail-bags, and he seemed to run back to the points; I think he had a hand lamp while he stood, but did not see it when he was running back to the points; I saw the assistant guard of up mail who had a lamp showing a green light; he seemed to be calling the train from the north back; he was standing opposite the waiting-room door, about 50 yards behind where I was, and I saw him wave the green light several times from side to side; I did not see the down mail at all before it struck the other train; I am quite sure it was a green light I saw, and that it was 50 yards behind from where I was in the carriage; the fog was very heavy overhead, but I think I could see a light about 100 yards ahead; I said to Permanent-way Inspector Lee that I thought the driver of down mail had mistaken the green light waving on platform for a signal waving him in, and that was the cause of the accident; I also spoke to Night-officer Palmer several days after to the same effect; he said he thought it was a white light which called the up mail back into siding.

*To Mr. Thow:* I did not get out of the carriage; I was leaning out when I saw the green light; there were four or five in same compartment with me; we chatted nearly all the way down; I got out after the accident, but spoke to no one about the cause of the accident, except Lee, to whom I spoke about an hour after the engines struck; I am quite sure the green light was not in front of me towards Maitland, but about opposite the waiting-room door; when I heard the down train puffing up the hill I looked at the back light of home signal, and saw that it was green; I could just notice this light through the fog; I was in the carriage when the collision occurred, and was not pitched about, but bumped by a fellow passenger.

*To Mr. Kirkcaldie:* I was sitting the whole time with my back to the engine, and merely turned my head to notice the back light of the home signal.

D. WILLIAMS.

### Conclusion.

The evidence as to the density of the fog is conflicting, but all witnesses agree that there was more or less. Some of the witnesses such as Palmer, Crothers, Downie, Edwards, Went, M'Phillips, Whyburne, and Brett describe it as very slight, but others as very foggy.

It appears to have been a shifting fog not sufficiently dense to render the fixed signals invisible at a distance great enough to give timely warning to men looking out for them, as to make the use of fog signals advisable.

W. H. Blezard gave very trustworthy evidence on this question. He is an independent witness (not connected with the railway staff), and was engaged at the boilers of the Maitland colliery on the evening in question, which is situated about 60 yards from the line on the left hand side going north, and about 700 yards on the Maitland side of the distant signal. From where he stood, 700 yards away, he saw the distant signal showing a clear red light half an hour before the accident occurred, and although this signal was obscured from his sight when the down mail passed the colliery he saw the red tail lamps of the train as it passed at 150 yards distance. With regard to the fixed down signals, neither of them is high; the distant signal especially is short and low, and well within the line of vision of an approaching train. They were burning brightly at midnight on the 12th instant, and we consider that the evidence is conclusive as to their having been both at danger when the down mail approached and passed them. On this point the evidence of Palmer, Crothers, Downie, Blezard, Brett, Went, and others, is very strong. The only witnesses who contradict them are the engineman, fireman, and assistant guard Irwin, who was a passenger in the up mail. We do not place the slightest reliance upon Irwin's evidence. His refusal to furnish us with the names of his fellow employees in support of his extraordinary statement produced in our minds an adverse impression, and we consider his statement as to seeing a white back light at a distant signal, and also that the arm of that signal had fallen to within 1 foot of the signal-post, as seen by him at the distance of fully 150 yards—immediately after the accident—a mere fabrication. On that account we have excluded from our consideration the whole of his evidence as utterly worthless.

The

The engineman and fireman admit that the home signal was at danger when they approached and passed it, but they assert that the distant was off. Against their testimony, which was given in a feeble and indirect manner, we place the opposite testimony of numerous witnesses, and do not entertain a doubt that both signals were against the train.

We cannot account for the men of the down mail passing the home signal, except on the supposition that they did not look out for it until just before entering Farley Station, and when too late to avoid the accident. The engineman admits that he did not see the home signal at all and only took steps to stop his train when the fireman called out to him to do so. The fireman shelters himself for disregarding the home signal on the plea that a green light (hand lamp) was waving from or near the platform; but the rules are very explicit on this point; they emphatically forbid the men to pass home signals when at danger, except under clearly expressed conditions which have no bearing in this case.

The engineman of the up mail, W. Sanderson, appears to have acted with great judgment in starting to move his train back immediately he saw the speed at which the down mail was approaching the station. There is no doubt that the accident might have been much more serious but for the prompt action of this driver.

DAVID KIRKCALDIE,  
Chief Traffic Manager.

W. THOW,  
Locomotive Engineer.

The Commissioners for Railways.

26th May, 1890.

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APPENDIX.

*(Evidence given by Mr. Henry Lee on 30th May, 1890.)*

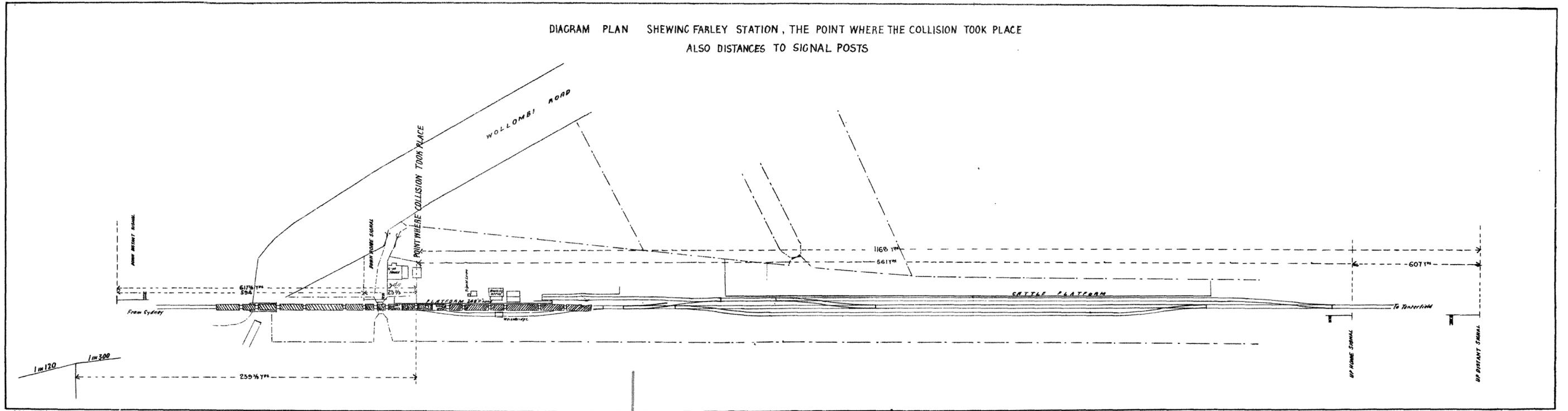
*To Mr. Thow:—Henry Lee, Permanent Way Inspector, Glen Innes, says:—I was in the up mail on the 12th May; left Glen Innes on 12th, and arrived at Farley Station; was not asleep at the time of arrival at Farley; was travelling in the van; I remember Guard Edwards, Went, another man, and Mr. Brett were in the van; just as the train was stopping I stepped out of the van; Mr. Brett followed me, and said, "Look out, she will be into us"; walked 10 or 12 yards towards the Maitland end of Farley platform; as I stepped out of the van I heard a long whistle from the engine of the down mail; then I heard Driver Sanderson on the up mail give two sharp whistles as a warning to the other train; I saw Sanderson's engine moving backwards, and beginning to slip; he turned towards the sand-box as if to put sand on the rails; he had moved back about the length of an engine when the collision occurred; before the collision my attention was called to the home signal by Mr. Brett, and I saw the green back-light plainly from where I stood soon after getting out of the van; it was not foggy at Farley Station; it looked hazy ahead, towards Maitland, but clear overhead; I did not look for the back-light of the distant signal, as I am not acquainted with Farley Station; I saw the head-lights of the down mail engine at least four or five seconds before she passed the home signal; I did not notice any hand-lamp being used on the platform that night; I saw a man named D. Williams in the train; he came with me from Glen Innes; he travelled in a second-class carriage; I said to him, "Are you hurt, David?" and he said, "I have lost my hat"; he showed me a mark on his forehead which looked like a scratch, and blood was flowing from it; I told him he was not hurt much, and he had better keep to one side, so as not to alarm passengers; he did not say to me that he thought that the driver of the down mail had mistaken a green light waving on the platform for a signal waving him into the station, and he did not say to me that he thought that that was the cause of the accident, neither at the time nor afterwards; I remained at Farley until the road was clear, assisting as far as I could in the matter; the clouds overhead were not so low as to obscure the home signal; the green light was distinctly clear at the back just before the accident.*

HENRY LEE.

[Two plans.]



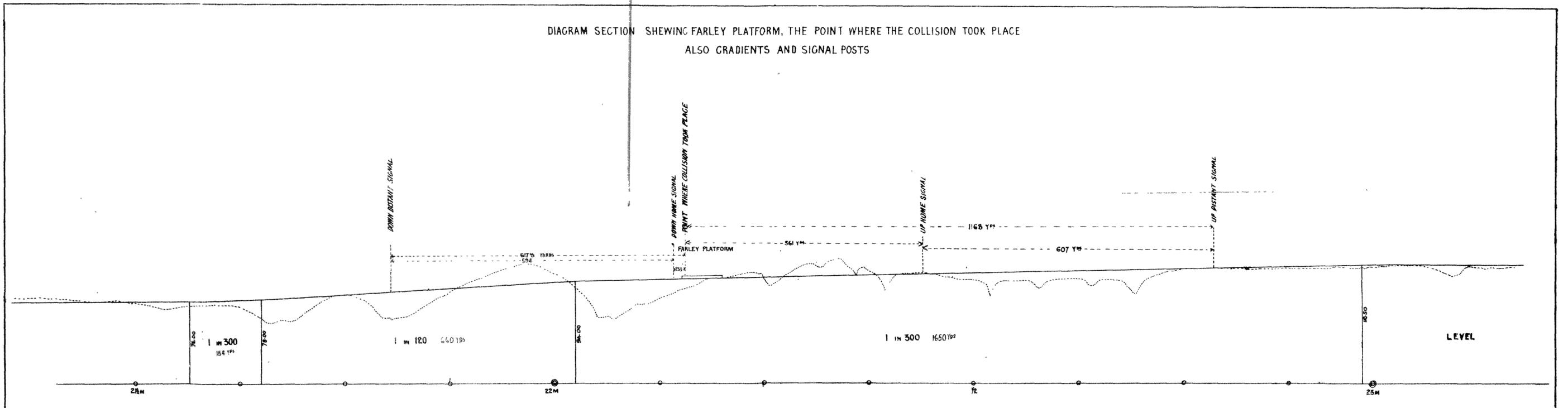
DIAGRAM PLAN SHEWING FARLEY STATION, THE POINT WHERE THE COLLISION TOOK PLACE  
ALSO DISTANCES TO SIGNAL POSTS



(Sig. 250)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES

DIAGRAM SECTION SHEWING FARLEY PLATFORM, THE POINT WHERE THE COLLISION TOOK PLACE  
ALSO GRADIENTS AND SIGNAL POSTS



(Sig. 250)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RAILWAYS.**

(REPORT OF BOARD OF INQUIRY ON ACCIDENT TO EXPRESS TRAIN AT THIRLMERE.)

*Ordered by the Legislative Assembly to be printed, 30 July, 1890.*

Accident to Up Express Train at 57 miles 58 chains south, 23rd July, 1890.

Gentlemen,

Sydney, 24 July, 1890.

Having, by your directions, held an inquiry into the cause of the accident to the Up Southern Express yesterday, we have now the honor to submit our Report thereon.

The train was made up as follows:—Engines Nos. 271 and 273, each weighing 63 tons 16 cwt. 3 qrs.; 1 mail-van, 1 first-class lavatory carriage, 1 composite carriage, 1 first-class lavatory carriage, 2 sleeping-cars, 1 mail-van and brake-van—all being bogie vehicles with the exception of the two mail-vans, and the weight, exclusive of the engines and of the passengers' luggage and mails, was 129 tons 14 cwt. 2 qrs.

It left Albury 7 minutes late, owing to the late arrival of the Victorian train; 15 minutes more were lost at Binalong waiting the arrival of the down mail train, and it left Mittagong at 9:55 a.m.—20 minutes behind time.

According to the evidence of all the engine-men and the guard, the train ran at the usual speed until when passing a gang of men who were engaged in re-sleeping the line at 57 miles 58 chains from Sydney both drivers felt their engines lurch; the train engine having, according to the evidence, lurched considerably more than the one in front of it, and, on looking back, the drivers observed that the mail-van next to the engine was off the rails, and that, after running for some distance in that manner, the lavatory carriage immediately behind it became derailed too.

The guard at the rear of the train also felt the lurch, and, on looking out to see the cause, noticed that the mail-van next his brake was also off the rails. The air-brake was immediately applied by both the driver of the train engine and the guard, but the train ran 25 chains after the first vehicle became derailed before it was pulled up.

The speed at the time the lurch occurred is estimated at from 30 to 35 miles an hour, and it may be here observed that the speed from Mittagong to the spot where the accident took place barely averaged 35 miles an hour.

The train parted in three different places, viz.:—Between the engine and mail-van, between the second and third vehicles, and between the mail and brake vans at the rear.

No one was injured.

The damage to the rolling stock is estimated at £50; in the permanent way 390 chairs were broken, and 15 sleepers rendered useless, the cost of which is, approximately, £45.

Evidence

## Evidence.

*William Cox*, states:—I have been twelve years next month a guard, and seven of these on the express train; we were seven minutes late leaving Albury on the night of Tuesday, 22nd July; Melbourne train late; delayed fifteen minutes at Binalong Crossing through the down mail, which was running late; we had two engines on train, and left Mittagong at 9:57; train made up on leaving Mittagong—

Leading engine...	...	...	...	...	...	...	...	No. 273
Train "	...	...	...	...	...	...	...	" 271
Mail-van	...	...	...	...	...	...	...	" 2
Lavatory carriage	...	...	...	...	...	...	...	" 163
Composite "	...	...	...	...	...	...	...	" 89
First-class lavatory	...	...	...	...	...	...	...	" 165
Sleeping-car	...	...	...	...	...	...	...	" 16
" "	...	...	...	...	...	...	...	" 2
Mail-van	...	...	...	...	...	...	...	" 15
Brake-van	...	...	...	...	...	...	...	" 151

All being bogie vehicles with the exception of the two mail-vans; mail van No. 2 was attached next engine at Mittagong, and we left at 9:57 a.m.; did not stop anywhere till accident happened; the accident happened at 10:30 a.m.; I looked at my watch; after passing Picton Lakes I was looking out on right-hand side of brake-van, and turning round, a box of flowers came down and struck me on the shoulder, caused by the oscillation of train; before looking to see what was wrong—I knew there was something amiss—I applied the air-brake full force; I then looked out of the window and saw the mail-van next my brake was off the line; I did not notice any other vehicles off the line; when I put on air-brake I should think we were running at the rate of 30 or 35 miles an hour—not more; am a pretty good judge of speed; the train ran, I should think, 20 or 30 chains after the accident; the first thing I observed when I got out of my B van was that mail-van No. 15 was off the rails, and my B van, which was on the rails, had become detached; I am not sure whether the couplings were broken or not; I did not look, being anxious to attend to the passengers; I next called out to the car-conductor to see whether anyone was hurt, and went to fore part of train; at the end of the compo. 89 and lavatory carriage 163 the draw-bar was broken; I did not notice the side-chains; between these two carriages there were eight lengths of rails displaced; I found lavatory car No. 163 and M. van No. 2 were both off the road, and the engines were standing some distance ahead of them, so that the train was in four parts; the leading engine was sent on for some carriages, and the train engine went to Thirlmere; I am positive we were not going at 50 miles or over.

*To Mr. Kirkcaldie*: I have an idea that the buffers of lavatory carriage 163 were locked with mail-van No. 15, but I did not see any other carriage's buffer locked; I sent the conductor back to Picton Lakes to protect the train, while I remained by the train; I have never travelled 50 miles per hour down the grade where the accident occurred.

*By Mr. Angus*: I don't care for a four-wheeled vehicle on the express train; I have noticed more oscillation with the small vehicles; I did not pass any flagmen or see the man in charge of relaying gang; we have travelled 50 miles an hour in places between Wagga and Albury.

WM. COX, 24/7/90.

*James Fergusson*, driver of the leading engine on the up express, on Wednesday, 23rd July, states:—My engine, 273, four-wheel coupled, was in good order; I left Mittagong at 9:55 a.m., being twenty minutes late; we did not stop anywhere; on approaching the place where the accident happened I sounded the whistle, and they all cleared away; when passing over the place where the men were at work I felt a nasty jar right side of engine, as if there was a bad bit in the road; looked back immediately to see if the train was coming, and saw the ballast flying; the brake was immediately applied by the train engine; I could not say how far the train ran before it was stopped; when the train did stop, I went back and had a conversation with the guard regarding the passengers; at the time the accident happened I am of opinion that we were travelling at a speed of from 30 to 35 miles an hour; there were three vehicles off the line altogether—the first was mail-van No. 2, second lavatory carriage No. 163, third was mail-van next the brake with overland mails; the mail-van loaded with milk was the first to go off the road; I noticed that the train ran a considerable distance before the next one left the rails; the draw-bar broke between the lavatory carriage No. 163 and the composite carriage No. 89.

*To Mr. Thow*: The couplings between the train and the second engine jumped off in consequence of the derailment of the mail-van, and the iron pipe for the air-brake broke; the flying gang were at work where the accident occurred; did not get any signal; I challenged them by whistle; did not see any flag; I did not go back to see how the road was after the accident.

*To Mr. Angus*: Slight curve where the engine left the line; I did not notice anything wrong with the road before I felt a severe jerk; have been a driver here thirteen years; have felt a severer lurch, and train has not left line; there were a large number of men at work where I felt the jerk; no flagmen out, and I was not slackened in any way; examined my engine before leaving Goulburn; the mail-van first left the road; have never heard of such a van being off the road before; it is customary to put on at Mittagong a similar vehicle every morning.

*To Mr. Kirkcaldie*: Did not notice whether any of the buffers were locked after the accident.

*To Mr. Angus*: Was not exceeding 30 or 35 miles an hour at time of accident; could not see anything wrong with engine; the jerk would be on inside of curve on the right-hand side of the engine.

*To Mr. Thow*: Was not slackening at time accident occurred; after passing Picton Lakes we check speed; consider the road brought about the accident.

*To Mr. Kirkcaldie*: Did not notice any buffers locked.

J. S. FERGUSSON, 24/7/90.

The buffers were in a direct line at Mittagong.

*Ebenezer Ingleton* : I was fireman to driver Ferguson assisting engine of up express yesterday ; have been two-and-half years a fireman ; have frequently run on the express, ran from Goulburn yesterday ; we left Mittagong at about 9:55 or 9:57 a.m. ; did not stop anywhere after leaving Mittagong ; we came down on a bit of level road and saw a number of fettlers working there and driver whistled, and they got out of road ; did not see any signal of any kind ; the road looked alright ; felt the road rough about 20 yards from where the men were at work ; my driver seemed to put the air-brake on a bit ; at the same time I put engine brakes on hard and driver sang out to stop ; driver looked back as soon as he felt engine jump ; I did not notice anything more till train was brought to a stand ; I remained on engine while driver went back ; the engines had become detached from the train ; when the driver returned to the engine we proceeded to Thirlmere with the tablet, and went on to Picton with tablet, and to see whether there were any carriages there ; after that went on to Douglas Park with tablet and returned to Picton, and then took part of the carriages which had come by the 9:30 a.m. train from Sydney into which passengers were transferred at the scene of the accident ; I could only see two carriages detached from the train ; I think we were travelling at 30 or 35 miles an hour, not faster than usual ; when the accident happened I think we ran a  $\frac{1}{4}$  of a mile after feeling the jerk.

EBENEZER INGLETON, 24/7/90.

*Joseph Paul* states :—I have been a driver about ten and a half years, principally on the Southern Line ; have been running the express and passenger trains for the past four months between Sydney and Goulburn ; I was driver of the up express from Goulburn to Sydney on Wednesday, 23rd July ; at Mittagong we attached a mail-van next to my engine, and left there at 9:55 a.m. ; did not stop anywhere after leaving Mittagong till accident occurred ; slackened down at Picton Lakes to pick up tablet ; I saw the men at work at the foot of the 1 in 40 grade on a straight road ; there were about eight or nine men on my side of engine ; I heard the whistle from leading engine as a warning for the men to get out of the way ; I noticed, within a very few yards where the men were at work, I felt the surging of the engine to such an extent that I thought she was off the road ; did not see any signal exhibited ; I think we were travelling at about 35 miles an hour, not faster ; when I felt surging of engine was running with steam off, applied the air-brake ; when I looked back I saw that the milk-van next the engine was off the road, but no others ; then we ran some considerable distance before the lavatory, next the mail-van, left the road ; the draw-bar between the second and third vehicles from my engine was broken, and the hose of air-brake was uncoupled ; we must have run between 20 and 25 chains after we saw the mail-van off the road ; I cannot account for train running 20 to 25 chains, but I had the air-brake applied and sand running ; the next thing I noticed was that the coupling had become disconnected ; the side chain was broken, also the air-pipe on the train engine was broken ; the engines when they came to a stop were about 50 yards in front of the mail-van ; went back to see if anyone was hurt (driver Ferguson and I), and guard made arrangements with fettlers to go back and protect the train ; the guard then arranged with driver Ferguson to go to Picton for carriages, while we went on to Thirlmere and was put in siding in order to let the break-down train pass ; I went back to place where milk-van first left the rails, and found the road out of line ; I am of opinion that the road was soft when the first engine passed over it, and that put it out of line, which I think accounts for my engine rolling about when we passed over the spot ; I noticed that the permanent-way men had been at work putting in new sleepers at the place where the accident occurred ; the ballast had been removed away from sleepers ; I spoke to some of the permanent-way men and they seemed to think the accident had been caused by the mail-van ; my engine was disconnected from the mail-van, then the lavatory was disconnected from the Redfern type carriage ; the draw-bar of the lavatory carriage was broken ; I did not see any other part of the train, but was told the couplings had parted between the mail-van and brake-van at the rear of train ; the only vehicles which were off the road were the mail-van, next the engine, the lavatory-carriage next, and the mail-van immediately before the brake-van ; I didn't notice any of the buffers locked.

*To Mr. Thow* : When I went back to examine the road I noticed 25 chains bare of ballast ; I think the accident was caused through the bad state of the road where it occurred ; the men have been relaying four months, from Picton up ; could not say how long the men have been working at this particular place ; the air-brake gripped as soon as it was applied ; between the derailed portion of the train and that on the line, it was about 65 feet, I think ; I applied the air as soon as I felt the lurch ; I noticed lavatory-carriage come off.

*To Mr. Angus* : I did not take particular notice of the position of the buffers between engine and mail-van at Mittagong. On the right-hand side I received the jerk first ; there were a larger number of men than usual at the place ; was on the right-hand side of engine when jerk was felt on straight road ; there were 50 yards between engine and mail-van ; I ran a considerable distance after I felt the jerk—about 25 chains ; I felt the leading engine-brake go on ; I last travelled over this part of the line with the same train on Saturday morning last ; the sleepers were bare ; have never been slackened with a flag at this place ; when we left the line it was 10:29 ; left Mittagong at 9:55 ; the brake was in good order in coming down the inclines—of 1:30 from Mittagong.

JOSEPH PAUL, 24/7/90.

*Henry Alfred Bennett* states :—Have been a fireman for this last seven years ; have been employed on Southern Line for about eighteen months between Sydney and Goulburn ; I was fireman of the train engine of express on Wednesday last ; at Mittagong a mail-van was attached to my engine and the shunter attached all the couplings ; the driver looked at the couplings ; we left Mittagong at 9:55 a.m. with an assistant engine in front ; after passing Picton Lakes some distance the first thing I heard was a whistle, and saw the fettlers stepping back from road ; the next thing I noticed was the leading engine oscillating, and then felt our engine oscillate too ; was looking out at the time ; driver remarked to me that it was very rough, and at once applied the air-brake while I applied the engine hand-brake and opened the sand ; I then looked behind and saw that the mail-van next my engine was off the rails ; the lavatory carriage next the mail-van did not leave the rails till sometime afterwards ; I think we ran about 20 chains after brakes were applied ; I think speed was 30 to 35 miles an hour at this time ; did all in our power to stop the train ; the soft place in the road was about 10 yards from where fettlers were standing ; the driver got off the engine and went back whilst I stopped to fill the boiler up ; while the driver was away I got down and looked at the couplings, and I noticed that the air-pipe on the tender was broken

broken and one side chain of the mail-van hanging to the side chain of the tender; the main coupling was hanging on the hook of the engine, having jumped off; the mail-van was about 30 yards from my engine; I noticed that the train had parted again between the lavatory and Redfern carriages (Nos. 163 and 89), but did not see any other parting in the train; we went down to Thirlmere and got into siding; there were no signals out for us coming down; after the train stopped I noticed that the buffers between lavatory carriage and mail-van were locked; did not see any others; could not say where milk-van left the road.

HENRY A. BENNETT, 24/7/90.

*John Reeves* states:—I was driver of an up special goods which left Mittagong at 8.30 a.m. on 23rd July; I passed Thirlmere at about 10.5 a.m.; speed was about 15 to 25 miles an hour after passing Thirlmere; did not notice any soft place where men were relaying; I saw John Sladen, relaying ganger, coming back with a flag, as if he had been out; I did not see a flag-man on the Sydney side of the men; I was driving engine 204, inside cylinder; I thought line in good order, with good top,

JOHN REEVES, 24/7/90.

*Thomas Cornthwaite* states:—I am Chief Inspector of the southern division of permanent-way, and I have been rerailing and resleeping a portion of the permanent-way between Picton and Picton Lakes; have not been doing the resleeping under the slackening notice; flag-men have been placed, and recalled when road has been made safe; I examined the road about a fortnight ago; the sub-inspector (White) has taken his instructions from me; the relaying ganger has been carrying out my instructions through Sub-inspector White; I am satisfied that if those instructions were carried out there was no fear of accident; have had no trouble to keep the embankment up at the place where the accident occurred; there are from 6 to 7 inches of ballast under the sleepers; width of ballast on formation about 11 feet wide, or 1 foot at each end of sleeper; the ballast is clean sandstone; I consider that the road was well packed, in fact as well as any man could make it; trains could travel at any speed they liked over the line where accident happened; my opinion is that the accident was caused through the milk-van between the engines and a heavy train—I don't think that the road had anything to do with it; have been an inspector since 15th April, 1878; I have had derailments before; I never remember seeing one of these small vans on a fast train; have never heard of them oscillating very much; I consider Ganger Sladen an experienced man for relaying and resleeping; I do not know that he has had any accident before; I saw this particular spot about a fortnight ago, and examined the line about 2.40 p.m. on the day of the accident; Sladen has never represented to me that the speed was too great for the road until yesterday; I did not consider it necessary for a slackening notice to be issued; when I saw the road at 2.40 p.m. yesterday it was safe to pass trains over at any speed, but, of course, I could not tell what condition it was in at the time of the accident; I don't think it would be better for the flagmen to remain out all day when resleeping.

THOMAS CORNTHWAITE, 24/7/90.

*John White*: I am Sub-inspector of permanent-way from Picton to Tarago; have been resleeping the portion of line where accident happened having been previously rerailed; we are resleeping between 57 and 58 miles without slackening notice, and at the time of the accident there were no flagmen out, as the inspector states he had made the road right, and had recalled the flagmen; I think we have put in about sixty sleepers a day; have been doing this work without a slackening notice; have had flagmen out in both directions till the road was made good; have no idea how many sleepers the ganger had put in on the morning of the accident; have recalled flagmen when road has been made good; this is the practice; the ganger has no other instructions than those contained in the rule-book; I was at Wangello, and proceeded to the spot as quickly as I could and arrived there about a quarter to 3; the ganger had not touched the line only where it had been knocked out of line by the accident; I walked over the line and saw that the sleepers were very fairly packed underneath; I am of opinion that the road was good enough to carry a train running at 40 miles an hour; cannot account for the accident; should think train was running considerably over 40 miles an hour to cause the accident.

JOHN WHITE, 24/7/90.

*John Sladen* states:—I am the ganger in charge of the relaying gang; have been relaying road; have been putting in sleepers; have not had a printed slackening notice, but flagmen have been out 800 yards on all occasions; had just called flagmen in before express came, as I considered road safe; have sixteen men at work; could not say how many sleepers had been put in—average, eighty a day; more than a foot of ballast was under the sleepers; the ballast extended 2 ft. 6 in. from the end of sleeper; ballast is sandstone; road was well packed and in line, and consider it was safe; might carry a train at 35 miles an hour; do not consider it safe for greater speed; I noticed the road go out of line when the train passed; should say speed was not less than 50 miles per hour; I think the train was going excessively fast; the carriages and engine were oscillating; I noticed the milk-van attached to second engine leave the rails first; it was on an embankment where the engine lurched; it is a soft formation; there is sand in the bank, and therefore I should think it is soft; have had no difficulty in keeping a top on the road; after a fast train has gone over it I have seen it go slightly out of line, both in cuttings and embankments; I saw the van leave the road, the front wheels first; did not notice the back wheels leave the rails then; the train ran about 25 chains after the carriages left the road; the milk-van got off the road at 57 miles 58 chains, and train stopped at 57 miles 32 chains; I am a judge of speed, and consider train was travelling at 50 miles an hour; have seen trains travel at this speed before; I do not think that the road is fit for a train at a greater speed than 35 miles an hour, and yet it is pointed out that the express is timed to run from Mittagong to Picton at a speed of 36 miles an hour, which points to the necessity for a slackening notice; have never reported that road was not fit for over a 30-mile an hour speed; would think I am correct in saying that train was travelling at

at 50 miles an hour at time of accident, in the face of the speed of 35 miles, as per time-table; I am quite sure that the train was travelling more than 35 miles an hour; I called the flagmen in about 23 minutes before express was due; the names of flagmen were Peter Moran and John Watson; the road was thrown about 6 inches out of line for a considerable distance.

JOHN SLADEN, 24/7/90.

Flagman Moran had been out since 9 a.m. when recalled; I have a full supply of flags and detonating signals; I did not say I could not signal train for want of them; Watson was the flagman in the other direction.

JOHN SLADEN, 24/7/90.

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#### CONCLUSION.

We are of opinion that the accident was caused primarily by a defect in the permanent-way.

It is shown in the evidence that the first engine lurched heavily, that the second moved still further, and that in consequence of the depression or movement in the road the light vehicle immediately behind the engines jumped the track.

It will be seen from Ganger Sladen's evidence, however, that he considered the line so safe that he recalled the flagman, who had been out protecting the operations in the usual way, about 20 minutes before the express was due; and it may also be mentioned that he had some reason for this belief in the fact that an up goods train passed safely over the road, although naturally at a speed much slower than the express, about 20 minutes before the accident occurred.

DAVID KIRKCALDIE.

W. THOW.

J. ANGUS.

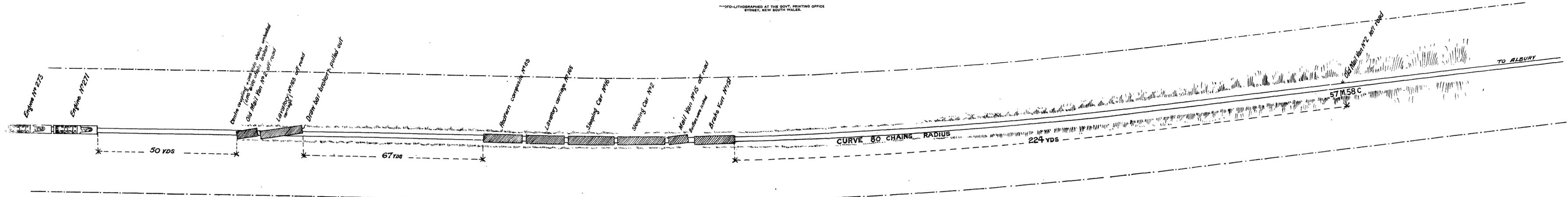
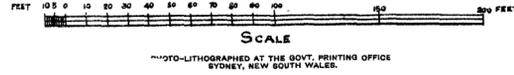
The Railway Commissioners.

[One plan.]

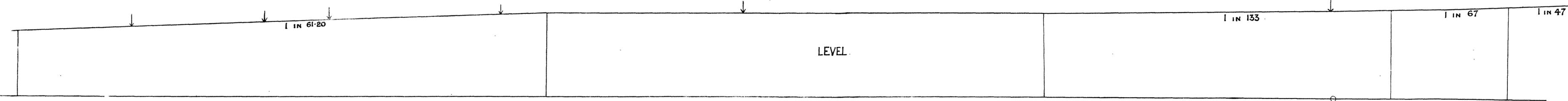


# N. S. W. COUNTRY

Plan showing Derailment of N<sup>o</sup>24 Up Passenger train at 57M58C. Great Southern Line on July 23<sup>rd</sup> 1890



PLAN



SECTION

(Sig. 46A.)

57M 58C

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(REPORT OF MR. E. B. PRICE, TEMPORARY EXAMINER OF PUBLIC WORKS PROPOSALS, ON  
PROPOSED BRANCH LINE TO BALLINA.)

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*Ordered by the Legislative Assembly to be printed, 3 December, 1890.*

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Lismore to Tweed Railway.—Proposed Branch to Ballina.

Sir,

I beg to report that I have been through the district traversed by the route of this proposed branch to Ballina.

With the exception of the swamps about Ballina, the whole country is of the richest description, and when cleared and cultivated should yield large crops of sugar-cane and other semi-tropical products.

Owing to there being navigable water along the course of the proposed line for nearly half its distance, the wayside traffic in heavy goods and cane could never be great; and certainly at present the wayside traffic would not make a line pay working expenses.

All traffic which may be gained from the interior will be so much lost to the line between Lismore and Byron Bay.

As at present authorised the line will connect two ports, neither very good, but both capable of very great improvement.

It appears to me that Byron Bay, even in its present unprotected state, will get all the goods traffic from Murwillumbah, and also a portion of the traffic towards Lismore.

Lismore will get the remainder, but if this line is made it will go to Ballina instead.

Certainly passenger traffic would come that way, and save 75 miles of river journey from Lismore to Ballina; and this saving to passengers is about the only point in favour of the line.

When Byron Bay Breakwater is constructed (as it eventually will be) the whole trade of the district will be drawn to an outlet at Byron Bay. Passengers will then come by rail from Lismore and Casino to Byron Bay.

So that no traffic would remain for the branch to Ballina, unless what was derived locally.

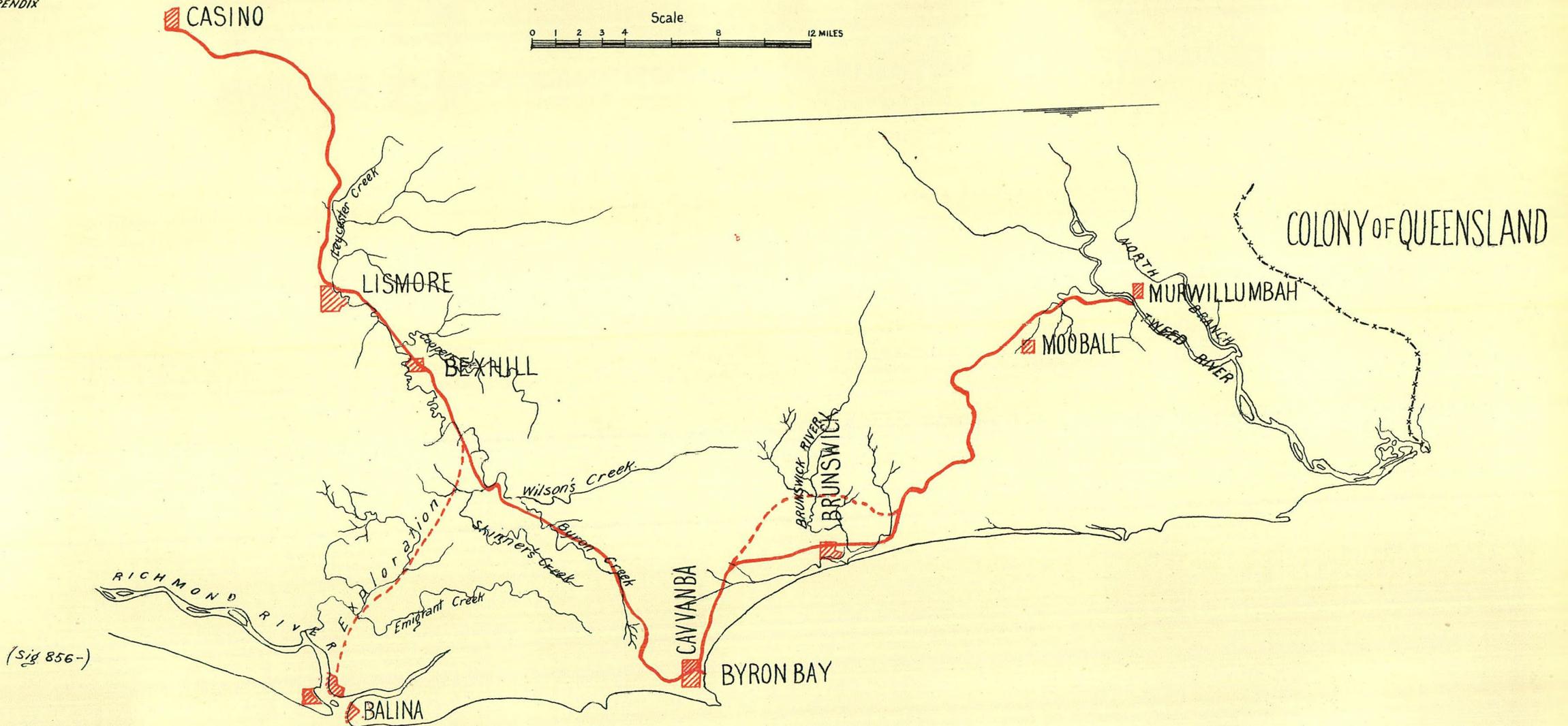
The conclusion I have arrived at is that this line, though of benefit to Ballina, does not present sufficient advantages to warrant its construction at present.

E. B. PRICE.

[One plan.]



Diagrams showing Railway Surveys etc,  
between the Richmond & Tweed Rivers



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RAILWAYS.**

(REPORT ON PROPOSED BRANCH LINE FROM BYROCK TO BREWARRINA.)

*Ordered by the Legislative Assembly to be printed, 23 October, 1890.*

Mr. P. Scarr to The Under Secretary for Public Works.

Proposed Branch Railway, Byrock to Brewarrina.

Sir,

Department of Public Works, 9 October, 1890.

In accordance with your instructions I went over this line, and made inquiry respecting it, and have the honor to report.

**Route.**

From Byrock, as far as Charlton Station, where the trial survey crosses the Bogan River, the line passes through undulating country, unaffected by flood, and free from engineering difficulties.

From Charlton to the crossing of the Tarrion Creek (an ana-branch of the Barwon), the country is all flooded to a greater or less depth—first by the overflow channels of the Bogan, and next by those of the Tarrion, the two waters meeting during floods.

Altogether, between these two points, there is 16 miles of flooded ground, where extensive openings and embankments would have to be provided, adding materially to the cost of construction, so that this line will probably not be found to be so inexpensive as might, from the level nature of the country, have been expected.

I am induced to draw attention to this fact from observing that through the papers and arguments in favor of the line, the very level nature of the country has been dwelt upon as a strongly favorable feature in the case.

**Area to be served.**

The proposed line would drain a tract of country within New South Wales approximately 100 miles square. Having Gongolgan as its most southerly point, and bounded on the west by the Bogan River to its junction with the Barwon, and thence by a line northerly to the Queensland border; on the north by the border as far as its intersection with the Narran River; and on the east by a line running south to the Barwon, at about 20 miles below Walgett; and on the south by a line thence to Gongolgan—an area of about 10,000 square miles. This piece of country is purely pastoral, and from it no produce can be expected other than that arising from pastoral operations. On it there are at present 1,158,000 sheep, yielding (say) 3,000 tons of wool.

In addition to this area within the Colony, the traffic from a considerable tract lying beyond the border would be drawn to Brewarrina.

A large quantity of wool already finds its way from Southern Queensland to the New South Wales Railways at Bourke and Narrabri; and it is claimed that Brewarrina, being so much easier of access than either of those places, this Queensland traffic would be largely increased by the proposed extension. So much so, that it is estimated the wool from more than 1,000,000 sheep depasturing in Queensland would be sent to the railway at Brewarrina.

This assertion is probably, in the main, correct; but not to over estimate, I would reduce the quantity by one-fourth, which would give, roughly, 2,000 tons wool to come from Queensland, making, with the 3,000 tons from within New South Wales, 5,000 tons of wool per annum to be trucked at Brewarrina.

It is, however, to be remembered that the greater part of this traffic already comes to the existing railways either at Narrabri or Bourke, and it would be only such additional traffic as the easier access to Brewarrina would draw from Queensland that could be considered new; in fact, to provide the traffic I have stated above for the proposed line, the existing lines must be made to suffer heavily.

It is claimed that Brewarrina is the natural outlet for the tract of country I have indicated, and that it is in both wet and dry seasons more accessible than either Bourke or Narrabri.

Taking Angledool for example,—I have a letter written by Messrs. Sherwin & Co., of Nulliwa, Angledool, wherein it is stated that a carrier who left Walgett in May last had not reached Angledool on the 30th August, when the letter was written, whilst one who left Brewarrina in July, delivered his loading at Angledool in five weeks, and "saved the people from a famine." What applies to Walgett would so, quite as strongly, to Narrabri. The distance from Angledool to Narrabri is 200 miles, whilst to Brewarrina is 100 miles.

As regards the outwards or return traffic to be expected, the lines of traffic are subject to so much disturbance that it is difficult to obtain any reliable estimate of the probable annual amount of goods to be sent out, and the figures are likely to mislead.

During wet seasons, when the rivers are navigable, the station supplies are obtained by steamers, and delivered at places along the river where most convenient, whilst during dry seasons they are sent by road direct from the railway stations.

Stock

### Stock Traffic.

A large number of both sheep and cattle, entering this Colony from Queensland, at Barrington, travel by way of Brewarrina, and thence up the Bogan, on the Marra River, to Nyngan and Nevertire, and it is very probable that with a railway station a considerable number of these would be trucked at Brewarrina.

During 1889 there crossed the border, at Barrington, 95,926 cattle. Of these, between 60,000 and 70,000 crossed the Barwon, near Brewarrina, only 29,879 crossing at Bourke.

The numbers of Queensland cattle trucked at Nyngan and Nevertire I could not ascertain, as no record is kept at the railway stations of where the stock came from.

Of sheep, there entered this Colony at Barrington, during 1889, 97,948, but as they enter a district stocked with sheep it is not possible to trace them further.

There crossed Brewarrina bridge during that year 165,432 sheep.

These figures will suffice to show that a large traffic in stock exists at this place, and it is only reasonable to suppose that of these large numbers a considerable proportion would make use of the railway at the first point of contact.

### Passenger Traffic.

It is not possible to obtain any reliable estimate of the probable numbers of passengers. The coach proprietors keep no record of the numbers travelling, and in any case that would be no reliable guide as to what might be expected on the railway. Nor is it likely the passenger traffic would be an item of much importance on this line.

It is chiefly from the wool, stock, and goods returns must be looked for.

### Increased Settlement.

Since the Land Act of 1884 came into operation almost the whole of the available land in the Brewarrina Land District has been taken up under homestead lease. There only now remains east of the Culgoa four blocks available, and to the west of that river very little. 237 homestead leases have been taken in all.

This means an important increase to the population, and also, probably, a considerable increase to the production of wool, as the land will no doubt be made to carry a much larger number of stock than it did under the pastoral leases.

### Need for improved access to Brewarrina.

This town does not present the appearance to a stranger of one rapidly increasing. There are no evidences of activity in building, but it was stated to me new premises for the Bank of New South Wales were shortly to be erected.

It is as a depôt from which supplies are distributed to the adjacent country it has importance.

In consequence of the bad road to Byrock, and the infrequency of the river being navigable, it is practically cut off from obtaining these supplies readily, and it is to remedy this evil the railway is asked for.

Both roads to Byrock—that *via* Gongolgan, and the more direct one *via* Charlton—are bad, and pass over a good deal of flooded country, making traffic most difficult in wet weather.

Material for road making is scarcely obtainable, and to construct a road would be most expensive.

The capitalized cost of constructing and maintaining the 55 miles of road between the two towns would be little short of £150,000.

Whether such an expenditure is ever likely to be undertaken it is not my province here to discuss, but, as has been pointed out by the Railway Commissioners, the choice between an expensive road and a railway is an aspect of the case worthy of consideration, apart from the commercial view of the question.

### Possible Extension from Narrabri.

Should the North-western line be carried on to Walgett and the branch to Brewarrina also be constructed, these two lines would be in direct and commercially disastrous competition.

If, on the other hand, any extension from Narrabri took a more northerly course, say to Mungindi, the competition would not be so great.

The two lines would be merely bidding for the Southern Queensland traffic at different points, and practically no greater competition would take place than if the termini were at Brewarrina and Narrabri.

### Conclusions.

Upon careful consideration of the case the conclusions I arrive at are:—

1. That upon the proposed line, if carried out, the traffic will be confined to the items of wool, stock, station and store goods, and a limited number of passengers. No agricultural produce is likely to be raised for many years.
2. That the proposed line upon its own merits affords a fair promise of sufficient traffic to make it commercially successful, as compared with similar lines running into purely pastoral country. But that such success must be at the direct expense of the existing lines. Of this there can be little doubt, as the area from which the traffic must come is already commanded by those lines.
3. That there is a fair prospect of a considerable stock traffic, which does not at present touch the railway until it reaches Nyngan and Nevertire, but that this new traffic in stock will be insufficient to compensate for the loss to the existing lines by the competition created in the wool and goods traffic.
4. That if in the policy of the Government any extension from Narrabri to Walgett is contemplated, the proposed Byrock to Brewarrina should not be carried out, as the two lines would be in ruinous competition.

I have, &c.,

PERCY SCARR,

Examiner Public Works.

1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## RAILWAYS.

(REPORT OF MR. E. B. PRICE ON PROPOSED COLO VALLEY LINE.)

*Ordered by the Legislative Assembly to be printed, 19 November, 1890.*

Mr. E. B. Price to The Under Secretary for Public Works.

Sir,

November 10, 1890.

In connection with my recent report on the Blacktown-Blayney and Richmond-Esk Bank alternative lines, I have the honor to submit the following short report on the Colo Valley Railway:

Not having gone over this route I can only judge of it from what appears in previous papers.

The line has been surveyed from Emu Plains to Rylstone on the Mudgee line; but I believe no survey has been made of the second section, from Mudgee to where it rejoins the existing line at Narramine; there appears to be little doubt that 1 in 100 grades, and 20-chain curves can be obtained right through, though at enormous expense.

Mr. Townsend estimates the cost at £3,500,000, but Mr. Whitton considers the line could not be constructed under £5,000,000.

The greater portion of the new country that would be opened up appears to be of little value—so the additional traffic which would be brought to the railway system must of necessity be small—too small in fact to do more than pay for the maintenance of the line.

Its principal traffic therefore would be derived from the area at present served by the existing railway, so that nothing is to be gained except what can be set down to the saving in carrying the extreme western traffic over a line with 1 in 100 grades and a lower summit level.

The cost per ton mile on the Colo Valley line would certainly be much less than on the existing Mountain line; and if only sufficient tonnage could be diverted over it, the saving in working expenses would, of course, finally warrant its construction.

But as only about one-fifth of the present western traffic could be diverted over the Colo line, the saving in working expenses would go but a short way towards paying interest on even £3,500,000 (Mr. Townsend's estimate).

And at the same time the present congestion of traffic would be very little relieved.

In the future, when the western system is extended to Broken Hill and South Australia, and the Darling District developed by irrigation, the traffic from the extreme west will probably become so great as to justify the expenditure of a large sum in order to obtain a really good line with flat grades.

From the nature of the mountain ranges it would seem to be impossible that such a line can be obtained, except by enormously expensive works.

It is not in my province to look for new lines but simply to examine those schemes submitted to me, and no scheme has yet been brought under my notice which offers equal advantages to the proposal to duplicate and improve the mountain section of the existing railway.

Even should a suitable alternative line be afterwards discovered the money spent in duplication would not be lost, as the mountain traffic alone will, before long, become too great for a single track. Map appended.

I have, &amp;c.,

EDWD. B. PRICE.

[One map.]

100

1000

1000

1000

1000

1000

1000

1000



Blacktown - Blayney   
 Richmond - Bell   
 Colo Valley 

**MAP**  
 of  
**NEW SOUTH WALES RAILWAYS**  
 shewing  
**COACH AND OTHER ROUTES FROM THE VARIOUS STATIONS**

Scale, 60 Miles to an Inch

Explanation  
 Railway lines marked thus   
 Coach routes do do   
 Projected Railways do do 

1890

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAYS.

(REPORT OF MR. P. SCARR ON PROPOSED LINE FROM GALONG TO BURROWA.)

*Ordered by the Legislative Assembly to be printed, 19 December, 1890.*

Department of Public Works, Sydney, 8 December, 1890.

Proposed Railway from Galong to Burrowa.

The Under Secretary for Public Works,—

Sir,

In accordance with your instructions I have the honor to submit the following report upon the proposed line of railway from Galong to Burrowa.

**Area to be Served.**

This will be comparatively limited, extending from Kalangan (half-way between Galong and Burrowa) on the south, to Numby and Kenyu on the north; Rye Park and Narrawa on the east, to Calabash and Douglas on the west,—an area of about 750 square miles.

Beyond these places the traffic would go southward to the Great Southern Railway, eastward to Goulburn and Gunning, northward to Cowra, and westward to Young.

It will thus be seen the existing railways practically so drain the outlying portions of the district that no traffic can be expected from distant places, as in other places where branch railways have been constructed.

No back country would be drained by this line. The district itself would have to entirely support it—that is the area I have named above.

And further, if the proposed extension to Crookwell be eventually carried out an additional slice of the traffic from the east and north-east will in all probability be filched from Burrowa.

**Nature of the Country.**

I have traversed a considerable part of the Burrowa district in several directions and followed the course of the line between Galong and Burrowa.

The country through which the line passes as well as that in the vicinity of Burrowa is of good quality and a large proportion fit for agriculture.

Such as is not adapted for that purpose may be called superior grazing country.

This character prevails for some miles in every direction round the town, but to the north and east the land gradually becomes more hilly, whilst to the north-east a good deal of rough broken country exists, having only a small proportion fit for agriculture, chiefly along the banks of the creeks, where some good alluvial flats exist.

**Size of Holdings.**

At present the land is generally held in large estates, ranging up to 10,000, 13,000, and even 25,000 acres. These are within 20 miles of the town of Burrowa fourteen or more estates of 5,000 acres and over, besides numerous others between 1,000 and 5,000 acres.

The average size of the holdings in the electorate is 883 acres—a high average as compared with others in the eastern division. These estates are used almost entirely for grazing purposes.

The holdings used for agricultural purposes are small and comparatively few in number.

It would appear that in years past a much larger number of selectors existed in the district, and that for some years a process of absorption of the small holdings into the large estates has been steadily going on until the result as stated above has been reached.

On the whole, the agricultural industry throughout the district is evidently languishing, with little prospect, so far as can be seen, of a revival.

## Agriculture.

The total area cultivated in the whole of the Burrowa Electorate for the year ending 31. March, 1890, is given in the Statistical Register as 8,655 acres, being but 1.98 of the total area alienated, or 0.89 of the whole area of the electorate.

The wheat produced being 78,403 bushels, besides other produce which appears to have been only sufficient to supply local wants.

In the article flour it does not appear that the one local mill now at work has been able to compete successfully with those on the existing line of railway.

The flour produced has been used principally for home consumption.

As an agricultural district, then, Burrowa does not compare favourably with other districts having a similar climate and position.

The following table will afford an easy reference for comparison with some of these districts :—

District	Distance from Sydney.	Proportion of Land Cultivated to Area Alienated.	Area Cultivated.	Remarks.
	Miles.		Acres.	
Carcoar . . . . .	181	4.82	33,023	
Gundagai . . . . .	287	4.53	35,647	
Young . . . . .	249	6.33	57,994	
Orange . . . . .	192	11.67	31,248	
Tumut . . . . .	307	2.78	11,396	20 miles from rail.
Inverell . . . . .	466	4.38	14,453	45 " "
Burrowa . . . . .	232	1.98	8,655	16 " "

Of the sixty-two country electorates Burrowa stands forty-first on the list, both as to the proportion of land cultivated and to the average size of holdings.

These statistics will give some idea as to the position of the agricultural industry in the district at the present time.

As a source of remunerative employment to the proposed railway it affords little encouragement. And unless it can be shown that an extensive change would be likely to take place as a result of the opening of the line traffic must be looked for from some other sources.

## Prospective increase in Agriculture.

It has been asserted that the cause of the present position of things has been brought about by the absence of railway communication with a market for produce—and that with the construction of the proposed line the present position of things would be so altered as to cause large areas of land to be placed under cultivation; either by the division of the larger estates, by sale or lease, amongst agriculturists or by the present holders themselves cultivating on a large scale.

After careful investigation and consideration, and comparing the position of this district with others in which agriculture has been successfully carried on, I have come to the conclusion that sufficient grounds do not exist for these expectations.

As a matter of fact a large quantity of the best land in the Burrowa district lies between that town and the railway line at Binalong and Galong and yet is not largely cultivated.

Burrowa, itself surrounded by excellent farming land, is but 16 miles from Galong and 20 from Binalong—not a sufficient distance to bar profitable cultivation entirely.

Take the case of Tumut; where maize is grown to the amount of 231,468 bushels per annum and sent by road in large quantities to Gundagai Railway Station (20 miles) for the Sydney market.

Whilst it will be found upon inquiry, that in the other districts referred to above, grain and other produce are carted long distances to the railway.

Only two of the railway stations of the districts quoted are nearer Sydney than Binalong and Galong.

It would not appear then that the distance from the railway is the absence of cultivation to be attributed, but more likely to the fact that the land can be applied more profitably to sheep farming by capitalists than to agriculture by others.

And instead of the large estates being subdivided or placed under the plough, instances are not wanting to show that the reverse is taking place, even along with the existing railways.

In the Burrowa Electorate during the last few years the immense Bendinine Estate, having the Great Southern Railway running through it, has been accumulated by the aggregation of the smaller holdings and by selection.

The selectors have been bought out and farms added to the estate until now, as I am informed, it consists of considerably over 50,000 acres. A large quantity of the land being eminently adapted for agriculture.

The whole tendency throughout the Colony seems rather to be in the direction of the accumulation of large estates than the breaking up of those already existing, and there is no apparent reason why the Burrowa district should form an exception.

At the sale of the Ballyryan Estate near Burrowa twelve (12) months since, the principal purchaser was an adjoining land owner who bought largely and now uses the land entirely for grazing purposes.

Instances of landholders cultivating for market on an extensive scale are exceedingly rare throughout the Colony.

Nor are cases where leasing of land for this purpose prevails numerous.

The principal exception, and almost the only one, is on the Bathurst Plains, unless it be where very rich alluvial land along river banks are used for special purposes.

I have dwelt at some length upon this question of the extension of agriculture, as a possible result of the construction of the proposed railway as it appears to be the key to the whole question.

### Wool and other Traffic.

The district to be tapped is now heavily stocked with sheep, on many of the estates up to one and a quarter to one and a half sheep per acre, and the chief product of the district consequently is wool.

There was received from the Burrowa district at Binalong, during the year ending 30th September, 1890, 502 tons wool, and at Galong 169 tons.

Allowing for some increase in the quantity from places which now send wool to Goulburn, Cowra, and Young, yet no substantial increase can be expected in this item of freight.

The present quantity may be therefore almost taken as a fixed quantity.

The extension of the line to Crookwell would be to some extent competing with the extension to Burrowa.

### Mineral Traffic.

A good deal has been said as to the probable traffic from the mines of the district.

The principal one is the Wallah Silver Mine, 20 miles east of Burrowa.

I visited and went through the workings of this mine, and so far as can be seen and judged by one who is not an expert, there appears to be a large body of ore available.

Of its value I do not presume to offer any opinion. The shareholders however, appear to be very sanguine as to the ultimate results of their operations.

If their expectations are realised no doubt the mine will support a considerable number of people, and produce a corresponding amount of traffic.

But so far the eventual success of the venture does not appear so well assured as to make it an important factor in the present question.

At Frogmore, 10 miles north of Burrowa is a copper mine at present being worked. This I did not see.

This mine was first opened some fifteen years ago, and after several attempts to work it, which for certain reasons proved failures, operations were renewed by the present owners who are sanguine as to their prospects, which are reported to be very favourable.

So far there is not yet sufficient development to prove the ultimate success of this venture, as a means of support to a large population.

### Passenger Traffic.

This is a difficult item to estimate. I have credited Burrowa with two-thirds of the total tickets issued at the two stations for the year.

### Summary.

The whole question of the prospect of the proposed line proving a financially successful undertaking must depend upon how far it would have the effect of improving the industries of the district to be tapped.

It has been shown that at present the land is held in large estates which are used as grazing farms, and that little agricultural produce is at present available for export.

No other industries exist on a scale worth bringing into consideration.

Therefore the chief product is wool; and as the land is already stocked up to, or nearly up to, its full carrying capacity, little or no increase can be expected in the quantity of wool to be produced.

To the increase in agricultural operations, then, must be looked such an increase in freight as will afford remunerative employment for the railway, unless the mines of the district are so developed in the future as to provide a means of living for a population to come in from outside.

This last probability is so uncertain as to make it unwise to at present take it into consideration.

The question then presents itself: Is there such a prospect of the district being so devoted to the pursuit of agriculture as a result of the construction of the railway that a payable traffic will arise from that source?

From no other source does it appear at present is such a traffic likely to be obtained.

The result of my inquiry leads me to the conclusion that this is not likely to come to pass.

### Conclusions.

After careful consideration, and being guided by the experience of what has taken place in other parts of the Colony I arrived at the following conclusions:—

- 1st. That the present traffic is altogether insufficient to provide even for working expenses.
- 2nd. That the traffic would not increase sufficiently within a reasonable time to return working expenses and interest upon the cost.
- 3rd. Therefore that for years the line, if constructed, must be run at a heavy loss, even if it should ever become payable, which, from the small area to be drained by it, is very doubtful.
- 4th. Consequently, looking at the question from a commercial point of view, the railway should not be carried out.

I have, &c.,

PERCY SCARR.  
Proposed

## Proposed Railway Galong to Burrowa.

Traffic Burrowa to Binalong and Galong, to and from, during year ending 30th September, 1890.

Estimated revenue per annum :—							£	s.	d.	
Interest at $3\frac{1}{2}$ per cent. on capital expenditure	...	...	...	...	...	...	3,419	0	0	
Working expenses	...	...	...	...	...	...	3,780	0	0	
Total							...	7,199	0	0
Receipts for year to 30th September, 1890 :—							£	s.	d.	
Wool, 671 tons, at local rates	...	...	...	...	...	...	100	13	0	
Wheat, 763 "	...	...	...	...	...	...	19	1	6	
Goods, 1,053 " at second class average	...	...	...	...	...	...	504	11	5	
Stock, Sheep, 42 trucks	}	...	...	...	...	...	36	0	0	
Cattle, 6 "		...	...	...	...	...				
Passengers, two-thirds of all tickets issued at Binalong and Galong	...	...	...	...	...	...	144	5	0	
Mails (say)	...	...	...	...	...	...	200	0	0	
Total							...	1,004	10	11
Deficiency							...	£6,195	0	0

1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## RAILWAYS.

(REPORT OF COMMISSIONERS ON PROPOSED LINE, WAGGA WAGGA TO TUMBERUMBA.)

*Ordered by the Legislative Assembly to be printed, 1 May, 1890.*

Proposed branch line of Railway, Wagga Wagga to Tumberumba, 65 miles.

Sydney, June, 1889.

IN accordance with section 13 of the Public Works Act, 1838, we beg to report as under:—

<i>Cost of construction.</i>	
The Engineer-in-Chief estimates the cost of construction of a single line of railway, exclusive of land and compensation, at	£700,000
<i>Annual cost.</i>	
Interest on cost of construction, at $3\frac{1}{2}$ per cent.	£24,500
The cost of working the line would be as under:—	
Traffic expenses	£1,366
Permanent-way expenses	8,125
Locomotive expenses	3,300
	12,791
Total annual cost	£37,291

The district through which the proposed line passes is very fertile, and no doubt capable of considerable development if supplied with railway communication to a market.

With regard to the revenue which is likely to be derived in the near future from the line, if constructed, no reliable statement can be made. Not many months ago the question was gone into by the Traffic Branch, and an estimate given of £8,610 per annum from all sources. Assuming that this is 50 per cent. below what might prove to be the actual result, even the increased amount would but pay working expenses, leaving the railway revenue from other sources burdened with the payment of £24,500 per annum for interest on the cost of construction, to which must be added a considerable sum for the interest on the cost of resumption of land and provision of rolling stock.

In view of other extensions into agricultural districts at a much lower cost already favorably reported on and from a commercial aspect, the construction of the line cannot be recommended until the railway revenue is in position to bear so large an additional burden.

If the line is made at some future date we consider that the residents in the district should combine together to have the land necessary for the construction of the line conveyed to the Department free of cost, and that a substantial sum derived from the enhanced value of the Crown lands should be credited to the cost of construction.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAY EXTENSION—NORTHERN DISTRICT.

REPORT BY MESSRS. SCARR AND PRICE.)

*Ordered by the Legislative Assembly to be printed, 17 September, 1890.*

Department of Public Works,  
Sydney, 31st May, 1890.

MINUTE PAPER.

RAILWAY EXTENSION—NORTHERN DISTRICT.

THE Minister desires Messrs. Scarr and Price to at once proceed to undertake the following inquiry in connection with Railway Extension in the Northern districts of this Colony.

The first matter for determination is the best way of connecting Inverell with the Great Northern Railway, for which the following points of junction have been proposed, viz. :—

- (1) Glen Innes.
- (2) Guyra.
- (3) Uralla.
- (4) Kentucky.

It will be necessary to give these routes the most careful investigation, with the view of determining which of them presents the promise of securing the most favourable results in the general public interest.

The second branch of the inquiry will embrace the consideration of the question as to the best means of connecting the Great Northern Railway with the proposed coast line. For this purpose the following routes have been suggested, viz. :—

Tenterfield to Casino,  
Glen Innes to Grafton, and  
Guyra, *viâ* the Don Dorrigo Scrub, to Grafton.

The third matter for attention is the connection between Guyra and the Coast about Coff's Harbour.

The merits of the proposed line from Tamworth *viâ* Manilla towards Inverell should also be inquired into.

The

The placing of these instructions under distinct headings must not be taken to imply that the different sections are each independent of the other. On the contrary, every branch of the inquiry must be looked at from the standpoint of its relation to the others. For instance, in taking up the subject of the connection of Inverell with the Great Northern Railway, regard must be had to the trend of its traffic, whether to Queensland on the one hand, or to the coast on the other. This will then bring in the question of the connection of the Great Northern Railway with the proposed Coast Line, either *via* Tenterfield or perhaps Guyra; and in the event of Guyra being found to afford the best means of connection, that may be taken as determining the best connection between Inverell and the Great Northern Railway—that is to say, if the trade of Inverell is likely to find its outlet (say) at the Clarence or Coff's Harbour. This must not be taken as an indication of what may be the solution of the question, but merely as showing the inter-dependence of one branch of the inquiry on the others.

In carrying out these inquiries, Messrs. Scarr and Price should carefully abstain from expressing any opinions on the subject-matter of their inquiry, but they are empowered and enjoined to obtain every kind of information bearing on the questions submitted to them, from whatever sources may be available. No statistics should be regarded as data which have not been carefully verified; and, in fact, the inquiry should be of such a character that whatever the conclusions arrived at may be, it should not be in the power of anyone to say that the whole of the facts have not been collected.

All available office plans and papers will be placed at their disposal.

These instructions are purposely given in outline only, with a view of leaving the freest scope to the judgment of the Officers selected to carry out the important work entrusted to them.

J. BARRING.

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#### RAILWAY EXTENSION—NORTHERN DISTRICTS.

The Under Secretary for Public Works.

Sir,

Department of Public Works, Sydney, 12 August, 1890.

We have the honor to report that, in accordance with the instructions contained in minute No. 1,672 of 31st May, 1890, we proceeded to the Northern Districts to prosecute the inquiry forming the subject-matter of these instructions.

As our instructions stated we were "to investigate with the view of determining which of the routes submitted, presents the promise of securing the most favourable results in the general public interests," we understood that we were to examine and report in a comprehensive manner upon the whole question, having regard rather to its commercial aspect than to enter into a discussion on the engineering merits of rival lines.

To do which thoroughly would require a great expenditure of time, with a view to discovering possible improvements, and would be trespassing unnecessarily on the duties of the Railway Construction Branch.

We trust then this report will be taken as an expression of the views of two independent and unprejudiced persons, engineers, who have gone carefully over the whole district, and looked at the question from every outside standpoint, but who, not having at the time seen the plans or sections of the lines, had no means of judging the engineering merits of any line further than by the knowledge gained from following its route as closely as possible, and from a rough statement furnished to them of the estimated cost, length, curves, and grades of some of the lines; and have, therefore, gone only briefly into engineering matters.

The necessity for this plea will be the more apparent when it is borne in mind the great extent of country travelled over, and that the survey of one of the most important lines is not yet completed.

An inspection, since our return from the field, of the existing plans and sections of the several lines has given us no reason to in any way modify our views.

We went over each of the several routes of proposed railway lines referred to us, examining the land passed through, and as far as possible the adjacent country—trying to gather from every source available all information bearing at all upon the question.

With this aim we invited the heads of public bodies, such as Municipal Councils, Progress Committees, &c., as well as the residents generally to make such statements as they might wish, and to furnish us with evidence for or against any proposed route.

And in order to afford every facility for their so doing, we arranged for interviews with those bodies collectively, and with the residents individually—noting the statements made and evidence furnished.

So that we consider no person can justly say that full opportunity has not been afforded for bringing forward any evidence or statement in support or otherwise of any particular line.

And here we might remark that we were met at the outset with this difficulty, namely, a disinclination on the part of the people to undertake the labour of again supplying the same statistical information, &c., they had already furnished to various officials and Government Departments.

Again, some statements made to us proved, on investigation, so utterly biassed and unreliable that we had, whilst refusing to hear no one, to put a good deal of what was stated aside, and trust largely to our own observation, and to information derived from disinterested persons.

At

At the same time we feel called upon to recognize the great trouble taken by some of the public bodies and private individuals in the matter, and the large amount of information they supplied us with.

In this report we do not propose furnishing a mass of statistics to show the probable traffic of any particular line or lines either for comparison or otherwise, for the reason that the whole traffic area under consideration is of such a comparatively untouched character that it appears to us any comparative calculations, based on present statistics, would be misleading, and no guide as to future traffic development.

The whole question of production and the consequent traffic must be very largely speculative, and can only be estimated from an investigation of the apparent capabilities of the country passed through and the facilities offered for settlement.

With this view then, we propose to give a detailed description of the nature of the country along each route separately as to its fertility, present and latent resources, settlement, and trend of traffic, and afterwards to summarize the whole, and state such conclusions as appear to us may be fairly drawn.

The routes travelled over by us were as follows:—

1. Guyra, <i>via</i> Tingha, to Inverell	... ..	55 miles.
2. Glen Innes, <i>via</i> Swanbrook, to Inverell	... ..	41 $\frac{3}{4}$ "
3. Glen Innes, <i>via</i> Wellingrove, to Inverell	... ..	41 $\frac{1}{2}$ "
4. Inverell, <i>via</i> Bundarra, to Kentucky	... ..	52 $\frac{3}{4}$ "
5. Inverell, <i>via</i> Yarrowick, to Uralla	... ..	80 $\frac{1}{2}$ "
6. Guyra, <i>via</i> Don Dorrigo Scrub, to South Grafton (estimated at)	... ..	145 "
7. Grafton, <i>via</i> Newton Boyd, to Glen Innes	... ..	102 "
8. Tenterfield, <i>via</i> Fairfield and Tabulam, to Casino	... ..	86 "
9. Inverell, <i>via</i> Bingera and Barraba, to Tamworth	... ..	147 "

We also inspected the country adjacent to Coff's Harbour, with a view to a connection between the Guyra and Grafton line, and the coast at that place.

Of the routes named, the surveys of No. 6, Guyra to Grafton, and the Coff's Harbour connection have not yet been completed. The former is in progress, but there remained, at the time of our visit, an interval yet unsurveyed of (say) 40 miles, between Guy Fawkes (to which point Messrs. Jamieson and Thornbury had worked from Guyra), and the head of Tallawadja Creek, near Glen Reagh, to where Mr. Cumming had surveyed from Grafton.

The connection between the Guyra-Grafton line and Coff's Harbour had not yet been even explored.

Of these unsurveyed portions then we can only speak in general terms from an inspection of the intervening country.

### Guyra to Inverell.

Statements much at variance with facts have been persistently made by some of the opponents of this route, as to the quality of the land over which it passes. It being freely described as "worthless," "thoroughly rotten," &c.

On the contrary, though a considerable portion of the country traversed by the line is of very inferior character for agricultural purposes, the wholesale condemnation of the country is certainly not justified.

From Guyra, for a distance of 8 miles, the soil is of a rich red volcanic nature, capable of producing heavy crops of cereals, &c., suitable to the climate.

Thence to Wade's selection, 3 miles west of Tenterden and about 23 miles from Guyra, the land consists of black alluvial flats and volcanic ridges.

This class of country extends for some miles on either side of the line. On the northern side merging into the Ben Lamond Range, and on the south into the high granite country bordering on the Bundarra River.

From the point last named (23 miles from Guyra) the line passes over poor stony land of porphyry and granite formation, to a point about 1 mile beyond Moredun Creek, whence to New Valley Range the country is fair pastoral land, but unfit for cultivation.

From New Valley to Tingha (40 miles from Guyra) the soil is decomposed granite of the worst quality, poor grazing land, and quite unfit for agriculture.

This character prevails for some 4 or 5 miles beyond Tingha, when volcanic ridges of red soil are met, which extend at intervals, alternating with granite slopes to the Gilgai, 5 miles from Inverell and 50 from Guyra.

Thence to Inverell the soil is generally rich and good, with the exception of some rocky ridges.

On the whole the land along this line may be said to consist for 30 out of the total length of 55 miles of soil, good above the average.

The other 25 miles being unfit for agricultural, and of only second rate quality for pastoral purposes.

A considerable portion is held in freehold by Tenterden and Ollera Stations.

There is, however, not nearly so large a proportion of land held in this way by the stations on this line as on the Glen Innes to Inverell route.

### Timber.

There is along this line little timber fit for bridge building or other railway purposes.

Between Tenterden and New Valley are some ridges of stringybark, with a little ironbark, and along the line are forest reserves amounting to 14,000 acres; but as two sawmills have been working there for some time, no doubt the limited quantity originally available has been much reduced.

So that nearly all the timber for railway construction would have to be brought from elsewhere.

### Minerals.

At Tingha is a large reserve for tin-mining purposes, from which, during the last eight years, a large quantity of stream tin has been obtained, stated to be 16,000 tons, valued at £828,722.

The output for last year was 1,200 tons, of a value of £62,000.

The question of the probable permanency of this field appears to depend largely upon the development of the tin lodes, as the output of stream tin is steadily decreasing.

On this point, we find in the Annual Report of the Department of Mines for 1899, Mr. Warden Fraser says:—"Several reefs have been discovered and are being tested, and I have no doubt the prosperity of this field will mainly depend upon the many reefs which are known to exist all over the field, and which prospectors are from time to time discovering. Then when capital \* \* \* and approved appliances \* \* \* are brought to bear on them, I anticipate a permanent source of profitable industry for this field."

Mr. Litchfield, one of the oldest residents, and who is intimately identified with this field, also states that with greater facility for carriage of machinery and tin ore by railway, and the encouragement this would give to investors, he is sanguine the Tingha tin-field will be a lasting and important one.

At present there seems to be no doubt that tin-mining on this field is languishing, a steady decrease in the output being apparent for several years past.

The prosperity and permanence of the field is therefore contingent upon fresh development.

Whether this will occur remains to be seen.

If it does, and the output of tin be maintained, Tingha, as a feeder to the railway, will be of considerable importance.

On the other hand, the failure of the tin yield, and the comparative unfitness of the land for other purposes, will inevitably lead to the complete or partial disappearance of Tingha as a town.

From Guyra Railway Station there were forwarded to Tingha during the year ending 30th June, 1890, 512 tons of goods, and received from that place for despatch by rail, 566 tons, the greater part of this last being tin.

For other places on the line, distant over 10 miles west of Guyra, there were forwarded during the same period 150 tons, and received for despatch by rail, 148 tons.

A considerable proportion of the Tingha tin is now sent to Glen Innes Railway Station.

#### *Population.*

The population residing on the Tingha mining reserve is 2,500, most of whom are depending more or less upon the tin mines.

Of these 1,000 are miners, three-fourths of whom are Chinese.

The population within 6 miles of Tingha is 1,800, a large proportion being Chinese.

Omitting that around Tingha, the population residing along the line is comparatively small.

The numbers between Guyra and Tingha, within 5 miles on either side of the line, as given by the police, are 250. Those within a radius of 5 miles of Guyra are not included.

Within that radius there are eighty-five families residing.

Between Inverell and Guyra there are ten public schools (excluding Inverell and Guyra), having 509 children on the roll, representing 119 families. Of these 171 children, representing 74 families, attend Tingha School.

The land for the first 30 miles out of Guyra is capable of supporting a much increased population so far as it extends. But as the area feeding the railway along this length will be limited in width, this population in the aggregate cannot ever be very large, as the good land bordering the line is bounded on the south and west by a tract of hilly and somewhat barren country between it and the Bundarra River, country too hilly to admit of traffic being freely drawn from that direction; and on the north and east by the hilly country in the direction of Ben Lamond and the head waters of the McIntyre River, where also it comes within the influence of the Great Northern Railway.

#### *Engineering.*

There appear to be no engineering difficulties to contend with on this route, much of it being a surface line, the curves and grades are easy, except through the New Valley Range, and at a few other points.

By slightly increasing the cost of works, we believe the ruling grade of 1 in 40 could be reduced, and the curves improved.

The line as laid out will terminate in the centre of Inverell, after crossing the Macintyre River at the town.

The necessity for this does not seem clear, as the line might be very well stopped at the southern side of the river, and so save the cost of a large bridge, and the purchase of valuable town allotments, as well as avoid the necessity of a second bridge in the event of the line being extended still further westward.

There is already one road bridge, and a new one under consideration, which could be erected to suit the traffic to and from the railway station.

#### Glen Innes, *via* Swanbrook, to Inverell.

This line, after leaving the Great Northern Railway, near Glen Innes Station, crosses Furrucabad Plain, and the range forming the watershed between the creek of that name and Reddeston (or Clairvaux) Creek, and the latter creek near its source then descending Waterloo Range by a steep gorge emerges on Waterloo Plain, above Balaclava Station, thence ascending by an easy grade to the summit of the watershed between Waterloo (or Wellingrove) Creek and Swanbrook, tributaries at the same point as the main road from Glen Innes to Inverell, goes over this range, crossing and re-crossing the road near this point—say 16 miles from Glen Innes.

The land along the line to here, with the exception of the descent to Waterloo Creek, where it is stony, is of the best quality—rich black or red volcanic soil—and extending for some miles on either side.

Fully three-fourths of the land on this length is fit for cultivation.

It appears to be all alienated and chiefly used for pasturage.

From the point last named, 16 miles from Glen Innes, the line descends by a steep grade to the head of Swanbrook Creek, and for, say, 4 miles passes through barren stony gullies, and along rocky sidelings, on the right bank of the creek, until it again comes out into less hilly country, near Mansfield's selection. Which open country continues through Young's selections, and to a point where the line again crosses from left to right, near the road crossing.

At Swanbrook Village it crosses the creek about 12 chains below the road, and again three-quarters of a mile lower down.

From Mansfield's selection to this point, about 3 miles, the land is good, and the greater part fit for cultivation.

From

From this second crossing of Swanbrook, the line follows closely the right bank as far as Littler's selection, at the western boundary of the Newstead Pastoral Holding, where it crosses the creek a third time.

The greater part of this  $6\frac{1}{2}$  miles, between the second and third crossing, is closely shut in by a high range on the north, and on the south is cut off by the creek from a considerable area of good land, which lies in the direction of the main road.

From the third crossing of Swanbrook, at Newstead boundary, right through to Inverell—a distance of 15 miles—the land, with the exception of a few stony ridges, may be said to be of first-class quality, rich black or red soil for miles on either side of the line—a considerable area, as on the Long Plain—being free from timber.

Out of the total length of 44 miles, we estimate that 29 miles of first-class land is passed through, the remainder being excellent pastoral land.

#### *Timber.*

There is along this line no timber of any value for construction purposes, and the whole of that required for the works would have to be brought from a distance.

#### *Minerals.*

There is no mining of any kind in progress on or near the line, except a little tin mining at Elsmore, 5 miles to the south.

Here, we find from the Report of the Mines Department for 1889, there were raised 113 tons of tin during that year, valued at £5,923.

#### *Population.*

The population is sparse throughout, and settlement, for other than pastoral purposes, small.

We find the number of schools, exclusive of Inverell and Glen Innes, to be 10, with an enrolment of 263 children, representing 73 families.

The numbers of persons residing along the line we were enabled to obtain, but the school numbers will afford a fair comparative test.

The land throughout the greater part of the length is undeniably capable of supporting a large population, being of the most fertile description, and a large percentage of it fit for the plough.

But it would appear that so far comparatively few persons reside and cultivate the land, as it is chiefly held in four large estates, viz., Inverell, Newstead, Waterloo, and Balaclava.

And as a very large portion of these estates are either freehold or conditionally purchased there appears little prospect of further settlement on a large scale taking place. As, although it was asserted to us, that some of these estates would be cut up and sold as soon as the railway was made, we, judging from results where railways have already been made through large estates, cannot place much value upon such assertions.

The tendency at the present time throughout the Colony being apparently to increase the size of estates, rather than to break them up.

#### *Engineering.*

The chief difficulties on this line are at the descent of the Waterloo Range, where a grade of 1 in 33 occurs, and in following the Swanbrook Creek, above Swanbrook Village.

The Waterloo Range is so steep and difficult at this place that we fear the grade can only be improved at the expense of much injury to the curves, which are already sharp, or by the substitution of tunnels.

The cross section of the land is very steep, and will considerably add to the apparent quantities of excavation and embankment.

To avoid the descent of Waterloo Range at this place a line was surveyed up Maid's Valley to connect the first portion of the Wellingrove line with the remainder of the Swanbrook line.

This, though an easy connection, would much increase the total length between Glen Innes and Inverell, without corresponding advantage.

This line terminates about  $1\frac{1}{2}$  mile to the north of the centre of the town of Inverell, and if extended to the westward would require a bridge across the M'Intyre River.

### Glen Innes, *via* Wellingrove, to Inverell.

Leaving the Great Northern Line immediately north of Glen Innes Station, this line crosses Furrucabad Plain, and ascends the range between that and Reddeston (or Clairvaux) Creek, on the northern side of the Inverell Road, with which it runs parallel and close to as far as Beaufort School, 5 miles from Glen Innes.

Here it leaves the road and crosses Clairvaux Swamp and Creek, ascending the Waterloo Range, which is here comparatively low, reaching the Head of Punch's Gully, down which it runs, crosses Wellingrove Creek, about  $1\frac{1}{2}$  mile above Ryan's homestead, 15 miles from Glen Innes.

From Glen Innes to this point, the land is generally of excellent quality, the exception being the descent of Punch's Gully, where the granite crops out, and the land, though well grassed, is unfit for agriculture; also in some places the tops of the ridges are too stony for cultivation.

From Waterloo Plain the line ascends a somewhat difficult range, and, descending to Creer's selection, passes through the King's Plains Estate for 11 miles, until the travelling stock reserve is met, 27 miles from Glen Innes.

This 11 miles is open, undulating country, of first-class soil, little of it being unfit for cultivation, the only exception being a length of 2 to 3 miles, where the country is ridgy, and the soil not of very good quality. There appears to be a comparatively small extent of this.

From the intersection with the travelling stock route the line follows more or less close to the road, through first-class red or black soil, to near Munzie's selection, where it crosses Swanbrook Creek; and thence to Inverell it is nearly identical with the Swanbrook route, the lines at two places almost touching, and at no point between this crossing of Swanbrook and Inverell more than a mile distant from each other.

#### *Land.*

*Land.*

Estimating in the same way as we have done in the cases of the two lines previously dealt with, out of the total length of 44 miles, 37 miles of first-class land is passed through, the remainder being excellent pastoral land.

A large proportion of the country passed through is, however, held in large estates—Inverell, King's Plains, Waterloo, and others.

The amount of land taken up and occupied by *bona fide* selectors being comparatively very small, and unless the estates referred to be broken up, which experience shows is not at all certain, there would appear to be little prospect of any large quantity of traffic being obtained by the way apart from what may be gathered from country further back to the north.

*Timber.*

Of timber for construction purposes, there is none along the line, and what will be required for railway purposes must be brought from a distance.

*Minerals.*

Of minerals, there do not appear to be any on this line.

*Population.*

The land being, as already stated, held in large estates for grazing purposes, the population along the line is small.

The schools have been included in those referred to on the Swanbrook line. The two routes being so close to each other, it is difficult to separate the schools.

*Engineering questions.*

The chief difficulty, as on the Swanbrook line, is the descent of the Waterloo Range; this is accomplished by a long grade of 1 in 40.

The crossing of the range from Waterloo Plain to King's Plains will also be rather difficult, but on the whole this would appear to be a superior line to that *via* Swanbrook.

The extension of this line westward from Inverell would also necessitate a bridge across the Macintyre River.

### Inverell, *via* Bundarra, to Kentucky.

Leaving Inverell, on the left or southern bank of the Mackintyre (the opposite side to the main portion of the town), the line as far as Gilgai is common to the Guyra-Inverell line already dealt with, and to that point, as described under that head, the soil is generally rich and good, with the exception of some rocky ridges.

*Land.*

From the point of divergence, 5 miles from Inverell, at Gilgai, for a distance of 3 miles, the land is good, consisting of low ridges of red volcanic soil.

From that point, however, so far as soil is concerned, it may be described in a few words; granite and slate formation, inferior second class or fair third class land for agricultural purposes, excepting round Bundarra, where there is a limited area of good land.

Being undulating and generally lightly timbered, it might, in course of time, be taken up for combined agricultural and pastoral purposes, and would, perhaps, for a few years produce light crops of wheat of good quality, but the soil is too light and shallow ever to support any considerable population.

The line, as far as Toryburn, runs at no great distance from the Bundarra River; at some places quite close.

This, to some extent, cuts it off from the country beyond, as the river is, in most places, difficult to cross.

The land on the opposite side is generally of the same quality as that traversed by the line—granite formation, with some good flats of limited extent along the banks of the river and its tributary creeks, but with no large extent of agricultural land.

On the western side of the line this same inferior quality of soil prevails generally, right back to the ridge between Bundarra and the Namoi waters, where high broken country prevails.

There is a considerable quantity of land available for selection along the route, and some large reserves.

*Timber.*

Throughout this line there is little or no timber of any value, and that for railway purposes would have to be brought from a distance.

*Minerals.*

In former years a considerable quantity of tin was produced between Bundarra and Gilgai, in the neighbourhood of the now deserted village of Kimberley (on Cope's Creek), and at Stanborough, where, however, very little is now obtained, and this little is included in the return from Tingha.

At the present time very little mining can be said to be carried on in close proximity to this line.

*Population.*

The land between Gilgai and King's Gap, 5 miles from Bundarra, being chiefly a mining reserve, few, but miners, live along it, and these are included in the estimate of the Tingha mining reserve.

The population residing in the district between King's Gap and Toryburn, through which the line runs for 27 miles north and south—and which extends 25 miles back towards Barraba on the west, and to the hilly country east of the Bundarra River—is stated by the police to be 1,500, including the population of Bundarra Village (about 500).

The line crosses the Bundarra River just above the iron road-bridge (a large bridge will here be necessary), and passes through the village of Bundarra, which is the only settlement of any importance on this line.

The

The wayside village of Bundarra, containing about 500 inhabitants, is substantially built, and is the commercial centre of a limited district.

There is a moderate quantity of fairly good land in the vicinity; but farming does not appear to be carried on to any large extent, the chief support of the town being the pastoral industry.

The town can hardly be said to be a progressive one, as would appear evident from the fact of the only bank which existed for some years having lately been closed.

The traffic of the place could not be considered of much importance in connection with railway extension. The Guyra-Inverell line would secure its traffic at Tingha, 18 miles by road; but the Glen Innes-Inverell line would not, as the nearest station on that route would be Inverell, 30 miles by road; whilst Uralla, 124 miles nearer Sydney, is but 52 miles.

### Inverell, *via* Yarrowick, to Uralla.

This line branches from the Inverell to Guyra line at Swinton's station, 4 miles from Tingha, and runs generally parallel with the Inverell to Kentucky route, varying in distance from 4 to 10 miles from that route, and passing about 7 miles to the east of Bundarra.

The country passed through is, on the whole, of the same inferior quality as that on the Kentucky line, with the exception of some limited areas of good land near the banks of the creeks tributary to the Bundarra River, being generally of granite formation with poor gravelly soil.

The country is more ridgy than on the Kentucky line, but little distinction as to quality of soil can be made between the two lines.

The comparison being rather in favour of this route.

The same remarks will apply to this line as to the Kentucky line as to population, resources, and prospective traffic.

#### *Timber.*

There is scarcely any timber of value, and all required for purposes of construction would have to be brought from a distance.

#### *Minerals.*

The only mineral being worked is gold—in the vicinity of Uralla on the old Rocky River Gold-field—and this in a limited way.

As these workings are so near the Great Northern Railway, the proposed line would not be affected in any way by them.

### Grafton, *via* Newton-Boyd, to Glen Innes.

In the inspection of this line we were, at the outset, met with by the difficulty of traversing it through at all, and the impossibility of doing so on horseback on account of the mountainous and broken nature of the country along a considerable part of its length.

From Grafton to Jackadgery, near where the line enters the valley of the Mann River, the country is described as being fairly level, undulating, good grazing country, with only a limited quantity of arable land, and this of only medium quality.

We were advised by persons well acquainted with the country and the route that it would be impossible to follow it through except on foot, and then only in fine weather, when the rivers are crossable.

This being the case, after examining the country round Grafton, we decided to travel by road to Newton Boyd, and there, striking the line, follow it down the valley of the Mann River, and then in the reverse direction towards Glen Innes.

Here, again, we were stopped by a fresh in the Mann River preventing us crossing, and, as we were informed that to carry out our intention it would be necessary to cross and re-cross the river many times, we were compelled to give up this idea.

In order to obtain a view of the surrounding country at Newton-Boyd, we ascended one of the mountain ranges rising out of the Mann River to a height of 2,000 feet, and from this, so far as the eye could reach, little could be seen but precipitous mountain ranges similar to that upon which we stood, excepting a strip of fairly good land lying along the banks of the Mann and Henry Rivers, in the vicinity of Newton Boyd, which, we were informed, belonged to the station of that name.

From Newton Boyd the line follows the Mann River up for 19 miles to the foot of the Big Hill, and is hemmed in on both sides the whole distance by broken, mountainous country, presenting no appearance, so far as can be seen from the road or line (which are near each other) or from the mountain tops, of any land available for settlement.

From the top of the big hill, on the main road, 2,500 feet above the river, a point commanding an extensive view—the same prospect is afforded as that described above—high mountains and broken country.

To quote from official papers, we have Mr. Hyndman, Railway Surveyor, in September, 1873, saying:—"The country along the Mann River is high granite ranges, with rough rocky peaks. From Big Hill to Jackadgery is of the same character, loose trap and clay slate on schist—mountains fall steeply to the river. Steep rocky bluffs at every bend. Country is inaccessible for horses. From Jackadgery to Grafton the country is undulating." (See Parliamentary papers to order, 20th April, 1875.)

Mr. Cowdery in the same year, 1873, says:—"The granite mountains rise up on either side to a great height—some at least 1,000 feet, and the bed of the river is full of boulders, making it impassable for horses." (See same paper.)

Mr. Palmer says:—"The whole of the country is very mountainous. The creeks, as they approach the table-land, become a succession of falls and rapids, and are very often enclosed by perpendicular slopes of great height." (See same papers.)

Our own observations confirms these reports, and shows not only the enormous expense of constructing a line here—an expense so great as to make it in effect commercially impracticable—but also that little or no traffic would come to the railway by the way, except perhaps a little timber.

Of this we saw little or none, though it is stated that patches of good timber do exist amongst the ranges.

The

The inaccessibility of the country would, however, militate very much against this being brought to the railway.

The line for about 50 miles would, if constructed, be practically inaccessible from any little good country that may exist adjacent to it amongst the ranges, because of the steep broken nature of the mountains.

In fact, speaking in general terms, from where the line enters the valley of the Mann River, near Jackadgery, to its exit on the table-land a few miles from Glen Innes, it runs through a mountain gorge hemmed in, and cut off from the surrounding country by precipitous ranges, rising in not a few places to a height of 1,500 to 2,000 feet above the beds of the rivers.

This being the case, it must be apparent to any unprejudiced and disinterested person that to adopt this line as the coast connection would be to throw upon the 45 miles between Inverell and Glen Innes the strain of earning interest upon the whole of the enormous capital required for the construction of this line. That is to say,—the 45 miles between those two places would have to earn interest upon the whole of the 147 miles from Inverell to Grafton.

We cannot think it necessary for us to say more upon the subject of this line.

The nature of the country through which it passes is admitted on all sides. The consequent cost is in evidence from the reports of the Engineer-in-Chief, who estimates this at £19,600 per mile, or a total of £1,999,000, and the impossibility of this section earning even a reasonable proportion of working expenses must be apparent.

The grades and curves are also shown to be such as are beyond the limit of a reasonably safe railway—8-chain curves and 1 in 33 grades,—and the cost of working must necessarily be great.

And though even improvements in curves and grades should be found possible, the barren and rugged nature of the country and the absence of any probable wayside traffic should be sufficient to condemn it.

In the face of all these facts, we feel justified in reporting this line to be an impracticable one,—commercially, if not absolutely so from an engineering point of view,—and we do not therefore feel called upon to say more on the subject of it.

### Guyra, *via* Don Dorrigo, to Grafton.

This line leaves the Great Northern Railway, near Llangothlin Platform, 7 miles north of Guyra Station, and after crossing a small stream which is the head of the Falconer or Guyra River, rises to the summit of the range forming the watershed between the Macleay and the Clarence Rivers, and follows it to near Alfreda Station, a distance of 43 miles. Throughout this length it leaves the actual summit for no great distance at any point, and only to avoid high points and maintain grades.

From Alfreda—the range bearing away to the south and rising to a considerable height in the Snowy Hills—the line is carried in a more easterly direction to Rigney's Station, where it crosses the Armidale and Grafton Road. Thence it continues easterly past Moles's house and through the Guy Fawkes country.

At the time of our visit, the survey had been carried by Mr. Jamieson to Biscuit Creek, 48 miles from Guyra, and within 2 or 3 miles of the point where he would connect with Mr. Thornbury's starting point.

Mr. Thornbury had carried the survey on some 17 miles further, making a total of 65 miles from Guyra.

From that point, a gap of about 40 miles remained unsurveyed, to the point at the head of Tallawadja Creek, where we saw Mr. Cumming who had carried the survey thus far from Grafton, *via* Glen Reagh, a distance of 40 miles.

#### *Land.*

From Guyra, for a distance of 43 miles, the land is of superior quality, consisting for the most part of rich volcanic soil, a large proportion of which is fit for cultivation. The only obstruction being a few stony patches on the summit of the range.

The same character of land appears to prevail for some miles on either side of the line, and from the elevated plateau along which the line runs, commanding an extensive view throughout, we had full opportunity of seeing this.

The country presents the appearance of open ridges, free from deep gullies, lightly wooded, and well adapted for agricultural purposes.

From the point referred to—43 miles from the Great Northern Railway—an interval of poor granite country is passed through, extending for (say) 7 miles until approaching the Armidale-Grafton Road, where the rich volcanic soil again appears and extends for several miles in length.

This character of soil prevails over the whole of this Guy Fawkes country, embracing a considerable area from the coast fall on the south of Rigney's to Tyringham (Perrott's) Station on the Armidale-Grafton Road, 25 miles in one direction northwards and right through to the Little Nymboida, north-easterly along the proposed line of survey.

As we failed to obtain a guide through the Don Dorrigo scrub, along the course of the proposed line, or to ascertain that any track existed in close proximity to it, practicable for horses, we travelled by the Armidale-Grafton Road, as far as Perrott's, and then struck across *via* Bostobrick and the Little Murray Creek through the Don Dorrigo scrub to Coghlan's, on the Brelsdow Creek, and thence to the head of the Bellinger River.

Thus cross cutting the country and the scrub from north-west to south-east.

Mr. Simpson had previously explored, on foot, the proposed line from north-east to south-west through the scrub. He describes the land thus:—"From the Armidale-Grafton Road to the Deer Park the land is open for considerable stretches and of a very superior nature, covered with a fine growth of natural grasses."

"From the Deer Park, right away to the Little Nymboida, the land is very good, and is covered with a fine forest of beautifully grown timber."

"The whole district is abundantly watered by perennial streams." (See Mr. Simpson's report, 23/8/89.)

Our route was for 25 miles, as far as Perrott's, generally parallel with and on the average 10 miles distant from Mr. Simpson's; and then at right angles to his line for a distance of 25 miles, through the Don Dorrigo to where we descended the coast fall to the head of the Bellinger. We

We found, from the crossing of the Little Murray Creek right through to the verge of the coast slope above the Bellinger, the land to be of the richest description of scrub land, and capable of producing heavy crops of cereals, &c.

This tract of country, so far as the dense scrubs permitted, has been well examined and found to possess land of superior quality throughout.

A large part of it is covered with so dense a growth of scrub and vines that except along tracks cut by the cedar getters, it is impossible to force a way with horses.

As Guy Fawkes is at about the same elevation as Guyra—4,400 feet above the sea-level—the rigorous climate of New England prevails there.

Thence through the Don Dorrigo scrub to the head of the Little Nymboida the fall is considerable though gradual, and a more temperate though still cold climate prevails, which will permit of the growth of cereals, potatoes, and other products of temperate climates.

This stretch of country appears to be an elevated tableland, falling abruptly towards the coast on the east and south, and sloping, at first gently, to the north, and finally pitching suddenly into the valley of the Nymboida, with a gradual inclination throughout to the north-east.

On the range forming the division between the heads of the Orara and the Little Nymboida Rivers, we found Mr. Cumming's camp.

Here the elevation was about 2,800 feet above sea-level.

Thence to the valley of the Orara at Glen Reagh—12 miles—the country falls rapidly, and, in the immediate vicinity of the line, consists of high ridges with deep valleys between, presenting along this 12 miles no land fit for cultivation except small flats close to the creeks in the vicinity of Glen Reagh.

From Glen Reagh to Grafton the land is generally of good quality.

Along the valley of the Orara it is superior, whilst the slopes are, though lighter and sandy, fairly good.

Taking the whole length of line from Guyra to Grafton, a distance we estimate at from 140 to 150 miles, a remarkable stretch of country is passed over; for with the exception of the space of 7 miles west of Guy Fawkes, and the length of 12 miles west from Glen Reagh, both referred to above, there is no part which does not present large areas of land fit for cultivation.

The greater part of it is of the most fertile nature, with a temperature ranging from the rigorous climate of New England, 4,400 feet above the sea, to the semi-tropical one of the northern sea-coast. And it is probable that in no part of New South Wales is there a finer stretch of rich land of equal extent so little broken in upon by barren intervals as this.

The rainfall is considerable, and the whole is intersected at short intervals by perennial streams.

#### *Timber.*

Not only is the soil of this tract eminently fitted for cultivation and capable, when properly tilled, of supporting a dense population, but the splendid forests of marketable timber of almost every kind indigenous to the colony, which prevail over a large extent of it would, with railway communication, find employment for hundreds of persons and supply the principal markets of the colonies for many years to come. Commencing about the Deer Park, and extending northwards beyond the Arndale-Grafton Road and eastwards to the sea shore, a forest of magnificent timber covers the whole face of the country.

In the Don Dorrigo scrub is cedar, beech, pine, and all the varieties of scrub timbers, whilst beyond this vine scrub itself in the densely-timbered land extending right up to the town of South Grafton forests of the finest ironbark, tallowwood, turpentine, blackbutt, &c., exist in lavish abundance.

Fortunately very large areas of this splendidly-timbered country have been reserved, so that the forests may be said to be practically untouched, and directly railway communication is established a large traffic must at once spring up in carrying timber to the nearest port as well as to the badly-timbered country towards the western interior.

Unlike many timber forests where the land is comparatively valueless after removal of the timber, the greater part of this land may be at once put under the plough, and support a large population.

The value of this stretch of country can scarcely be exaggerated.

We take leave to suggest for consideration whether, large as are the existing forest reserves along this route, they might not be extended with advantage. This suggestion we would apply also to the Tenterfield to Casino route.

#### *Minerals.*

At Nana Creek and the vicinity mining for gold has been carried on more or less for some years past, but at present this industry does not appear to be giving very satisfactory results.

Near Glen Reagh Station we were informed coal existed, but nothing appears to have been done towards proving or developing the seam.

Thirty-five miles from Guyra, in a north-easterly direction, is the Kookoobookra Goldfield, upon which there is a population at the present time of 250 persons, and between the two places 70 others.

This goldfield does not at the present time appear to be in a very flourishing condition.

#### *Population.*

The population along this line is very small. From Guyra to Guy Fawkes there are very few selectors, and only some half-dozen stations. A large quantity of the land is unalienated. About Guy Fawkes are a few selectors, and three or four stations chiefly stocked with cattle. Thence to Glen Reagh the country may be said to be practically unsettled and uninhabited, except by a few cedar-cutters. From Glen Reagh to Grafton the country is more thickly settled, and on the better land are a good number of selectors.

On the whole the tract of country along this line has a sparse population, but is capable, when supplied with railway communication, of supporting a large number of people.

#### *Engineering.*

The line from the Great Northern Railway to near Guy Fawkes appears to be very easy; in fact the greater portion is a surface line, requiring no large bridges and few culverts. For the next 10 miles occasionally difficult pieces occur. The following 40 miles is still unsurveyed, but we think no difficulty will be found in securing a good line.

The

The descent from the Don Dorrigo table-land to Glen Reagh is considerable, and some difficulty is being experienced in the route now under survey, and it may be necessary to try a line down the valley or along the spurs of one of the creeks further west—perhaps Kangaroo Creek.

From Glen Reagh to Grafton presents no difficulties.

#### *Advantages.*

As a link between the Great Northern Railway and the proposed coast line, this route has the following advantages:—

1. So far as has been yet ascertained, it will be comparatively inexpensive for 60 miles at the Guyra end, and also for 30 miles at the Grafton end. The intermediate portion, the position of which is yet unfixd, will be probably found more expensive; but as far as can be seen no great difficulty will be encountered.
- (2.) For the greater part of its length it passes through land of excellent quality and abundantly watered, most of which is still unalienated.
- (3.) Along 70 to 80 miles of the route it runs through a forest of fine timber of nearly every description known in the Colony.
- (4.) Along the route a range of climate exists, gradually changing from the cold of New England to the semi-tropical heat of Grafton, thus permitting of the production of a variety of crops.
- (5.) It will afford direct connection between the coastal districts of the Macleay and Bellinger, as well as those further north, with New England and the west.
- (6.) That it will, at Guy Fawkes, where it crosses the Armidale to Grafton Road, be within 36 miles, by a fairly good road, of the Hillgrove Gold-field, which has, at the present time, according to the statement of the police, a population of 3,000 persons.

This field is now in a prosperous condition, and likely to be permanent.

#### *Disadvantages.*

The only serious disadvantage in connection with this line, so far as can be judged before completion of the survey now in progress, is the somewhat circuitous route between Inverell and Grafton.

The distances by the alternative routes would be:—

Inverell, *via* Glen Innes and Llangothlin, 219 miles.

                  "          "          Guyra and Llangothlin, 207 "

as against 146 miles by the more direct, but almost impracticable route, *via* Glen Innes and Newton Boyd.

The distance from Llangothlin (the actual point of departure of this line from the Northern Railway) to Grafton being estimated at 115 miles.

In the absence of this completed survey, it is not possible to say what engineering difficulties may exist, but it is not thought there are many to be encountered, nor can the exact distance be stated until the survey is completed.

If this line be found practicable throughout, the length of it would appear to be the only real disadvantage it has.

And this objection is modified to some extent by the quantity of excellent land passed through, and the abundance of timber on the way.

### Coff's Harbour Connection.

This is a question which must depend largely, first, upon the route finally determined upon for that part of the Guyra to Grafton line, between the Don Dorrigo scrub and the Orara Valley, and, secondly, the position of that section of the projected North Coast Railway between Coff's Harbour and Grafton.

At present the former line is being surveyed from the Orara Valley, at Glen Reagh, up the right or east bank of the Tallawadja Creek, on to the table-land.

If this survey result in a practicable line being obtained by that route, it would appear more judicious to deviate the proposed coast line north of Coff's Harbour from its present position, and striking off a little north of Coff's Harbour to cross the coast range (which is here very low) and run into the valley of the Orara, near Sherwood's, and then, *via* Bagawa to join the Guyra-Grafton line at Glen Reagh, making the one-line serve thence to Grafton, and so avoid having two lines nearly parallel in close proximity.

This would form a fairly good connection with Coff's Harbour, and the fertile country lying along the sea and the coast range from the Bellinger northwards, and also bring the Macleay District into touch with New England and the interior.

If, however, the rise from Glen Reagh, *via* Tallawidja Creek to the Don Dorrigo, is found too abrupt, it may be necessary to look for a line up the valley or along the spurs of one of the creeks further west—for instance, Kangaroo Creek; in which case, as a greater distance would exist between the two lines, it might be advisable to continue the coast line, *via* Woolgoolga, as originally proposed. Considerations of coast defence may be of weight here.

As to a direct connection between the Guyra-Grafton line at the verge of the table-land and Coff's Harbour.

The most direct course would be to leave the Guyra to Grafton line on the water-shed between the heads of the Little Nymboi and Orara Rivers, and striking nearly due east, descend by the head of the Orara, which here apparently flows nearly west to east, and, crossing the coast range, skirt the northern side of the high bluffs which abut on the sea above Coff's Harbour.

Without some exploration it would be presumptuous to offer any decided opinion on the possibility of a practicable line being obtained here, but from observation of the country from several commanding points, it appears likely that considerable difficulty will be experienced in doing so. It is entirely a matter for exploration and survey.

Should, however, this be found a practicable route, it becomes a question whether it would not be advisable to continue the Guyra to Grafton line direct to Coff's Harbour, and there connecting with the North Coast line carry the traffic over that line to Grafton, either by Woolgoolga as surveyed or by the suggested deviation, *via* Bagawa, Glen Reagh, and the Valley of the Orara.

From

From the Bellinger northwards along the littoral there is a large quantity of most fertile scrub land, and the table-land connection being made at Coff's Harbour, greater facility would be given for the interchange of produce between that part of the coast and New England.

The land from Coff's Harbour across the coast range to the Orara Valley at Sherwood's, and thence down that valley to Glen Reagh, is of the most fertile description, the greater part being thick scrub and heavily timbered.

The whole question of this connection with Coff's Harbour, however, is, as previously stated, a matter for exploration and survey, but we think it well worthy of attention before a final decision is arrived at.

### Tenterfield to Casino.

From Tenterfield, for some 7 miles, the line runs through moderately hilly country, which gradually merges into ranges, and thence to Black or Plumbago Creek, near Tabulam, a distance of 45 miles from Tenterfield, the country consists of high ranges with steep slopes, but not generally of a rocky or broken character.

From Tabulam to Casino the country is of an open character and the ranges more moderate in height, presenting no great engineering difficulties.

The land as far as Barney Downs Station, some 6 miles out of Tenterfield, is good, and a considerable quantity of it is under cultivation. From that point it gradually merges into the high ranges mentioned above, and until Tabulam is reached there is little land adapted for cultivation. Though the soil on some of the hills is good, they are generally too steep to admit of tillage.

From Tabulam to Casino the land is generally very good, and a large proportion of it fit for agriculture; it consists of rich black soil flats, with lighter sandy loam on the ridges. On the Richmond—or Sandilands—Range and its spurs, the soil is of the rich nature usually found in the dense vine-scrubs such as cover this range.

We have statements from police officers and other reliable persons that the good land extends north to the Queensland border, and south as far as Yulgilbar, and that of this a considerable quantity is rich scrub land.

The forest land is good, except in places where broken.

Along the valley of the Upper Richmond there is a large area of good land fit for cultivation.

#### *Timber.*

From Sandy Hill, 20 miles from Tenterfield, right through to near Casino, the proposed railway line runs for about 60 miles through a forest of splendid timber of varied kind, a forest probably unsurpassed in the Colony.

On the Richmond Range large quantities of "hoop pine" exist, whilst cedar is found in the same district.

This timber forest, we learn from good authority—the police and others—extends north to the Queensland border, and for many miles southward.

A large and profitable timber traffic may therefore be relied on as soon as this line is constructed.

A limited trade now exists in wattle-bark, which is forwarded from Tenterfield into Queensland. The quantity exported through Wallangarra Station for the year 1889 was 107 tons, and for the half-year ending 30th June, 1890, 80 tons.

It is claimed that this trade would be largely developed if this line of railway was constructed, and this, we think, probable, as much of the rich land between Tenterfield and Drake, too steep for other purposes, is now clothed with wattle.

#### *Minerals.*

An important point in connection with this proposed line is, that it would pass through the extensive mineral field in the vicinity of Drake, known as Fairfield.

The Prospecting Board, in a report dated 12th of March, 1889, say:—

"From the foregoing it will be seen that in this district there are numerous ore deposits, containing gold, silver, copper, lead, zinc, &c. \* \* \* \* \* With more efficient gold-saving appliances \* \* \* \* \* steady and profitable yields may be anticipated."

We find that large sums of money have been spent in erecting machinery, and in mining on a number of claims on this field, and several are still working more or less actively, but, on the whole, so far unsuccessfully as regards dividends, and mining would, therefore, appear to be at a low ebb.

It still remains to be proved how far the field can be profitably worked. The construction of a railway, and the consequent saving in freight, would materially assist towards the successful working, especially of the baser metals.

The yield of gold would appear to have steadily increased during the three years 1887, 8, and 9, amounting to £4,798, £5,999, and £8,522 in those years respectively; and at the time of our visit good yields were being obtained at Long Gully.

At the Richmond Range, in close proximity to the proposed line, we saw the coal seams which had been discovered near "Ross' Inn."

There were five seams varying in thickness from 9 inches to 4 feet 3 inches.

These cropped out of the hill in the bed of a watercourse where we were enabled to take samples, of which we obtained the attached analysis kindly furnished by the Mines Department.

The analysis goes to show that the samples we submitted contain too large a percentage of ash to be of commercial value.

Should exploration of these seams prove that good steam coal can be obtained at a greater depth or further into the hill, it would be an important factor in connection with this line by providing coal for railway and other purposes in the north.

We append a statement furnished to us by the Tenterfield Progress Association giving statistics, and setting forth the case generally in favour of the construction of this line. It was impossible for us to verify this in every particular as to figures, but, taking it as a whole, it appears to be a fair statement of the case.

*Population.*

*Population.*

The population is generally small along this route, except on the Fairfield diggings. Here the numbers given by the police are 1,288 Europeans and 62 Chinese for Drake and the neighbouring district, and for Tooloom, whence the traffic would join at Tabulam, 200.

The population along the other parts of the route—exclusive of Tenterfield and Casino—would probably amount to less than another thousand.

The numbers of the present population along these lines affords but little criterion, however, as to the value of the country as a support for future railways.

The whole country may be said to be nearly in a virgin state and the results of railway communication can only be estimated by taking the whole of the circumstances as to each line together, and can only be speculative.

*Cattle Traffic.*

The land along the route is principally occupied by large cattle stations, and some of it will never be fit for any other than grazing purposes, owing to its hilly nature.

It is probable that a considerable traffic would accrue to the railway in fat cattle. At present the greater part of the fat cattle go to Ramornie Meat Preserving Works, near Grafton, or are consumed locally. The remainder are driven to and trucked at Tenterfield for the southern markets.

We were unable to obtain any reliable estimate of the number of fat cattle likely to be forwarded by rail in the event of this line being constructed, but it would probably be large judging from the total number of cattle in the Richmond Electorate, *viz.*, 152,000, and from the fact that fat cattle deteriorate so much when sent by sea that few are despatched that way, and only low prices are given at Ramornie.

*Engineering.*

With regard to engineering matters, the opinion we arrived at as to this line was that the curves would prove the chief trouble.

The nature of the mountain ranges should allow of good grades being obtained.

As much of this line will be along steep sidelings of a rather unstable nature, precautions will be necessary to guard against land slips in wet seasons.

Several tunnels will be required, but none of them of very great length, and one large bridge across the Clarence at Tabulam, where, owing to the great height to which the flood rises, a very long approach will be required on the western side.

This line would appear to be capable of great improvement in some places.

*Advantages.*

The advantages possessed by this line are:—

- 1st. That it passes through a large extent of good land between Tabulam and Casino. In addition to which it would afford an outlet to another large area of good land which extends some distance north of Tabulam, along the Upper Richmond in the direction of Mount Lindsay, and also to the fertile country on the Clarence below Tabulam.
- 2nd. It would tap and connect with the interior the districts of the Richmond and Tweed, which, we gather from the evidence given before the Works Committee on several occasions, are unsurpassed in the Colony for fertility, and have a rapidly-increasing population.
- 3rd. That, upon the completion of the proposed harbour works at Byron Bay, a capacious port, with deep water, will be afforded to the inland districts within a reasonable distance—232 miles from Inverell.
- 4th. That it passes for nearly the whole distance through a fine forest of magnificent timber, in which there must be a large traffic, both towards the interior and the coast. The Forest Reserves here, as on the Guyra to Grafton line, are very extensive.
- 5th. That it will traverse and assist to develop the very promising mineral field about Drake—a field which, although at present not yielding largely or profitably, may later on when the evil effects of rash speculation have passed away become a valuable one.

It has been stated that “of the sixty-seven known minerals, forty-seven have been discovered in Drake and the neighbourhood.”

Whether this be literally correct or not we are unable to say, but it appears very certain that a large number of the metals of commerce exist here, and it is possible that this field may yet become so developed as to support a very large population.

- 6th. That by this route, upon the completion of the line from Casino to the Queensland border at the Tweed, with the short interval thence to the present Queensland terminus, near Southport, a second connection with Brisbane will be had; and by altering the gauge on this length (about 50 miles) of the Queensland line an uniform gauge would be had between Sydney and Brisbane, and the distance lessened by 16 miles as compared with route *via* Wallangarra and Toowoomba.

*Disadvantages.*

The disadvantages are:—

- 1st. That the line between Tenterfield and Casino will be a costly one, estimated at £15,000 per mile, and a total cost for 86 miles of £1,290,000. The curves between Tenterfield and Tabulam numerous and sharp, and the grades in some places steep. There is, however, nothing impracticable about the route and further examination will probably prove that these objections may be considerably modified.
- 2nd. That for the greater part of the distance between Tenterfield and Tabulam (50 miles) the land is unfit for cultivation; an objection largely compensated for by the wealth of timber and promise of a valuable mineral field upon it.
- 3rd. That the line would be so far north as to neutralise in a great measure any benefit the more southern coast districts would otherwise derive from a connection with the interior.

And it is here the Guyra-Grafton line possesses the advantage. That it would strike the coast-line fairly midway and so, as far as any single connection can do, afford equal facilities to all parts of the coast between (say) the Macleay on the south and the Richmond on the north.

Tamworth,

### Tamworth, *via* Manilla to Inverell.

We travelled from Inverell to Bingera and thence *via* Barraba and Minilla to Tamworth.

#### *Land.*

Although there is along this route, between Tamworth and Bingera, a considerable quantity of good land, it, on the east, quickly merges into the high granite country running out northward from the Moonbi Range and that forming the watershed between the Bundarra and Minilla Rivers, whilst on the westward the better country soon falls within the influence of the Narrabri line of railway.

We, therefore, do not consider that at present this line is necessary.

A large traffic, however, now exists, coming from Warialda and the north and north-west, in the direction of Goondiwindi and Moree, and trending to Tamworth Railway Station.

### Inverell to Bingera Extension.

And this, we would suggest, may be best met by the extension of the Inverell line to Bingera, thus effectually intercepting this traffic at Bingera.

This extension would also serve to carry produce such as flour, forage, potatoes, &c., from New England and Inverell to the westward, as well as to bring in further traffic from the west to the sea coast when the coast connection is carried out.

This Bingera extension would run through one of the most fertile parts of the Inverell District.

For nearly 20 miles this is thickly occupied by farms, and on it are some of the best in the district.

The rich red or black soil extends for 15 miles further, though principally occupied by the Myall Creek Station, while the remaining 12 miles to Bingera is on the whole fairly good land.

The land at Bingera, and for about 12 miles in the direction of Tamworth, is also of a very rich quality, and will doubtless be cut into farms and cultivated—when the alluvial gold-mining ceases—and prove an additional feeder to this suggested extension from Inverell.

#### *Traffic.*

The question will probably be asked,—Will the Warialda to Tamworth traffic make use of the railway if extended to Bingera?

The position would be this,—Bingera is 100 miles from Tamworth by road, the greater part of which is still unmetalled, whereas Bingera would be, with a railway *via* Inverell and Glen Innes, from Tamworth 231 miles.

It may be thought that goods can be sent 100 miles by road at less cost than 231 by rail.

Taking wool, at present one of the most important items of carriage.—The Railway Commissioners carry wool from Glen Innes to Sydney, 422 miles, at £3 15s. per ton; add to this the full ordinary rates for wool 90 miles, Bingera to Glen Innes, say £1 10s., and we have a total of £5 5s., Bingera to Sydney per rail.

The road freight, Bingera to Tamworth, 100 miles, would be say £3 10s.; add rail freight, Tamworth to Sydney, £3 15s.; total, £7 5s. per road and rail. Showing a saving in carriage by rail against road of £2.

And if the wool traffic be intercepted and taken by rail it follows the return loading must go by the same route.

As to passenger traffic.—The coach fare, Bingera to Tamworth, 100 miles, is £1 17s. 6d., and rail Tamworth to Sydney, 281 miles first-class, is £2 7s. 5d.; total, £4 4s. 11d.

Bingera to Sydney by rail would be say 512 miles, and we find the first-class fare for that distance would be say £4 3s. 6d., or in round numbers, about the same amount for a first-class rail fare (with comfort), as for a day and a night's coaching with a night's train travelling to follow.

If the extension from Glen Innes stops at Inverell, this large traffic now passing from the north and north-west, *via* Warialda and Bingera, to Tamworth will continue as at present, and none, or very little of it, be obtained for the railway until Tamworth is reached.

This Inverell to Bingera extension, as we have above stated, passes through a rich stretch of country studded with farms, so that considerable wayside traffic would be picked up.

We, therefore, after due investigation, confidently urge consideration of the advisability of this extension to Bingera in connection with any from the Great Northern Railway to Inverell, and the propriety of drawing sooner to the rail a traffic which, although not sufficient to justify the construction of a railway for itself, is large enough to become a very valuable addition to that of the Northern Railway and proposed branch.

A railway from Tamworth to Inverell would be practically a competing one against the Great Northern and any connection with Inverell.

#### *Trend of Traffic.*

Assuming Inverell to be connected with the Great Northern Railway either at Glen Innes or Guyra, and no connection made with the coast, it is clearly apparent that by far the greater part of the resulting traffic must be with Sydney and Newcastle.

As part of the traffic going south, taking the item of wool, we estimate that the clip from 750,000 sheep—equal to 2,000 tons—which is at present sent to Sydney and Newcastle from the country around and west of Inverell, would be trucked at Inverell; to which must be added 1,352 tons of tin now trucked at Glen Innes and Guyra—the produce of the Elsmore and Tingha fields. (*See Mines Report, 1889*).

We also find that for the twelve months ending March, 1890, 2,648 tons of general goods were received from Sydney and Newcastle at Glen Innes Station for despatch to Inverell, and that 512 tons were received at Guyra for Tingha, which would probably come by rail to Inverell in the event of the Glen Innes line being made. So that, without going into the consideration of probable increase, we have this large amount of tonnage going to or coming from the south; and, until a connection is made with the coast near Grafton, and an interchange of products established between there and the west, this Sydney and Newcastle traffic must be the principal. The

The coast connection effected, however, a considerable traffic will no doubt arise in supplying the coast districts near the Clarence with breadstuffs and other articles not produced there, and a corresponding return of products from that semi-tropical district.

This will also apply to the coast districts north of the Richmond River, where the population is increasing at a rapid rate, and if the connection from Tenterfield to Casino and Lismore were also made, these districts would be supplied with the same products, breadstuffs, &c, and a northern traffic established.

It is contended that, with a railway to Grafton, the products of Inverell would all go to that port for shipment to Sydney; but a comparison of the rates of carriage would hardly support this.

From Inverell to Sydney, *via* Glen Innes, 466 miles, calculated at present rates, wool would be carried to consignees' stores for £3 15s. per ton.

From Inverell to Grafton, *via* Glen Innes and Don Dorrigo lines, at present mileage rates would be £3 1s. 8d., add to which, sea freight, extra handling, insurance, and cartage from wharfs in Sydney, and the margin of difference would hardly be enough to divert the traffic, once loaded.

With an improved port, however, goods would probably be sent to Grafton for direct shipment to other countries.

It has been stated that with the construction of the Inverell-Glen Innes line, a considerable trade in breadstuffs would spring up between Inverell and Queensland, in supplying the country west of Toowoomba.

It does not, however, appear that such is likely to occur at present, as the following will show.

The distance, Inverell to Wallangarra, *via* Glen Innes, is 112 miles, and the freight upon wheat would be 9s. per ton, or 2.92 pence per bushel.

Wallangarra to Toowoomba is 132 miles, and the cost of carriage, at Queensland rates, 11s. 9d. per ton, or 3.81 pence per bushel. Total, 6.73 pence per bushel, Inverell to Toowoomba.

Brisbane to Toowoomba is 101 miles, and the cost of carriage, 10s. 5d. per ton = 3.38 pence per bushel, leaving a difference in favor of Brisbane of 3.35 pence per bushel, to cover the cost of landing sea-borne wheat at Brisbane.

Inverell to Sydney, *via* Glen Innes, would be 466 miles, and the cost of freight, 17s. 4d. per ton = 5.62 pence per bushel to land the wheat in a large market, as against 6.73 pence to land it in a limited one at Toowoomba.

Further, the area put under wheat in the three districts in the Darling Downs, *viz.*, Allora, Warwick, and Toowoomba was, for 1889, 14,242 acres, as against 10,485 acres in Inverell, Glen Innes, and Tenterfield. And Queensland statistics show that the area put under wheat was as great in 1889 as in any previous year, except 1881 when it was slightly in excess of 1889.

With regard to maize, the area planted in the three Darling Downs Districts above named has steadily increased, being in—

1887--13,269 acres	} Darling Downs District,
1888--16,651 "	
1889--19,339 "	

with an average yield equal to that of the Inverell District, and an area under cultivation largely in excess of Inverell, Glen Innes, and Tenterfield Districts combined, which stand for those years respectively.

1887--6,541 acres	} Combined districts of Inverell, Glen Innes, and Tenterfield.
1888--7,332 "	
1889--7,971 "	

This would go to show that wheat and maize growing has been so fairly successful in the Darling Downs District as to make any competition in these products a very questionable matter from places so distant as Inverell.

It has been proved to us that at present neither Glen Innes or Tenterfield, which claim to be wheat-producing districts and possess mills, are sending wheat or flour (in quantity) into Queensland, as we find that, although a considerable quantity of flour crosses the border at Wallangarra, it is all brought from Sydney and sent only a few miles into the adjacent Colony, principally to Stanthorpe and the vicinity. And it would appear that the special rate charged in Queensland on imported flour is practically prohibitive. Nevertheless this Toowoomba market would still be open to Inverell, when paying prices prevailed, owing to failure of crops in Queensland.

But that a traffic must eventually spring up across the border is inevitable, as it would seem inconceivable that with federation accomplished and tariffs assimilated two great Colonies should not have an important interchange both of passenger and goods traffic, more particularly when an uniform railway-gauge is adopted.

#### SUMMARY.

OF the immediate necessity for connecting the magnificent and extensive country about Inverell with the Railway system, no one who has travelled through the district can have any doubt.

It requires neither figures nor statistics to prove it—it is self-evident (and it is to be regretted that want of unanimity amongst the people should have delayed its construction so long).

We, therefore, confine ourselves to the question submitted to us, namely: What connection will be conducive of the greatest good to the greatest number?

The Uralla and Kentucky lines, though possessing many engineering merits, and having the great advantage of being the most direct routes to Sydney, besides having been shown to run through very poor country, present to us the insuperable objection, that neither would form any direct link towards connecting the western interior with the north coast districts.

We, therefore, dismiss them from further consideration.

We also dismiss the "Swanbrook" route from Glen Innes, as that *via* Wellingrove seems superior. This leaves only the Guyra to Inverell, and the Glen Innes to Inverell, *via* Wellingrove, to be discussed, and their advantages and disadvantages compared.

As a connection with the Great Northern Railway, the Guyra to Inverell line has the following advantages:—

- 1st. It is the least expensive, the estimated cost being £103,861.
- 2nd. It is, as to grades and curves, the better line.
- 3rd. It passes through a fair quantity of good land, much of which is unalienated.
- 4th. It offers the more direct connection with Sydney.

5th.

5th. It would also be the more direct connection between Inverell and the proposed Guyra to Grafton line.

6th. It passes through the mining district and town of Tingha; though, as pointed out previously, the permanence of this tin-field remains to be proved.

7th. It would get the Bundarra traffic, which would hardly come to the Glen Innes line.

The single disadvantage is, however, that in the possible event of the Tenterfield to Casino line being constructed at no distant date, as a second connection with the coast, all traffic to and fro between Inverell and the country north of Grafton, as well as that with Queensland, would have to be taken 48 miles out of the way, *via* Guyra, as compared with the Glen Innes to Inverell route.

The advantages possessed by the Glen Innes to Inverell line are:—

1st. The length to be constructed and worked is less than the Guyra line, although the cost of construction will be greater.

2nd. It passes for almost the whole distance through land of the most fertile character.

3rd. It strikes the main line nearly midway between the proposed coast connections from Guyra and from Tenterfield, and, as the result of our investigations, tends to show that both these connections will be justified within a reasonable future, it seems desirable when this occurs that the line to the western interior should be midway between them.

4th. That it is the shorter route to Queensland from Inverell.

5th. That it will connect two important towns, *viz.*, Inverell and Glen Innes, between which there is at present a considerable local traffic.

On the other hand the disadvantages are:—

1st. That the estimated cost of the line is £402,400, or £88,530 in excess of that to Guyra.

2nd. The grades are heavier and the curves sharper.

3rd. That the traffic to Sydney and southern parts, and that to the coast at Grafton, by way of the Don Dorrigo, would be taken 26 and 12 miles respectively out of the more direct course *via* Guyra.

4th. That almost the whole of the land along the route is alienated and principally held in large pastoral estates.

Taken by itself, as a connection between Inverell and the Great Northern Railway, the Guyra line possesses advantages over its remaining rival from Glen Innes.

We must now consider how the proposed connections with the coast will effect it, and this is really the key of the whole question.

The Grafton to Glen Innes line we have already dismissed on account of its many disadvantages both engineering and commercial, which the saving in mileage, its single advantage is quite insufficient to out weigh.

The line from near Guyra, *via* Don Dorrigo to South Grafton, though rather circuitous in route, possesses many merits and is apparently the best line that can be got from Grafton to the table-land.

That the present and future prosperity of the Clarence depends on such a connection being made is pretty well apparent, for it has now practically ceased to be the Scaport of New England.

That the present prosperity of Inverell or New England depends on getting this connection, has not been made clear to us, although we heard it freely stated, though the future in a measure does.

For if the Clarence is made a first-class port for direct shipment to England, as Sir John Coode's Report indicates, it will be when the proposed improvement works are carried out in their entirety. It will then be a matter of great importance to the interior to have this port as an outlet, and be able to ship produce by deep-sea vessels.

We, therefore, think that the Don Dorrigo line, from near Guyra to Grafton, should be constructed.

If this were to be the only connection with the coast, then the Guyra to Inverell line should undoubtedly be made as being the more direct.

But we cannot help being impressed with the necessity for constructing, in the future, the line from Tenterfield to Casino, for the following reasons:—

It will connect the fertile and populous Richmond District and Byron Bay with Tenterfield and the interior.

It will tend to develop the important mining district of Fairfield.

It will open up a large area of good land *en route*.

It will pass through one of the finest forests in the Colony.

It will form a link in a more direct route between Sydney and Brisbane.

And will open up a traffic area, which would not be served by any line to Grafton from the table land.

### Conclusion.

Being, therefore, convinced that soon after the completion of the Guyra to Grafton line, the Tenterfield to Casino Railway must also be constructed, we are of opinion that the general interest of the whole country would be better served by the line from Glen Innes to Inverell than by the line from Guyra to Inverell, for the reason that Glen Innes is between the two points of connection with the coast.

The advantages of such a position were fully shown when discussing the trend of traffic.

It would appear to us desirable, rather, for all time, to take the southern traffic 26 miles round than, by effecting this saving to commit, what appears likely ultimately to be a considerable Queensland and Richmond traffic, to a detour of 48 miles, with the ascent and descent of Ben Lomond, and at the risk of it afterwards proving necessary to construct a second western connection to meet this northern traffic.

And on these grounds we found our disposition to favour—

1st. The construction of the Glen Innes to Inverell line.

2nd. The construction of the Guyra, *via* Don Dorrigo to Grafton line.

And at a later date that from Tenterfield to Casino.

We have, &c.,  
PERCY SCARR,  
EDWARD B. PRICE.

Proposed

Proposed Railways, Northern Districts.

Table of Distances.

EXISTING LINES.							Miles.
Sydney to Kentucky	...	...	...	...	...	...	334
" Uralla...	...	...	...	...	...	...	343
" Guyra...	...	...	...	...	...	...	385
" Glen Innes	...	...	...	...	...	...	422
" Tenterfield	...	...	...	...	...	...	479
" Wallangarra	...	...	...	...	...	...	490
Guyra to Llangothlin	...	...	...	...	...	...	7
Llangothlin to Glen Innes	...	...	...	...	...	...	30
Glen Innes to Tenterfield	...	...	...	...	...	...	57
Tenterfield to Wallangarra	...	...	...	...	...	...	11

PROPOSED LINES.							
Inverell, <i>via</i> Swanbrook, to Glen Innes	...	...	...	...	...	...	44 $\frac{3}{4}$
" " Wellingrove, to Glen Innes	...	...	...	...	...	...	44 $\frac{1}{2}$
" " Guyra	...	...	...	...	...	...	55
" " Yarrowick, to Uralla	...	...	...	...	...	...	80 $\frac{1}{2}$
" " Bundarra, to Kentucky	...	...	...	...	...	...	82 $\frac{3}{4}$
" to Bingera	...	...	...	...	...	...	45
Bingera <i>via</i> Barraba, to Tanworth	...	...	...	...	...	...	100
Llangothlin, <i>via</i> Don Dorrigo, to Grafton	...	...	...	...	...	...	145*
Glen Innes, <i>via</i> Newton-Boyd, to Grafton	...	...	...	...	...	...	102
Tenterfield to Casino	...	...	...	...	...	...	86

Inverell, <i>via</i> Guyra and Llangothlin, to Grafton	...	...	...	...	...	...	207*
" Glen Innes and Llangothlin, to Grafton	...	...	...	...	...	...	219*
" Newton-Boyd, to Grafton	...	...	...	...	...	...	146
" Guyra and Tenterfield, to Casino	...	...	...	...	...	...	235
" Glen Innes and Tenterfield, to Casino	...	...	...	...	...	...	187
" Glen Innes, to Sydney	...	...	...	...	...	...	466
" Guyra, to Sydney	...	...	...	...	...	...	440
" Uralla, to Sydney	...	...	...	...	...	...	423
" Kentucky, to Sydney	...	...	...	...	...	...	417

QUEENSLAND LINES.							
Wallangarra to Toowoomba	...	...	...	...	...	...	132
Toowoomba to Brisbane...	...	...	...	...	...	...	101

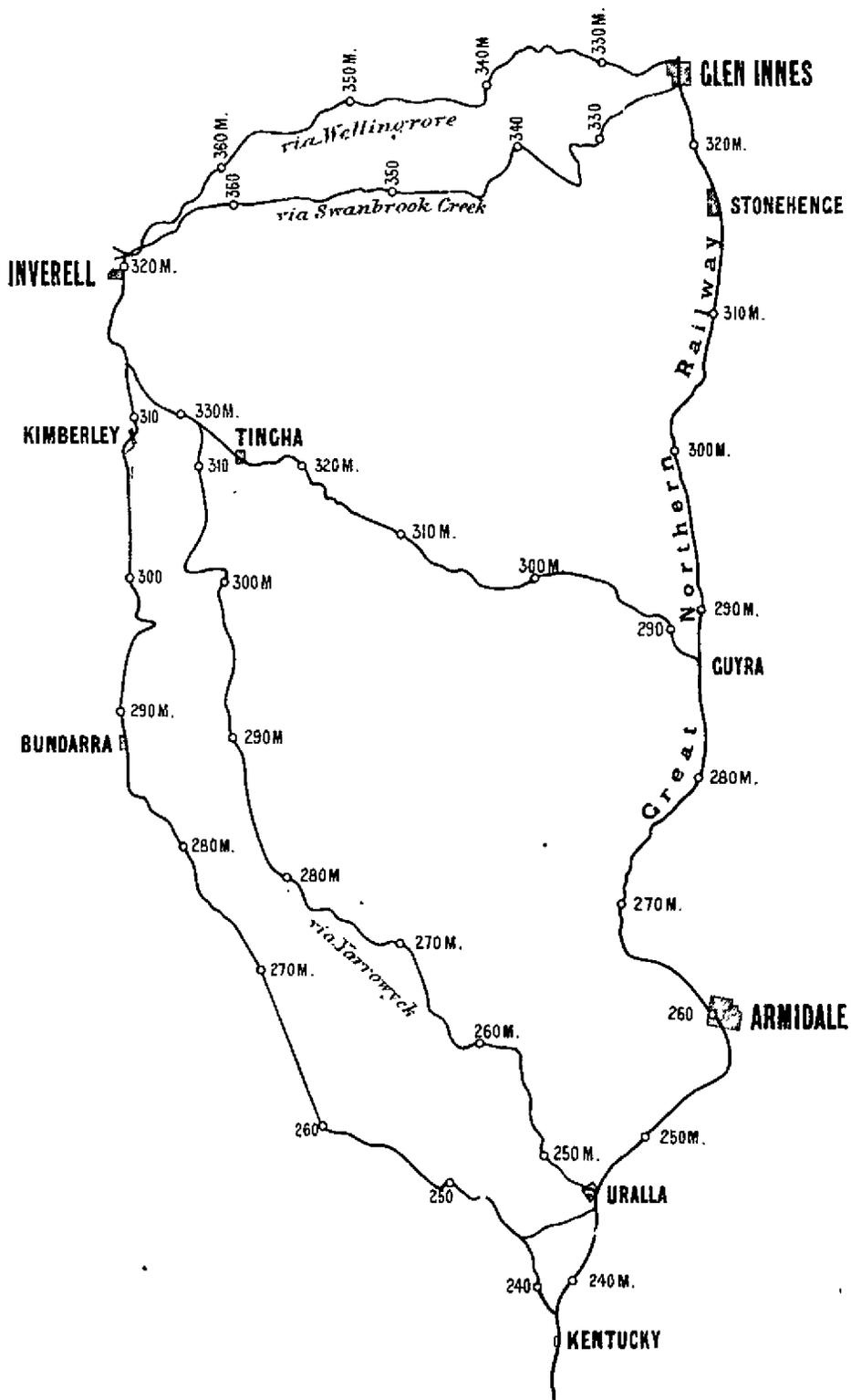
\* Estimated.

[One Plan.]

# DIAGRAM PLAN

## Shewing the proposed Routes

### FROM THE GREAT NORTHERN RAILWAY TO INVERELL



Scale = 10 Miles to 1 Inch

Drawn by C. Willberg

To accompany U. S. Letter 89 124. (Sig 570)  
17. 5 89.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,  
SYDNEY, NEW SOUTH WALES.

1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## PYRMONT AND GLEBE ISLAND BRIDGES—TRAMWAY TO BALMAIN.

(REPORT OF BOARD APPOINTED TO INQUIRE INTO QUESTION OF CONSTRUCTION OF.)

*Ordered by the Legislative Assembly to be printed, 11 September, 1890.*

### Pyrmont Bridge—Glebe Island Bridge—Tramway to Balmain.

THE appointment of a Board, consisting of C. W. DARLEY, Engineer-in-Chief for Harbours and Rivers, Chairman; R. R. HICKSON, Commissioner and Engineer-in-Chief for Roads, etc.; H. DEANE, Acting Engineer-in-Chief for Railways; T. ANGUS, Acting Engineer for Existing Lines; G. GORDON, Hydraulic Engineer of Melbourne,—

To consider the above questions originated in a minute of the Minister for Works, dated 21st October, 1889. The duties of the Board were at first to be confined to the consideration of the question of the construction of a new bridge to replace the existing Pyrmont Bridge, but that of the Glebe Island Bridge was added by order of the Minister on the 18th November. Further, on the 23rd November of the same year, the Under Secretary informed the Chairman of the Board that it was the wish of the Minister that the question of the tramway communication with Balmain should also be considered by the Board as an opportunity seemed to offer itself of connecting that suburb with the proposed cable tramway in Harris-street, by taking the Pyrmont Road, crossing the Glebe Island Bridge, the design of which might possibly be adapted for the passage of such a tramway.

Much delay has occurred in collecting information and preparing the report, and the Board wish to point out that at first there was difficulty in finding days to suit Mr. Gordon, who is a resident of Melbourne, and whose duties when in the Colony took him to the Hunter River District and other places. With a view to meet the difficulty of calling together all the members, the Minister, on the 23rd of November, decided that for the purpose of deliberation three should form a quorum. This improved matters very much, but it has never been easy to fix upon a day or an hour when even three members (heads of branches) can make it convenient to meet, and the Board finding no other time have repeatedly had evening sittings. Again, there was the delay in getting witnesses to come; it has frequently happened that important witnesses have disappointed the Board and the proposed meeting has had to be put off from time to time in order to get their evidence.

The Board from the commencement felt the great difficulty of dealing with these matters, especially with that of the Pyrmont Bridge. It was most desirable therefore that they should not come to a hasty conclusion, but should weigh the matter in the most careful manner, and with that end in view evidence has been taken from some of the leading residents, business men, and Members of Parliament, who seemed likely to be in a position to give valuable and impartial opinions on the question at issue.

The Board began their deliberations by considering all the schemes that had been proposed; they visited the sites of the present bridges and examined on the ground other routes which had been suggested with a view to divert the present traffic and obviate the construction of new bridges with swing spans, but it was soon apparent to the Board that it would be absolutely necessary that the Glebe Island Bridge at least should be rebuilt closely adjacent to its present position, and that the question of tramway communication with Balmain would have to be taken on its own merits and adapted to the bridges after those matters had been decided, that is to say, that the question of the renewal of the bridges on their present sites or removal to others must be treated as the main point at issue, and that the tramway must either be made afterwards to fit in or must be treated as a separate question altogether.

#### *Pyrmont Bridge.*

The Board having come to this conclusion as regards the tramway, then had to consider what they should recommend as the best means for providing for the heavy and increasing traffic across Darling Harbour at present passing over Pyrmont Bridge, and in dealing with this question they found it surrounded with many difficulties, more indeed than could possibly at first sight appear, owing to the numerous interests affected.

These may be classed as follows:—

*In favour of present site.*

1. Vested interests in present bridge by owners of property adjacent to each end of the bridge, and the thoroughfares leading thereto, viz. :—Market-street on the east, and Union-street on the west.
2. Those of the Commissioners for Railways who are now fitting up the large goods-shed, recently erected, with all modern appliances to enable almost the whole of the inward and outward goods traffic to be conducted at the Pymont end of the Darling Harbour yard, and therefore require easy and direct access with the City.
3. Those of a large labouring population who work amongst the stores and wharfs on the City side, but reside over the water and pass to and from their homes, in many cases several times a day. The census of traffic taken (see Appendix A), showing clearly how large this interest is, and how necessary it is that it should be provided for.

*Opposed to present site.*

1. Those of wharf-owners above the bridge whose property would be enhanced in value by having uninterrupted communication with the rest of the harbour.
2. Those of the residents of Balmain and of other suburbs who drive to the City, and who suffer from the inconvenience arising from the frequent opening of the bridge, and would prefer a fixed bridge with a certainty of crossing higher up the harbour. Keeping these interests in sight, what the Board had to consider was that of the reconstruction of Pymont Bridge on its present site, its removal higher up the harbour, or the erection of a high-level bridge, which would give sufficient headway for vessels to pass clear underneath, and thus obviate the necessity of a movable span.

*Several schemes have been brought forward.*

1. Renewal of the bridge on or near the present site.
2. Erection of a new bridge on line of Druitt-street.
3. Erection of a new bridge on line of Bathurst-street.
4. Erection of a fixed bridge on the line of Liverpool-street, and reclaiming the small covered portion of the head of Darling Harbour.
5. Erection of a high-level bridge somewhere near the position of the present bridge. Two or three positions have been suggested for such a bridge, but the various proposals may be treated as one.

Commencing with the latter proposals, viz., that of a high-level bridge, this would seem at first sight to have much to recommend it, and its advantages have been urged by many who gave evidence to the Board; but it is evident that unless the trade of the upper part of the harbour is to be restricted to vessels with low masts, and as a consequence of doing so the Government is prepared to pay very large compensation to the wharf-owners thus injured, the headway of such a bridge must be sufficient to enable vessels of all classes to pass under it unimpeded. Captain Chadfield, of the U. B. S. Co., whose premises are now established above the bridge, says masts vary from 125 to 150 feet, and many masts of the latter height cannot be struck; a bridge should therefore possess this clear headway. The adoption of a bridge giving the maximum headway would have the effect of sending all carts and other vehicles passing from Pymont to Sydney, and *vice versa*, over a height of 90 feet above York-street, and the traffic between the Railway Goods Station and Sussex-street would have to mount 150 feet when proceeding from one side of the harbour to the other, and the length of the journey would be increased from 1,500 feet to 6,200 feet, and on gradients of 1 in  $17\frac{1}{2}$  from the city and 1 in  $18\frac{1}{4}$  to the city. (See diagram, section attached.) It is evident that such a bridge would be a serious impediment to road traffic, and drivers of vehicles would probably much prefer to pass round the head of the harbour than rise this useless height. Foot-passengers would also have serious cause for complaint. The cost also would be excessive. The question of the construction of a high-level bridge may therefore be dismissed.

Several gentlemen, who gave evidence in support of a high-level bridge, explained afterwards that they meant a bridge of 50 or 60 feet headway, which would allow most of the traffic to pass under, and that they would have a movable span in the centre for large vessels. A bridge of this height would obviously be very little better than one with 22 feet clear headway; it would only be productive of cost without having any of the advantages of a fixed bridge.

The proposal to erect the bridge on the line of Druitt-street appears to have very little to recommend it, and the difficulty of giving suitable access to the Railway Station yard caused the scheme to be laid aside.

The proposal to erect the bridge in line of Bathurst-street is open to the same objections.

There remain therefore two proposals, which, in the opinion of the Board, are alone worthy of consideration, and about these they have had very great difficulty in coming to a conclusion. These are the erection of a bridge of improved construction adjoining the site of the present one, or the erection of a fixed bridge in a line with Liverpool-street.

The relative merits of these two sites will now be compared, and for that purpose it must be assumed that the bridges which would occupy those positions are the most suitable for their respective purposes. The assumed new bridge on the present site for example would be one with greater headway, broader roadway, and a larger opening span than the present structure, while the Liverpool-street site would involve a bridge starting from Sussex-street, and rising to such a height as to pass over the Darling Harbour Station yard, without interference with the traffic or the arrangements of the yard, and terminating at Pymont-street.

The evidence in favor of these two proposals appears to be nearly equally divided, and were it not for one most important consideration, to be mentioned below, the Board would have decided to recommend the removal of the bridge from its present site, and so do away for all time with the hindrance and obstruction to navigation which must necessarily exist even with the most approved structure.

Residents in Balmain, Birkenhead, and all those not immediately adjacent to the present bridge strongly advocate the Liverpool-street site. It is also evident that the same site would be supported by wharf-owners on the eastern side of the harbour above the present bridge.

On

On the other hand Pymont residents and those having business adjacent to the ends of the bridge on either side of the harbour strongly object to its removal. Further, there is a large daily foot passenger traffic between Balmain and Sydney, people having been induced to take up their residences in Pymont, and these would lose much were the bridge removed. The claims of these persons, however, could well be met, the Board consider, by means of a subsidised ferry.

In order to test the importance of the bridge on its present site the Board obtained a return of the traffic across the bridge for seven days between the hours of 5 a.m. and 7 p.m. A synopsis of this is appended.

Before deciding on any recommendations as to the bridge, it has to be carefully considered how each proposal affected the goods traffic at the Darling Harbour Station. It was found, after consultation with the Chief Commissioner for Railways and Mr. Angus, one of the members of the Board, that it would be very difficult to meet the requirements of the Railway Department as the station-yard is now constructed at the Liverpool-street site, as the existing goods-shed would be completely useless. Had the goods-yard to be freshly laid out it might be possible to so dispose the sidings and goods-shed as to suit that site, but with the yard laid out as it is the Liverpool-street site would involve sending the traffic a very long way round, which would prove injurious to all concerned, and the approaches to the goods-shed would have to be the same as if the present bridge were renewed, and the removal of the goods-shed would involve very great expense in itself and a radical alteration in the arrangement of the sidings.

Having taken these matters into consideration the Board find themselves compelled, though somewhat reluctantly, to recommend the erection of a new bridge adjoining the present site.

The description of bridge recommended is one with iron or steel superstructure on cast iron cylinders, roadway 42 feet, two 12 feet footpaths, surface of roadway to be wood blocked, and a clear headway of 20 feet above high water, two opening swing spans 60 feet clear with a headway of 22 feet under the span to enable the small steamers and lighters to pass. The estimated cost of such a structure being £220,000.

#### *Glebe Island Bridge.*

With regard to the Glebe Island Bridge the Board decided, as already mentioned, that the new bridge ought to be built at a point adjacent to its present site as shown in plan herewith by which the heavy grades now existing can be abolished.

The Board recommend the construction of a bridge with cast iron cylinders, wrought iron or steel superstructure, roadway 36 feet wide, two 7 feet footpaths, and clear headway of 12 feet. A draw span to be provided in the centre of the bridge. The estimated cost of which would be about £140,000.

#### *Tramway to Balmain.*

Various schemes for connecting Balmain and the City by tramway have been under consideration, and may briefly be enumerated as follows:—

1. *Via* Market-street, Pymont, and Glebe Island Bridges direct.
2. *Via* Harris-street and Glebe Island Bridge.
3. *Via* the Glebe, extending present tramway from end of Glebe Point by a new bridge over Rozelle Bay to Darling-street.
4. *Via* Forest Lodge, extending existing tramway round *via* Annandale, heading Rozelle Bay up to Darling-street.

The first two projects were proposed on the cable system, and the latter two on the steam motor system.

Owing to the opening spans in the two bridges referred to we consider the cable system inapplicable, as to work No. 1 scheme from Market-street would necessitate the establishment of three different engine-stations, with driving power for the cables,—first on the Sydney side, second at Pymont, and third on Balmain side, with two breaks in the route, *viz.*, on the bridges, where it would be necessary to horse the cars over the opening spans. On the other hand the cable system may be the only one suitable for working a tramway safely on the Market-street gradient of 1 in 11; were it not for the opening spans we would have no hesitation in recommending this route as it would open up direct communication with the cable system proposed for the eastern suburbs, Woollabra, &c.

No. 2 scheme is open to the same objection as No. 1, though in a lesser degree, as it would require two separate engine-stations and one break.

Either of these routes, however, would probably be capable of being worked by electricity, and we are of the opinion that if the experiments now being conducted by the Railway Commissioners should prove that electricity can be successfully applied as a motive power that force should be made use of for the tramway to Balmain, in which case they would recommend the advisability of taking the tram to the foot of Market-street where it might be found necessary to have a transfer to change into the cars worked on the cable system up Market-street.

Should electricity not be found suitable, it will be necessary to consider the schemes Nos. 3 and 4.

No. 3 being the prolongation of the Glebe Point tramway by a new bridge across Rozelle Bay to the Abattoir road, thence along Western-street, or along Mullins and Beattie Streets to Darling-street. By casing the grade at some points along these routes a ruling gradient of 1 in 18 can be obtained, and steam traction could be adopted. The erection of a fixed bridge across Rozelle Bay would cut off valuable frontages, and considerable compensation will have to be paid to owners. The cost of works only by this route would be about £37,000, *via* Mullins-street.

No. 4 is the prolongation of the Forest Lodge tramway through Annandale, heading Rozelle Bay to the junction of Western and Darling Streets, Balmain. By some slight alteration of present road level in Weston-street this route can also be adapted to steam traction. The Annandale people as well as the Balmain residents would be benefited by this route. We estimate the cost at £13,000, one half of which might be debited to Annandale. We are of the opinion that unless electricity can be proved successful and suitable for the direct route from foot of Market-street, that route No. 4, *via* Forest Lodge and Annandale, is the best to adopt, and accordingly have no hesitation in recommending it.

A comparison of the distances by the various routes proposed is given below :—

From Market-street *via* George-street, Harris-street, Pymont, Glebe Island Bridge, Weston-street to Darling-street—3 miles 77½ chains.

From Market-street *via* Elizabeth-street, George-street (West), Glebe Point Road, Bridge over Rozelle Bay, Weston-street to Darling-street—4 miles.

From Market-street *via* Elizabeth-street, George-street (West), Forest Lodge, Annandale, Weston-street to Darling-street—4 miles 4 chains.

The direct distance from George-street, to the same point *via* Pymont and Glebe Island Bridges, is 2 miles 26 chains.

C. W. DARLEY, Chairman.  
ROBT. HICKSON.  
H. DEANE.  
J. ANGUS.

APPROXIMATE Estimates of Schemes mentioned in this Report :—

Bridge Darling Harbour, present site	...	...	...	...	...	...	...	...	£220,000
" Druitt-street	...	...	...	...	...	...	...	...	210,000
" Bathurst-street	...	...	...	...	...	...	...	...	180,000
" Liverpool-street	...	...	...	...	...	...	...	...	160,000
" at Glebe Island	...	...	...	...	...	...	...	...	140,000
Tramway <i>via</i> Forest Lodge	...	...	...	...	...	...	...	...	13,000
" " Glebe Point	...	...	...	...	...	...	...	...	37,000
Electric tram over bridges from foot of Market-street to Darling-street, <i>via</i> Weston-street	...	...	...	...	...	...	...	...	60,000

C. W. DARLEY, Chairman.  
ROBT. HICKSON.  
H. DEANE.  
J. ANGUS.  
G. GORDON, M. Inst., C.E.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

LOCOMOTIVE WORKS IN THE COLONY.

(CORRESPONDENCE RESPECTING ESTABLISHMENT OF.)

*Ordered by the Legislative Assembly to be printed, 1 May, 1890.*

No. 1.

The Chief Commissioner of Railways to The Minister for Railways.

Establishment of Locomotive Works in the Colony.

Sir,

14 May, 1889.

The Commissioners are anxious to see locomotive engines manufactured in the Colony; but the experiments which have been tried in the past have been very unsuccessful, and at this moment we are placed in a very awkward position in consequence of the loss of time during the last three years in ordering new engines, so as to endeavour to get fifty built in the Colony, as within the last week one of the firms which had a contract for twenty-five has notified its inability to go on with the work, and we shall experience great difficulty in carrying on the traffic until we can get engines built in England. There is no proper machinery in the Colony for manufacturing engines, and no persons skilled in the work; and we would suggest to the Government the wisdom of advertising in England and the Colonies simultaneously somewhat as under:—

The Government of New South Wales is anxious to see workshops for the construction of locomotives erected in the Colony, either in the vicinity of Sydney or Newcastle.

The works must be capable of turning out locomotives equal in character to the best English-built engines, and the managing director or manager, who must reside on the spot, must be an engine-builder of known repute. No restrictions will be placed upon the firm in regard to importing any parts of the engines, if such a course is found to be advantageous.

The price to be paid for the engines must be nearly approximate to the cost of the present imported engines when erected and ready for work in the Colony.

The Railway Commissioners will be prepared to place orders for at least seventy-five engines during the next five years with any firm starting works under the conditions above referred to.

The number of locomotives at present in use on the New South Wales Government Railways is 429. It will therefore be seen that ordinary renewals will call for a good number of engines to be built annually.

A considerable sum of money is about to be spent in building new passenger and goods rolling stock. Preference will be given to any firm prepared to begin operations at once.

In the London advertisements:—Communications are invited through the Agent-General, Sir Samuel Samuel, 5, Victoria Chambers, Westminster.

In the colonial advertisements:—To the Railway Commissioners.

The Commissioners will be glad if the Government will come to an early decision hereon.

I am, &c.,

E. M. G. EDDY,  
Chief Commissioner.

## No. 2.

A. Greenwood, Esq., to The Colonial Secretary.

Proposal for the establishment in New South Wales of Works for the entire manufacture of Locomotives, Carriages, and Waggons.

Dear Sir,

Albion Works, Leeds, 15 August, 1889.

In view of the rapid development of the railway system in the Australian Colonies, and the consequent growing demand for locomotives and rolling stock, we venture to lay before you the following proposal for the establishment in the Colony of New South Wales of works for the entire manufacture of locomotives, carriages, and waggons, on the system of duplicate parts, adopted by the best managed railways in this country, and equal in every respect to those manufactured by our leading makers.

We are prepared to form a private limited company, with a capital of £200,000, of which we propose to subscribe at once £100,000, in ten shares of £10,000 each, so that in fact the company will be a private partnership, and not brought out for stock exchange or speculative purposes.

One of the subscribers is one of the most able and distinguished mechanical railway engineers in this country, who has had great practical experience in designing and building locomotives and rolling stock. He is prepared, if a suitable arrangement can be made with your Government, to give up his present position, and to settle permanently in the Colony and take the management of the company's proposed works.

The works would be established on the latest and most improved principles, with the best and most powerful machine-tools and appliances. Their capacity would be for an annual output of—

50 locomotive engines,  
300 passenger carriages, and  
1,000 waggons.

It is proposed to establish these works within twelve months of a satisfactory arrangement being arrived at with your Government. To enable us to carry out the above programme, we venture, in the first instance, to approach your Government in the hopes that, not only to secure an ample and reliable source of supply for your own railway system, but to encourage a new and important industry in your Colony, you will give our proposal favourable consideration.

The conditions we would respectfully submit to your consideration, upon which we are prepared to carry out the scheme, are as follows:—

*First*—That the Government of New South Wales make us a free grant of land, of suitable area for the erection of our works, in direct communication with your railway system, at or near the town of Newcastle, and within reasonable distance of the harbour. We have selected this town from its central position in the Australian railway system, its harbour, and its being the centre of the Australian coal-field.

*Second*—That the Government of New South Wales give us a monopoly of the supply of locomotives and carriages for a period of ten years, on the condition of our being able to supply all your requirements at prices to be agreed upon, these prices to be based on those paid to first-class English builders, with a reasonable allowance for freight of material and the extra cost of labour in the Colony. In fact, all we ask is that we may stand upon the same footing as first-class English builders.

*Third*—That the Government of New South Wales agree to take annually a reasonable minimum number of engines, carriages, and waggons from the company.

*Fourth*—That the company, so long as they supply your requirements, are at liberty to build all descriptions of engines and of railway and tramway plant for other Colonies and companies.

We are prepared to give you any references you may require as to our financial ability to carry out this scheme, and we shall be glad to furnish any information to your Agent-General in London, the Colonial Office, or elsewhere. We are prepared to find all the capital ourselves here, but at the same time we have no wish to exclude colonial capital; indeed we should welcome two or three colonial gentlemen to join our company.

We are further prepared to send out at once, on hearing from you by cable, addressed "Greenwood, Leeds," a gentleman with full power and authority to discuss and settle the details of a contract with your Government.

Trusting that our proposal may receive favourable consideration at your hands,

We are, dear sir, your most obedient servants,

(For the proposed Colonial Locomotive and Waggon Company),

ARTHUR GREENWOOD,

Chairman of Greenwood and Batley (Limited).

P.S.—The writer is also Chairman of the Colonial Ammunition Co. (Limited), who have recently concluded a contract with the Victorian Government, through their Managing Director, Captain Whitney, for the establishment of a cartridge factory in Melbourne, and your Government has agreed to take cartridges from them. He hopes that the proposed locomotive company may be successfully carried out in your Colony, and that it may take its place prominently in the development of the industries and mineral resources of New South Wales.

The Secretary for Public Works.—H.P., 31/10/89. The Under Secretary for Public Works, B.C., 1/11/89.—C.W., Principal Under Secretary. B.C., Railways.—W.S., 4/11/89. The Under Secretary for Finance and Trade. Please see report to Minister herein.—H.McL., 7/11/89.

## No. 3.

## The Railway Commissioners to The Minister for Railways.

Proposal for Establishment in New South Wales of Works for the entire manufacture of Locomotives and Rolling Stock.

7 November, 1889.

WE have carefully considered this question, and we feel that if works for the construction of locomotives of the character described could be successfully carried on in the Colony, it would be a very material advantage to the Department, and would in all probability lead to the establishment, on a substantial basis, of a new industry of a most desirable character.

We could not advise the Government to agree to the proposal to give a monopoly for the supply of locomotives, carriages and waggons to the proposed company; but we consider it absolutely necessary that a guarantee of some kind should be given, and would advise an order being given for 100 locomotives to be supplied within a period of three years, if suitable terms could be arranged. As there are already several manufacturers of carriages and waggons in the Colony, the company should take its chance with those firms in securing orders for that class of stock.

The question of a free grant of land which is raised in the letter we feel that the Government will not require our advice upon.

We must without delay place orders for further supplies of locomotives, and it is therefore very necessary that a decision on this question should be arrived at as early as possible, as unless the new company be started and able to commence the manufacture of engines within twelve months we must place orders with the home makers; and, of course, to place a number of engines under order in this way would of necessity mean the reduction by a similar number of the total of 100 that we recommend should be guaranteed to the proposed company.

E. M. G. EDDY.  
W. M. FEHON.  
CHARLES OLIVER.

## No. 4.

Cablegram from The Minister for Railways, Sydney, to The Agent-General for New South Wales, London.

19 November, 1889.

GREENWOOD, Leeds, have submitted proposal for locomotive works this Colony. Decided will advertise for tenders here and in London. Particulars by post of 19th November.

## No. 5.

Cablegram from The Minister for Railways, Sydney, to Greenwood, Leeds, England.

19 November, 1889.

PROPOSED locomotive works. Public tenders to be invited Colony and England. Particulars sent Agent-General this mail.

## No. 6.

The Minister for Railways to Messrs. Greenwood & Batley, Albion Works, Leeds.

Gentlemen,

The Treasury, New South Wales, Sydney, 19 November, 1889.

In reply to the proposal, dated the 15th August, addressed to the Honorable Sir Henry Parkes, Colonial Secretary, I have the honor to inform you that the subject of the establishment of locomotive works in the Colony has been under the consideration of my Government, and it has been deemed desirable to call for proposals, both in the Colonies and at Home, for the establishment of works of the nature described by you, and I have pleasure in enclosing heroin, for your information, a copy of the draft advertisement which the Agent-General has been requested to arrange to appear in the English papers.

I have, &c.,

W. McMILLAN,  
Minister for Railways.

## No. 7.

The Minister for Railways to The Agent-General.

Sir,

The Treasury, New South Wales, Sydney, 19 November, 1889.

Referring to my cablegram of this date, I have the honor to inform you that a proposal has been received by the Government from Messrs. Greenwood & Batley, Limited, Albion Works, Leeds, to establish works in the Colony for the manufacture of locomotives and railway rolling stock. The Government is anxious to see first-class locomotive works established in the Colony, and have decided to invite public tenders, both in the Colony and in England, and with that view forward herewith draft advertisement for insertion in the English newspapers which will in your opinion be the most suitable.

I shall feel obliged by your sending forward the communications you receive on the subject as early as possible, in order that the Government may consider the same in conjunction with similar proposals which may be received in the Colony.

I have, &c.,

W. McMILLAN,  
Minister for Railways.

[Enclosure.]

(Advertisement inserted in Colonial papers).

Establishment of Locomotive Works in New South Wales.

THE Government of New South Wales are prepared to receive proposals for the establishment in the Colony of a first-class firm of locomotive builders, for which there exists a good opening—a large number of engines being required both for renewals and additions to the present stock of 431 locomotives.

The

The works must be fully equipped with the best modern machinery, and be capable of building locomotives equal in every respect to those made by the English makers. It is estimated that a capital of about £125,000 would be required.

The Managing Director or Manager must reside on the spot, and be a locomotive builder of known repute.

The firm may manufacture or repair any class of machinery or rolling stock, and, as regards Government contracts for this class of work, will be on the same footing as other builders in the Colonies.

The firm may, subject to any Customs duties which may be in force, import any parts, materials, or machinery for the manufacture of locomotives, which cannot be reasonably made in the Colony, such articles to be subject to the approval of the Railway Commissioners, and to be set forth in the proposal for establishing the works.

Proposals should be accompanied by satisfactory references as to financial standing, technical ability, and manufacturing experience.

Proposals should state the price per ton of engine and tender empty at which locomotives built in the Colony can be delivered complete in steam. If considered desirable, a sliding scale of prices may be named, based on the variations in the market prices of copper, spelter, best Yorkshire iron and steel boiler plates.

The Railway Commissioners are prepared to give any firm established under the above conditions an order for 100 locomotives, to be supplied within the next three years, provided the price quoted does not materially exceed the price of similar engines built by first-class firms in England and delivered in steam in Sydney.

The first engine must be delivered not later than 1st July, 1891.

Proposals will be received up to the 14th February, 1890.

Communications are invited through the Railway Commissioners, Sydney, New South Wales.

W. McMILLAN,

Minister for Railways.

NOTE.—Although well advertised in the colonial papers, no local offer was received.

### No. 8.

#### Sir Saul Samuel to The Minister for Railways.

Sir, 5, Westminster Chambers, Westminster, S.W., 14 February, 1890.

Referring to your letter of the 19th November last, No. R. 89-62, on the subject of the establishment in the Colony of a first-class locomotive works, I have the honor to enclose herewith copy of the advertisement which has been extensively circulated in the United Kingdom, inviting proposals for the establishment of the works in question; and I have now to report that only one tender, that of Messieurs D. Drummond, Arthur Greenwood, Henry Hudson, and J. E. Pepper (being "The Australasian Locomotive Engine Works, Limited"), has been received by me. I forward the same herewith, for your information.

I have, &c.,

SAUL SAMUEL.

The Secretary for Railways.—G.E.

The Treasury. B.C., 24/3/90.

[Enclosure.]

(Advertisement inserted in English papers).

Establishment of Locomotive Works in New South Wales.

THE Government of New South Wales are prepared to receive proposals for the establishment in the Colony of a first-class firm of locomotive builders, for which it is considered there exists a good opening—a large number of engines being required by the Government both for renewals and additions to the present stock of 431 locomotives. The works must be fully equipped with the best modern machinery, and be capable of building locomotives equal in every respect to those made by English makers. It is estimated that a capital of about £125,000 would be required. The Managing Director or Manager must reside on the spot, and be a locomotive builder of known repute. The firm may manufacture or repair any class of machinery or rolling stock, and, as regards Government contracts for this class of work, will be on the same footing as other builders in the Colonies. The firm may, subject to any Customs duties which may be in force, import any parts, materials, or machinery for the manufacture of locomotives which cannot be reasonably made in the Colony, such articles to be subject to the approval of the Railway Commissioners, and to be set forth in the proposal for establishing the works.

Proposals should be accompanied by satisfactory references as to financial standing, technical ability, and manufacturing experience. Proposals should state the price per ton of engine and tender empty at which locomotives built in the Colony can be delivered complete in steam. If considered desirable, a sliding scale of prices may be named, based on the variations in the market prices of copper, spelter, best Yorkshire iron, and steel boiler plates.

The Railway Commissioners are prepared to give any firm established under the above conditions an order for 100 locomotives, to be supplied within the next three years, provided the price quoted does not materially exceed the price of similar engines built by first-class firms in England and delivered in steam in Sydney. The first engine must be delivered not later than 1st July, 1891.

Proposals, accompanied by satisfactory references, should be sent on or before the 14th February, 1890, to the Agent-General for New South Wales, 9, Victoria-street, London, S.W.

6th January, 1890.

SAUL SAMUEL,  
Agent-General for New South Wales.

TENDER.

16, Great George-street, London, S.W., 13 February, 1890.

To the Honorable Sir Saul Samuel, K.C.M.G..

Agent-General of the Colony of New South Wales, London,—

Dear Sir Saul,

We, the undersigned, are prepared to establish a Locomotive Building Factory in New South Wales, in terms of your advertisement of 19th November, 1889, fully equipped with the best modern machinery, and capable of building locomotives equal in every respect to those made by the leading English makers.

The general conditions we would submit for your acceptance are as follows:—

That our company shall be placed on the same footing as other builders in the Colony as regards Government contracts, and be at liberty to manufacture or repair all descriptions of railway or tramway rolling-stock for other Colonies or companies.

That, after the satisfactory completion of the one hundred (100) engines now specified, a further order of one hundred (100) engines be guaranteed on the terms of and in conformity with your advertisement dated 19th November, 1889, namely,—a sliding scale of prices, based on the variations in the market price ruling to-day of copper, spelter, best Yorkshire iron and steel boiler plates, and subject to the fiscal duties existing at the present time. This stipulation we consider reasonable, as the company established by us will be permanently and purely a colonial factory, having no connection with any English or foreign company,—the present number of locomotives offered being, of itself, wholly inadequate to induce a first-class firm of builders to expend their capital and settle in the Colony unless further substantial orders be received to keep their works employed.

We

We consider, from careful inquiry and practical knowledge, that three types of engines will suffice to meet the whole of the working requirements on your system of railways. Of these, the first or main-line engines which we recommend, are designed for working either passenger or goods trains; each engine to have all its parts interchangeable, or duplicates of each other, and be of the most modern design, and the materials and workmanship equal to the highest class of English manufacture. The second class are designed for local passenger traffic. The third class for shunting and working short-distance goods and mineral traffic, and are of the same quality of material and workmanship as the main-line engines.

These engines are the well-known types built for the North British, the Caledonian, and the London, Brighton, and South Coast Railway Companies. They are specially designed to work over heavy gradients and sharp curves, and are provided with copper fire-boxes, brass tubes, and brass axle-boxes. Their working steam pressure is 170 lbs. per square inch.

We are prepared to supply your Government with one hundred (100) engines of this type, and deliver them in steam on your line within two years and six months from date of order, for the sum of sixty-five pounds (£65) per ton for main-line tender engines, and seventy pounds (£70) per ton for tank engines; payments to be made within one month of the delivery of each engine in working order.

We may remark that the manufacturing cost of these engines in England at the present time is £60 per ton, while the cost per train mile for working and repairs is considerably less than that of any other engine running in this country,

Future prices to be based on a sliding scale, according to the variations in the market, as may be from time to time arranged, on the basis of our present tender.

That the Government afford every facility for the purchase by the company of suitable land to the extent of 10 acres or thereby, belonging to the Government, in the immediate vicinity of their railways that we may select for the purposes of the company, and at a reasonable price.

Our Managing Director, who is a well known locomotive builder and engineer of acknowledged skill and repute, and Member of the Institute of Civil Engineers and of the Institute of Mechanical Engineers, will reside on the spot.

For our financial standing, technical ability, and manufacturing experience, we refer you to—

W. L. Jackson, Esq., M.P., Financial Secretary to the Treasury.

Messrs. William Williams, Brown, & Co., Bankers, Leeds.

The Yorkshire Banking Company (Limited), Leeds.

Messrs. Williams, Deacon, Thoroton, & Co., Bankers, London.

We annex a statement of the machinery and parts or materials of engines which require to be imported, presuming that none of the articles named therein can at present be made or procured in the Colony.

We are, Sir,

Your obedient servants,

D. DRUMMOND,

Managing Director.

ARTHUR GREENWOOD,

HENRY HUDSON,

J. E. PEPPER.

(The signatories being the partners in the proposed The Australasian Locomotive Engine Works, Limited).

STATEMENT of parts and materials of engines to be imported:—

Frame and boiler plates—in the rough.  
Copper fire-box plates—in the rough.  
Brass, iron, and steel tubes.  
Tyres—in the rough.  
Crank axles—in the rough.  
Cast-steel wheels—in the rough (wrought and cast iron wheels will be made in the Colonies.)  
Spring steel.

MACHINERY to be imported:—

3 steam engines.	1 cupola.
2 steam boilers.	1 hydraulic engine and accumulator.
3 power overhead cranes.	1 paint grinding mill.
3 wheel lathes.	1 engine adjusting weighing machine.
4 slotting machines.	1 10-ton weighing machine.
1 frame slotting machine.	1 nut tapping machine (6 spindles).
12 drilling machines.	1 nut making machine.
27 lathes.	1 plate planing machine.
4 shaping machines.	1 plate bending machine.
1 horizontal boring machine.	50 bench vices.
1 cylinder boring machine.	2 large forge furnaces.
3 screwing machines.	1 punching and shearing machine.
1 quartering machine.	1 oliver.
1 slot drilling machine.	3 large grinding machines.
1 saw bench.	1 American turret lathe.
1 wood planing machine.	Complete plant of hydraulic riveting machinery.
1 hydraulic forging and flanging press.	Complete set of emery grinding machinery.
4 hydraulic riveting machines.	Complete equipment of brass and iron moulding machinery.
1 bolt and rivet machine.	Complete equipment of machines for spring making.
1 Roots' blower.	Complete equipment of machinery for making wheels and axles.
5 steam hammers.	
15 smiths' hearths.	
15 anvils.	
4 iron and brass moulding machines.	
1 pug mill.	

All the machinery to be specially designed, and with all the most modern improvements.

## No. 9.

## The Railway Commissioners to The Minister for Railways.

Proposed establishment of Locomotive Works in New South Wales.

Office of the Railway Commissioners of New South Wales,  
Sydney, 27 March, 1890.

Sir,

We have carefully considered the enclosed proposal which has been made in response to the advertisements put out by the Agent-General on the subject, and consider that the offer is a most advantageous one—the advance upon the price of the engines made by English manufacturers being small as compared with the very material advantage that would be gained by the Department if the locomotives were constructed on the spot under the supervision of the officers of the Department, and the greatly accelerated delivery as compared with that we are now experiencing in obtaining engines from abroad. There are other and material advantages which will accrue to the Department by the establishment of such works which we need not now enumerate.

Attached hereto is a minute from the Locomotive Engineer, giving the prices at which engines have recently been built for the South Australian Government, delivered free on board in London and in steam in Adelaide, and also colonial prices for similar engines which were obtained after very keen competition. You will see that the figures of the "Australasian Locomotive Engine Works Company, Limited," are extremely favourable, looking at them in all ways.

We therefore strongly recommend the acceptance of the offer, and would be glad if the Minister will say if we may proceed with the matter under the powers given to us in clause 47 of the Government Railways Act, 1888.

We have, &amp;c.,

E. M. G. EDDY, Chief Commissioner.

W. M. FEHON, Commissioner.

CHARLES OLIVER, Commissioner.

## No. 10.

## Memo. to The Railway Commissioners by Mr. Thow, Locomotive Engineer, New South Wales Government Railways, late Locomotive Engineer, South Australian Railways.

Locomotive Works.

CONSIDERING the several attempts made—without success—to establish the manufacture of locomotives in this Colony, as evidence of a desire to establish that industry here, I regard the offer of the Australasian Locomotive Engine Works Co. (Limited) as most favourable for that purpose. There cannot be a doubt entertained as to the convenience of having a well-equipped and well-managed locomotive factory in Sydney, assuming, of course, that the work would be executed at a fair advance on English prices. The prices asked by this new company are most reasonable. For purposes of comparison I give below the cost per ton of 5-3-gauge locomotives of the best types, but of ordinary simple designs, delivered by Messrs. Beyer, Peacock, & Co., and Messrs. Dübs & Co., to the South Australian Railways during the last five years; and in addition I give the prices obtained, after keen competition, by a colonial maker for fifty-two engines, exact duplicates in all respects of the English imported engines alluded to.

I consider the suggestion that a second order should be given for 100 engines, at corresponding or relative prices, a reasonable one, which may be safely entertained, because the probable increase of traffic and extension of lines in two and a half years will render that amount of increase in our locomotive stock desirable.

Suburban tank-engine, packed f.o.b., London ... ..	£77	per ton.
The same engine delivered in steam, Adelaide...	88	"
The same engine, colonial made, delivered in steam ... ..	115.28	"
Express passenger (inside cylinder) tender engine, packed f.o.b.,		
London ... ..	60.25	"
The same, delivered in steam, Adelaide...	69.9	"
The same, colonial made, and delivered in steam ... ..	90.37	"
Heavy slow passenger and goods (outside cylinder) tender engine,		
packed f.o.b., Glasgow ... ..	55.46	"
The same, delivered in steam, Adelaide...	63.86	"
The same, colonial made, and delivered in steam ... ..	82.9	"

Notwithstanding the seemingly high colonial rates, I do not believe any profit will be made.

26/3/90.

W. THOW.

## No. 11.

## Memo. to The Railway Commissioners by Mr. Neale, Mechanical Engineer.

Proposals—Colonial Locomotive Company.

Mechanical Engineer's Office, 44, Phillip-street, Sydney, 27 March, 1890.

I HAVE carefully examined the figures, &c., in the proposals to build locomotives in the Colony, and consider the terms fair and advantageous to the Colony.

As a locomotive engineer, Mr. Drummond's reputation for ability and energy stands very high, and he has achieved great success in rebuilding the rolling stock and repair shops of two great railways. He believes in using the best materials and workmanship in the first instance, and has proved that this pays in the consequent diminished repairs. Mr. Drummond's well-known determination to always have good work should ensure our colonial-built engines being built up to the mark.

Messrs.

Messrs. Greenwood & Pepper are also well known men, connected for many years with first-rate firms, engaged respectively in making all kinds of machinery which has been most successful in accomplishing difficult work, and in the manufacture of the best quality of iron made in Great Britain, known as "Best Yorkshire."

The suggestion of making only three classes of engines is, I think, a sound one under our circumstances. The same engine that takes a passenger train could then, if necessary, return with a goods without waiting for a passenger train, while the present four coupled Dübs express (of which we have forty-seven) could work light passenger trains or run on the easier parts of the line where the proposed main-line engines would be unnecessarily powerful. We do, however, undoubtedly badly want more powerful engines for the heavy parts of the line, and, as showing that one class of engine would do for both goods and passenger traffic, I give the following figures for the desirable standard trains on gradients of 1 in 40:—

PASSENGER TRAINS.		GOODS TRAINS.	
	tons.		tons.
2 Sleepers ... ..	50	25 Waggons at 8 tons (loaded) ...	200
1 Car 1st (lavatory) ... ..	23	1 B. van, Bogie ... ..	16
1 Car compo. (lavatory) ..	23	Engine and Tender ... ..	80
1 2nd ... ..	23		—
1 B.V. (lavatory) ... ..	21		296
	—		
6 Vehicles (loaded) weighing ...	140		
Engine and Tender ... ..	80		
	—		
Total ... ..	220		

The difference in weight, 76 tons, would be offset by the higher speed required with the passenger train.

I estimate that an engine as proposed by Mr. Drummond, with six coupled wheels, 170 lbs. boiler pressure, and a pony truck in front, would do this work if made with 42 tons adhesion weight, or 14 tons on each driving axle. The total weight of the engine would be about 50 tons, and the tender loaded 30 tons. The weights empty would be about 46 and 14½ tons respectively.

Engines of similar weights and dimensions are coming into favour on the Canadian Pacific Michigan Central, Erie, Chicago, Burlington, & Quincy, and other lines in the U.S.A. for passenger traffic

According to the terms of the offer, I estimate the cost of the different proposed classes as follows:—

	Weight loaded, E. only.	Weight, E. and T. empty.	Price per ton.	Cost, each.
	tons.	tons.	£	£
Main-line Engine.....	50	60½	65	3,933
Shunting Tank—Mineral .....	56	45	70	3,150
Suburban Tank .....	45	34	70	2,380

These prices, as regards the heavier engines, appear high, but the engines are far heavier and more powerful than any we now have, and would also be more durable.

Our best available engines haul a load of only 18 trucks up 1—40, which is practically the ruling grade on the most important parts of our main lines. The proposed engine would, I estimate, haul easily 25 loaded wagons. This would not only mean an increase of nearly 40 per cent. in the load for 37½ per cent. increase in the first cost of the engine, but would give a greater increase in the earnings without any appreciable increase in the cost of working, as shown by the following figures of the estimated annual earnings and expenses of a main line engine, on the basis of 25,000 train miles per annum.

PRESENT ENGINES.		PROPOSED ENGINE.	
Earnings—	£	Earnings—	£
Load of 18 wagons = ... ..	8,750	Load of 25 wagons = ... ..	12,150
<i>Expenses—</i>		<i>Expenses—</i>	
Running and repairs ...	£1,100	Running and repairs ...	£1,100
Interest on cost of engine, 4 per cent. on £2,850...	114	Interest on cost of engine, 4 per cent. on £3,933...	157
Interest on proportion of cost of workshops and machinery ... ..	40	Interest on proportion of cost of workshops and machinery ... ..	40
Total expenses ... ..	1,254	Total expenses ... ..	1,297
Net earnings per annum ...	£7,496	Net earnings per annum ...	£10,853

While the extra charge for interest on the first cost of the more powerful engine is £13 per annum, the net earnings are over £3,300 per annum greater, figures that explain the great benefits obtained elsewhere from the use of more powerful engines, and fully justify the greater cost of the proposed main line engines.

Such engines would have the flexible wheel base, great tractive power, and consequent profitable earning capacity, which are the strong points of modern American engines, united with the economical consumption of fuel, careful design, and excellent materials and workmanship, which render English locomotives so durable, trustworthy, and economical.

The

The following table shows the cost of the most recent examples of various types of our existing engines, the actual price as paid to the various English makers being compared with the cost on the proposed scale. All American type engines have been excluded, because the extensive use of cast in place of wrought iron increases the weight and diminishes the cost and renders impossible any comparison on a price-per-ton basis. It is believed that the following is a fair comparison:—

Maker.	Class of engine.	Weight— L. & T. empty.	Cost— proposed scale	Actual price paid.	Date price quoted.
		tons cwt.	£	£	
Dubs .....	Express passenger.....	50 6	3,270	2,877	January, 1885.
Beyer .....	Goods (Mogul) .....	52 0	3,383	2,866	Latter part 1884.
" .....	" .....	52 0	3,383	2,860	August, 1889.
" .....	Suburban tank (351) .....	31 17	2,230	2,240	1885.
Vulcan .....	Shunting tank (285) .....	28 2	1,967	2,290	Latter part 1883.
	Average .....		2,847	2,627	
Beyer .....	Shunting Mineral tank .....	Weight not accurately known		2,780	August, 1889.

The proposed scale of prices is thus about 8·3 per cent. above the prices paid hitherto.

The difference in cost must be considered against the great delay in obtaining engines from England. Ten passenger engines were indented for October, 1888, but only five of these engines had arrived up to March, 1890. Thus five engines had been obtained in seventeen months after order, whereas the proposal offers 100 engines within thirty months after order.

Another batch of twenty-five goods engines were indented for in June, 1889, but, though urgently wanted, little progress had been made up to the following February, the English makers being full of orders.

D. H. NEALE,  
Mechanical Engineer.

### No. 12.

#### Minute from The Under Secretary for Finance and Trade to The Secretary for Railways.

The Secretary for Railways, with copies enclosed of telegrams which have been passed upon the subject.  
G.E., B.C., 28/3/90.

#### [Enclosures.]

Cablegram from the Hon. Wm. McMillan, Sydney, to the Agent-General for New South Wales, London.  
28 March, 1890.

LOCOMOTIVE works. Proposal accepted. Railway Commissioners anxious for plans of suggested engines, &c. Send first mail if possible. Also enter into interim agreement, leaving final and detailed agreement to be made here.

Cablegram from The Agent-General for New South Wales, London, to The Colonial Treasurer,  
New South Wales.

LOCOMOTIVE Works. Interim agreement arranged. Plans of locomotives posted to-day.  
London, 11 April, 1890.

### No. 13.

#### Prices per ton paid for Locomotives made in the Colonies.

	Victoria.	South Australia.	Queensland.	New South Wales. (Proposed Prices.)
Tender engines...	£72 3s. 7d.	£82 1s. to £90 7s. 5d.	£67 to £79 7s. 3d.	£65
Tank engines ...	£91 18s. 9d.	£115 5s. 7d.	None being built.	£70

H.M.L., 15/4/90.

1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## PULLMAN CARS.

(CORRESPONDENCE RELATING TO USE OF, ON NEW SOUTH WALES LINES.)

*Ordered by the Legislative Assembly to be printed, 3 July, 1890.*

RETURN to an *Order* of the Legislative Assembly, That there be laid upon the Table of this House,—

“All correspondence, minutes, documents, and writings in anywise relating to the proposed use on our lines of the Pullman cars.”

*(Mr. Crick.)*

## Memo. by The Secretary for Railways.

*Re* proposed use of Pullman cars in New South Wales.

WITH regard to the preliminary negotiations in this matter, it may be stated that, seeing it announced in the newspapers that Mr. William Pullman, of the firm of Pullman & Co., the well-known carriage-builders of America, had arrived in Melbourne, with the view of introducing the Pullman cars into Australia, the Railway Commissioners placed themselves in communication with Mr. Griffin, the United States Consul, with the desire of having an interview with Mr. Pullman so soon as he arrived in Sydney.

Mr. Pullman soon after arrived in Sydney, and was duly introduced, through Mr. Griffin, to the Commissioners. Several personal interviews took place, Mr. Pullman representing that he had power to negotiate on behalf of the Pullman Company for the introduction of the Pullman cars to the Australian railways, and at an interview on the 6th January, 1890, the heads of an agreement were drawn up, and, after subsequent meetings, the arrangements stood as shown in paper. Before the agreement was formally prepared it was necessary for Mr. Pullman to produce his authority from the Pullman Car Company to sign such an undertaking on their behalf, but, as some little time elapsed without Mr. Pullman again meeting the Commissioners, a cable was sent to the Pullman Company, with the result as shown in papers following.

H.M.L.

Office of the Railway Commissioners of New South Wales, Sydney, 6 January, 1890.

Notes of interview relative to introduction of Pullman Vestibule Trains into New South Wales.

*Present:—*

The Railway Commissioners. | Mr. William Pullman.

1. The general proposal of the Pullman Company to introduce their system of dining-car and vestibule train into New South Wales was discussed. The proposal of the Pullman Company to divide the railway traffic was considered, but it did not commend itself to the Commissioners, and, as an alternative, it was proposed to make a mileage allowance for the use of the carriages, as is the custom between railway companies generally, and to allow an extra fare to be charged for the additional comfort secured by these cars. It was ultimately proposed that 3d. per train mile should be allowed for the use of the carriages for a period of ten years, and after that 2d. per mile; and, in order to increase the traffic, the extra fare for the use of the vestibule cars, including sleeping-berths, to be limited to 8s. per passenger.

2. It was further stipulated that, in the event of better terms being made by any of the other Colonies for the running of the vestibule cars, the New South Wales Railway Commissioners shall have power to vary this agreement so as to make it as favourable to the New South Wales Government as that granted to such other Colonies. Further, that the Members of both Houses of Parliament, and such other holders of free passes as the Commissioners may decide, to be allowed to use the vestibule train free of extra charge except for refreshments.

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[882 copies—Approximate Cost of Printing (labour and material), £4 10s. 0d.]

3. The rates to be charged to passengers for refreshments to be subject to the approval of the Commissioners, and everything provided to be of the best character. The servants employed to be subject to the approval of the Commissioners.

4. Mr. Pullman to arrange that every comfort now given in the vehicles running on the lines of the United States shall be provided in the carriages sent to New South Wales, and that the total weight of the cars shall not exceed 20 tons, and the cars shall not exceed 60 feet in length. Should any cars become damaged through defective road or carelessness on the part of any servant of the Railway Commissioners, such damage to be made good by the Railway Commissioners.

5. Shelter-sheds to be provided by the Railway Commissioners at the respective termini.

6. It is proposed that the cars shall accommodate forty-six passengers for refreshments, each car to be capable of sleeping thirty-two passengers; three trains to be provided to make up the express service between Sydney and Albury (the present service being a train daily from Albury and Sydney, with the exception of Sunday and Saturday). The Pullman Company to supply three spare carriages (one dining-car and two drawing-room cars). The service to commence by 1st October, 1890. The extension of the system to the section between Sydney and Wallangarra to be the subject of further negotiations.

7. The allowance made to the Pullman Company shall cover all expenses in connection with the staff, &c., required for attendance upon the passengers in every form, and shall include the upkeep, washing, &c., of the rolling stock, and the keeping of it in first-class condition, and shall include the lighting of cars by the electric light. The Commissioners shall arrange to make the necessary examination of the train, and provide for the necessary oiling.

8. Should the public object to double sleeping-berths, Mr. Pullman undertook to withdraw the double berths, and substitute single ones.

9. Should wayside passengers travel in the Pullman cars, and not require sleeping-berths, an extra charge to be made of 2s. for the first 100 miles or part thereof, and 1s. for each 50 or part of 50 miles beyond that distance.

10. The Railway Commissioners shall have the right at any time during the currency of this agreement to purchase the cars at a price based on £6,000 for each dining-car and £4,000 for each drawing-room car, proper allowance being made for wear and tear; and should the Railway Commissioners and the Pullman Company not be able to agree as to the amount to be paid, the same to be determined by arbitration in the usual manner; and should the cars be purchased by the Commissioners, the name of Pullman to be removed.

11. It was agreed that the Commissioners shall bear half the cost of freight and insurance of the cars from San Francisco to Sydney.

Office of the Railway Commissioners of New South Wales, Sydney, 18 January, 1890.

Notes of interview relative to the introduction of the Pullman Vestibule Trains into New South Wales.

*Present* :—

Mr. Commissioner Fehon.

Mr. William Pullman.

In the absence of the Chief Commissioner, Mr. Pullman saw Mr. Fehon, who read to him the heads of agreement, as talked over previously by Mr. Pullman and all the Commissioners.

Mr. Pullman objected to the Commissioners taking power to purchase the cars during the currency of agreement at £6,000 per dining-car and £4,000 per drawing-room car, and stated he would require £2,000 per car as profit on above figures, which he stated was the actual cost.

At a subsequent interview, after a cablegram had been received from the Chief Commissioner, declining to pay £2,000 per car profit, Mr. Pullman agreed to reduce his proposition to £1,000 per car.

Cablegram from the Chief Commissioner, Ashburton, New Zealand, to W. M. Fehon, Sydney.

20 January, 1890.

PULLMAN. Our terms generally are liberal. Think suggested figures for taking cars over too high. Would have no objection to £1,000 being added to price.

Office of the Railway Commissioners of New South Wales, Sydney, 30 January, 1890.

Notes of further interviews relative to the introduction of Pullman Vestibule Trains into New South Wales.

*Present* :—

The Railway Commissioners

Mr. William Pullman.

12. With regard to clause 8 of the memorandum of interview on the 6th January, it was agreed that single sleeping-berths only should be provided from the commencement of the arrangement, and that provision should also be made for ladies, separate from the general passengers.

13. With reference to clause 10 of the memorandum of interview of 6th January, and Mr. Pullman's subsequent communication with the Railway Commissioners, it was ultimately agreed that the Railway Commissioners shall have the right at any time during the currency of this agreement, on giving three months' notice, to purchase the cars at the cost price, less depreciation, and should the Railway Commissioners and the Pullman Company fail to arrive at a mutual understanding as to the sum to be paid the matter shall be settled by arbitration in the usual manner. Should, however, the plant be purchased within five years of the date of the arrangement coming into force, it was agreed that a sum not exceeding £1,000 shall be added to the original value of each car, so as to indemnify the Pullman Company for the exceptional expenses which will be incurred in establishing and perfecting the new service.

If the arrangement is terminated after the Pullman Company have been running for a period of five years or more the actual first cost of the vehicles only, less depreciation, to be considered in agreeing upon the sum to be paid for the purchase of the cars.

14. If the cars are purchased at any time by the Railway Commissioners the name of the Pullman Company to be removed therefrom.

15. The Railway Commissioners intimated that their existing arrangements with the refreshment-room contractors would not terminate until the end of the present year, and should there be any difficulty in making arrangements with these contractors regarding the required alteration in the present system of providing refreshments in connection with the express trains the dining arrangement could not be brought into operation until the 1st January, 1891.

16. The Railway Commissioners undertook to use their best influence to obtain the necessary authority for the sale of liquors in the dining-cars *en route*.

17. The Railway Commissioners also intimated that should a uniform gauge be arranged between the various Colonies, and the cars are enabled to run through to Victoria, the rate to be agreed to be paid per mile would have to be reconsidered.

18. It was understood that the Westinghouse brake would have to be fitted to all the wheels of the cars, and that the leverage must be arranged according to the standard adopted by the Master Car-builders' Association; also that the wheels and axles must be in accordance with the New South Wales Government Railways specifications, and all details such as buffers, &c., to be agreed with the Locomotive Engineer of the New South Wales Government Railways.

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J. Nobbs, Esq., M.P., to The Commissioners for Railways.

Gentlemen,

Granville, 24 January, 1890.

I beg most respectfully to lay before you a few facts in connection with a matter of the utmost importance to my electorate and other portions of the Colony in which industries are established similar to those which are the mainstay of portions of Central Cumberland.

It is currently reported that you are negotiating on behalf of the Government with Mr. Pullman, of the Pullman Car Company, of America, for the running by that company on the railway-lines of this Colony of saloon, dining, and sleeping cars, and that certain concessions are asked by Mr. Pullman which, in my humble opinion, are such as would, if granted, have an effect which could not but be extremely prejudicial to some of our already-established industries.

If I am correctly informed, Mr. Pullman is to be free to supply the rolling stock ready-made from his American works, and retain the right to charge for certain accommodation, and to the exclusive sale of refreshments *en route*. If the first be correct, permit me to say that to obtain ready-made carriages would be to strike a heavy blow at firms like that of Hudson Brothers (Limited), who are certainly able to turn out carriages fit to run on any line, and have expended a vast amount of capital in bringing their works to such perfection as enables them to do it. I merely mention them as a typical firm, and one in my own electorate. There are doubtless many other firms which, if competition were opened, would endeavour to secure the work, and would be able to supply all that is necessary. They will undoubtedly feel that they have been slighted and put to a disadvantage, as compared with a foreign competitor, by not being invited to compete for the work.

You will pardon my laying stress on the fact that at the works mentioned, and others at Granville, Auburn, and other places, many hundred men are employed, and any serious blow at such important industries would have the effect of throwing a large number of industrious citizens out of work.

Feeling sure that you are actuated only by a desire to secure the greatest benefit possible to the department, and through it to the Colony, I am assured that you will pardon my protesting respectfully, but strongly, in the name of a large number of my constituents, against the proposed arrangement, until, at all events, it has been conclusively proved that the manufacturers of New South Wales are unable or unwilling to similarly supply the rolling stock required, and on terms equally advantageous to the Colony, which is already indebted to your exertions for so many much-needed reforms.

I am, &c.,

JOHN NOBBS.

---

The Chairman, Hudson Brothers (Limited), to The Chairman, Railway Commissioners.

Dear Sir,

2, O'Connell-street, Sydney, 27 January, 1890.

We notice in this morning's papers paragraphs referring to certain letters which Mr. Nobbs, M.P., has addressed to the Railway Commissioners and the Minister for Works, protesting, on behalf of the alleged manufacturers, against the importation of the Pullman cars. We beg to say that, so far as this company is concerned, we know nothing of the matter, and must strongly object to be made a political stalking-horse for anyone.

We quite recognize the fact that the Messrs. Pullman, by their genius, have invented cars which give the height of comfort in railway travelling, and it is our desire to assist in the adoption of the latest and most improved facilities for travelling, rather than to protest against the introduction of improvements, and we shall be glad to assist Mr. Pullman all we can to make his scheme a success.

I may, perhaps, add, with regard to the introduction of improvements, that when in America some time ago I obtained particulars of a dining-car, and on my return impressed upon the Railway authorities the desirability of doing something to popularize railway travelling by the introduction of such cars, and at my risk built the dining-car which now belongs to the department.

We should feel very much pained if the Commissioners should think we had anything to do with any apparent reflection upon their splendid efforts to improve our railway travelling. We are too well impressed with the courtesy which has been extended to us by the Railway Commissioners, and beg to assure them that our best efforts are at their disposal.

I have, &c.,

ROBERT HUDSON,  
Chairman, Hudson Brothers (Limited), Sydney.

The Secretary for Railways to J. Nobbs, Esq., M.P.

Sir,

Railway Commissioners' Office, Sydney, 7 February, 1890.

I am directed to state that the Commissioners are desirous of having, as far as possible, all rolling stock made in the Colony, and if it is determined to obtain any special stock from outside the Colony it will be for the reason that, owing to the making of certain vehicles being covered by patent rights, they will have to be obtained abroad.

I may add, the local builders are now practically full of orders, and, as a matter of fact, the Commissioners would be much pleased if the orders in hand could be turned out at a much faster rate than is now the case, so that tenders for further supplies of carriages could be called.

I have, &c.,

HUGH McLACHLAN,

Secretary.

J. Nobbs, Esq., M.P., to The Commissioners for Railways.

Gentlemen,

Granville, 26 February, 1890.

I am in receipt of yours of 7th instant, in answer to my former representations to you on the undesirability of arrangements being made with Mr. Pullman of an exclusive kind.

I am pleased to note that it is the intention of the Commissioners to obtain, if possible, all rolling stock in the Colony, and not to go outside the Colony unless the article is protected by patent rights within it; and, as I am informed by a competent authority that a careful search in the Patents Office shows no record of any patent as being granted to the Pullman Car Company, I presume the intention to introduce American cars will be abandoned, and that they will be manufactured in the Colony.

I am glad to hear that the Commissioners are in receipt of information to the effect that some local carriage-builders are full of orders, but regret that my inquiries do not tend to prove that this is at all general, at all events with the larger firms.

I am, &c.,

JOHN NOBBS.

Cable Message sent 6th March, 1890, from Eddy, Chief Commissioner, to George Pullman, Pullman City.

Negotiations with William Pullman. Are you preparing agreement?

Cable Message received 6th March, 1890, from George Pullman, Pullman City, to Eddy, Sydney.

Party unknown.

The Secretary, Pullman Palace Car Company, to Mr. Chief Commissioner Eddy.

Dear Sir,

Chicago, 6 March, 1890.

Your cable message was duly received this day, as follows:—

“To George Pullman, Pullman City. Negotiations with William Pullman. Are you preparing agreement.”

“Eddy, Chief Commissioner.”

This company has no foreign representative; except in London (England). Mr. Pullman does not know the party “William Pullman” referred to, and therefore directed me to briefly cable you, which has been done, and same is hereby confirmed.

“Eddy, Sydney. Party unknown.”

We were called upon to pay the cable charges, \$13.20, which amount I will thank you to send me by early mail.

Very respectfully,

A. S. WEINSHEIMER,

Secretary.

The Chief Commissioner of Railways to G. Pullman, Esq., President of The Pullman Palace Car Company, Chicago, Ill., U.S.A.

Sir,

Railway Commissioners' Office, Sydney, 18 March, 1890.

I beg to confirm my cable of 6th instant, “Negotiations with Pullman. Are you preparing agreement,” and have to thank you for your prompt reply. I may say in explanation of cable that a Mr. William Pullman (see card enclosed) came here with a recommendation from the United States Consul and represented he was acting on behalf of your firm to endeavour to introduce your palace sleeping and dining cars into this Colony, and negotiations were opened up for the supply of Pullman cars for the express train service between Sydney and Albury (for Melbourne). The agreement only wanted a final meeting to confirm, but as six weeks elapsed without hearing from him we thought it wise to cable you.

We are disposed to introduce your cars into this Colony, and shall be obliged if you will say on what terms you are prepared to supply eight sleeping-cars. The standard width and dimensions of the vehicles we would require are shown on the accompanying statement and drawing. The cars would probably be sent out in parts, and they could be put together in the railway workshops.

The sleeping-carriages we now have accommodate twenty passengers each, and it is necessary that separate berths should be provided for each sleeper.

Our

Our circumstances are as follows:—

We have a large sleeping-car traffic between Sydney and Melbourne, the cars running from Sydney to Albury (386 miles), where there is a break of gauge. The gradients are heavy throughout, grades of 130 feet per mile being frequent, while there are several miles of 176 feet per mile. Our sharpest curve is 528 feet radius, or nearly 11 degrees. At present we are running the 386 miles in 12 hours 35 minutes, including one stoppage of 25 minutes for supper, and two stoppages of 10 minutes each and two of 5 minutes each. Deducting all stoppages, the actual time in motion is about 11½ hours, and the average speed 33½ miles per hour, making no allowance for slackening speed at crossing-places on single line. Only a few miles are double track. Our present train consists of two second-class passenger day cars, a baggage and mail car, and two sleepers, the whole weight of the train, exclusive of engine, being about 200,000 lb. The present sleepers weigh empty 39,900 lb., and accommodate twenty passengers each. You will see from this that our present rolling stock is very light on account of our heavy grades.

This weight cannot be materially increased without greatly increasing the cost of running the trains, and, while we wish the accommodation improved, the question of speed is very material, and a reduction in time of one hour or more would be of great importance.

If you can provide a sleeping-car for twenty-eight passengers only weighing 56,000 lb. the weight per passenger will not be increased.

The accompanying brief specification will give you particulars of our requirements on points of detail, but we would also like a proposition from you for cars of the "Mann" type, which are now running with very satisfactory results in other parts of Australia. As you can readily understand, the "Mann" system of compartments is more congenial to English tastes (or prejudices) than the open American car. The Railway Commissioners of New South Wales are therefore prepared to entertain offers from the Pullman Car Company as follows:—

1. To provide eight Pullman sleeping-cars fitted with connecting passages, the arrangement for attaching and dividing the connecting gangway being of simple construction. The use of shops, and machinery, cranes, &c., for putting the cars together, being given free in the Commissioners' shops in Sydney; wheels and axles to be supplied by the Commissioners, but all other expenses being defrayed by the Pullman Company.
2. To build and equip in the United States and erect in Sydney eight similar cars on the "Mann" principle (these cars to be in lieu of those referred to in paragraph 1). A fold-up basin for washing to be provided in each compartment.

Should the offer of the Pullman Palace Company prove moderate and acceptable, the Commissioners may later on require additional vehicles for other services.

Payment will be made—75 per cent. on bill of lading being lodged with a San Francisco bank to be named by the Commissioners, and 25 per cent. one month after the cars have commenced running in New South Wales.

The insurance against sea risk to be dealt with by the Pullman Company.

If the cars, or any of them, could be placed on the line by October next it would be a great advantage, as a large traffic is conveyed to Melbourne for the races at the end of that month.

For the purpose of expediting the matter, I submit the following code for cabling:—

<i>Phrase</i>	<i>Code.</i>
We can supply eight "Mann" cars landed in Sydney and erected ready for running.	"Minutaglia"—pounds.
We can supply eight Pullman sleeping-cars landed in Sydney and erected ready for running.	"Miratrix"—pounds.
The weight of "Mann" cars will be tons of 2,240 lb.	"Mirrastes"—tons.
The weight of Pullman sleeping-cars will be tons of 2,240 lb.	"Mirtidane"—tons.
We will deliver vehicles in Sydney month of	"Misaltate"—month.
The number of berths in "Mann" car will be	"Miscadere"—number.
The number of berths in Pullman car will be	"Miscidate"—number.
We will accept your terms for Pullman cars.	"Miserodence."
We will accept your terms for "Mann" cars.	"Misericers."

Should you find occasion to add anything further you might make use of the A.B.C. code. I may say that "Eddy," Sydney, will be my cable address.

I have, &c.,  
E. M. G. EDDY,  
Chief Commissioner.

Cablegram from Pullman, Chicago, to Eddy, Sydney.

Time, 10:30 p.m.; 24 April, 1890.

Impossible to deliver this year.

Cable sent 28th April, 1890, from Eddy, Sydney, to Pullman, Chicago.

Cable prices—state earliest date delivery.

Cable Message received April 28th, 1890, from Chicago, to Eddy, Sydney.

Have written.

The President, Pullman Palace Car Company, to The Chief Commissioner for Railways.

Dear Sir, Pullman Palace Car Company, Office of the President, Chicago, 26 April, 1890.

I duly received your letter of March 19th, confirming your cable message of March 6th, and transmitting blue prints and specifications for eight Pullman sleeping-cars, and requesting terms upon which this company would be prepared to furnish the same.

The first intimation we had that anyone claiming to represent this company was in negotiation with your Commissioners in regard to the building by the Pullman Company of sleeping-cars, for service in New South Wales, came to us in associated press despatches. This was confirmed by your cable message of March 6th. As you know, we promptly replied to your despatch, and advised you that the person so claiming to act for this company was unknown to us.

I regret very much that your Commissioners were so imposed upon by one who had absolutely no authority to make any dealings on our behalf, and of whom this company had no knowledge whatever.

I have caused careful examination to be made of the blue prints and specifications submitted with your letter; and, as requested, have sent you a cable response to your communication, stating that it was impossible for us to make delivery of the cars referred to this year. Our works are now running to their fullest capacity, and the condition of orders now being filled, and of others under which delivery must be made during 1890, makes it impracticable for us to undertake to meet any further requirements of the character specified in your letter during this year.

If your Commission desire to adopt the Pullman system of sleeping-cars next year, it would be advisable for you to send to us an engineer, in order that he may become acquainted with the Pullman system of vestibule trains. His familiarity with your requirements, in conjunction with the practical knowledge of our people engaged in the operation of such trains, would, no doubt, result in simplicity and perfection of general plan, and ready adjustment of details.

We shall be glad to extend our field of usefulness into your country, and to confer fully and freely with your representative, when you may be pleased to send one to us.

Yours, &c.,  
G. M. PULLMAN,  
President.

1890.

## LEGISLATIVE ASSEMBLY.

## NEW SOUTH WALES.

## RAILWAY FROM BYROCK TO BREWARRINA.

(CORRESPONDENCE IN CONNECTION WITH PROPOSED.)

*Ordered by the Legislative Assembly to be printed, 6 May, 1890.*

RETURN to an *Order* of the Legislative Assembly of New South Wales, dated 8th May, 1889, That there be laid upon the Table of this House,—

“Copies of all papers, &c., in connection with the proposed Railway from “Byrock to Brewarrina.”

(Mr. Willis.)

## SCHEDULE.

NO.	PAGE.
1. R. Barton, Esq., M.P., forwarding petition from residents of Brewarrina, urging construction of railway from the Great Western Railway to Brewarrina. 7 September, 1881 .....	2
2. Engineer-in-Chief for Railways to R. Barton, Esq., M.P. Instructions have been issued to make survey from Great Western Railway to Brewarrina. 12 November, 1881.....	2
3. R. Barton, Esq., M.P., to the Honorable the Minister for Works, that survey from Western line to Brewarrina, via Gongolgan, be proceeded with at once. 3 April, 1882 .....	2
4. Engineer-in-Chief for Railways to R. Barton, Esq., M.P. Instructions have been issued to make survey. 25 April, 1882 .....	3
5. Petition from residents of Brewarrina, urging construction of railway from Byrock to Brewarrina. March, 1883 .....	3
6. Report of deputation which waited on Minister for Public Works, respecting railway from Brewarrina to Bourke. 21 December, 1883 .....	3
7. Report of a deputation which waited on Minister for Public Works, respecting construction of a railway Byrock to Brewarrina; also, petition from residents setting forth advantages of line. 2 April, 1885.....	4
8. R. R. Macphatie, Esq., M.P., to Minister for Public Works. Telegram <i>re</i> meeting deputation on 28th August. 18 August, 1885 .....	4
9. Minister for Public Works. Report of deputation which waited upon him <i>re</i> Byrock-Brewarrina line. 28 August, 1885 .....	4
10. W. Sawers, Esq., M.P., to the Honorable the Minister for Works, urging construction of line. 7 December, 1885 .....	5
11. Minister for Public Works. Report of a deputation which waited upon him <i>re</i> proposed line to Brewarrina, and statement presented by Mr. Sawers, M.P. 17 June, 1886 .....	5
12. Under Secretary for Public Works to Thos. Waddell, Esq. Minister will receive deputation <i>re</i> proposed line. 13 April, 1889 .....	6
13. Under Secretary for Public Works to Messrs. Willis and Davis, M's.P., that Minister will receive deputation. 13 April, 1889 .....	6
14. Report of deputation which waited on Minister respecting construction of line. 18 April, 1889 .....	7
15. Report of Railway Commissioners on proposed railway from Byrock to Brewarrina. 16 July, 1889 .....	7
16. Thos. Waddell, Esq., M.P., to the Honorable the Minister for Works, to know estimated amount of traffic required to make the line pay. 23 July, 1889 .....	8
17. Further report of Railway Commissioners <i>re</i> estimated annual cost of working line. 8 August, 1889.....	8
18. Under Secretary for Public Works to T. Waddell, Esq., and W. W. Davis, Esq., M's.P., acknowledging letter <i>re</i> information as to estimated traffic. 26 July, 1889.....	8

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## RAILWAY FROM BYROCK TO BREWARRINA.

No. 1.

The Chairman, Public Meeting, Brewarrina, to The Secretary for Public Works.

[Presented by Russell Barton, Esq., M.P.]

Railway Line from Brewarrina to line from Dubbo to Bourke.

The humble petition of the inhabitants of the town of Brewarrina and surrounding district,—

RESPECTFULLY SHOWETH:—

That at a public meeting of the inhabitants of Brewarrina and surrounding district, the following resolutions were unanimously adopted:—

That this meeting is unanimously of opinion that a branch line of railway to Brewarrina from the nearest point of the proposed main trunk line from Dubbo to Bourke is an urgent necessity.

That the said branch line would very greatly increase the export of wool and other pastoral produce from this district.

That Brewarrina being centrally situated with reference to some of the most extensive and best pastoral properties probably in the Colony, the said branch line would be kept employed at other seasons than the wool season in the conveyance of cattle and sheep to the Orange Freezing Company's works, and that the conveyance of merchandise in conjunction with these would keep the line occupied profitably during the year.

That the said branch line would divert into New South Wales the large and profitable trade now carried on with the neighbouring Colonies of Queensland, South Australia, and Victoria, by the River Darling, when navigable.

That a petition be forwarded to the Honorable the Minister for Works, conveying the sentiments of this meeting upon this subject.

In compliance with these resolutions, we, the inhabitants of Brewarrina and the surrounding districts, respectfully pray that a trial survey of such branch may be made as early as convenient to your honorable Government; and we would respectfully point out the necessity of expedition, as, from the state of the River Darling, one year's additional trade would be a considerable item in defraying cost of such trial survey.

THOS. THOMPSON,

Chairman of Public Meeting.

Brewarrina, 7 September, 1881.

Forward to Engineer-in-Chief.—C.H.A.G., B.C., 6/10/81. Mr. Palmer to see me on this subject, with plan of the district.—J.W., 14/10/81. Mr. Palmer. Saw Engineer-in-Chief.—H.P., 18/10/81. I see no objection to a trial survey being made if authorised by the Minister.—J.W., 21/10/81. Under Secretary.—P.W.O., B.C., 22/10/81. I think it might be desirable to have the information which a survey would give, with a view to future railway construction.—J.L., 3/11/81. Mr. Palmer to make arrangements to have this survey made as early as practicable.—J.W., 8/11/81. Mr. Palmer noted.—H.P., 10/11/81.

No. 2.

The Engineer-in-Chief for Railways to R. Barton, Esq., M.P.

Department of Public Works, Engineer-in-Chief's Office, Sydney, 12 November, 1881.

Sir,

I have the honor to inform you that instructions have been given for a railway trial survey, to be made as early as practicable, from the Dubbo to Bourke Extension of the Great Western Railway to Brewarrina.

I have, &c.,

W. H. QUODLING,

(For the Engineer-in-Chief).

No. 3.

R. Barton, Esq., M.P., to The Secretary for Public Works.

Sir,

Russell Lea, Five Dock, 3 April, 1882.

On behalf of the inhabitants of Brewarrina and surrounding districts, I have the honor to request that the trial survey for a railway from the Bourke line to Brewarrina *via* Gongolgon may be proceeded with at once. This is the more important, as the trade of this extensive and rich pastoral district is now being forced to Adelaide and Melbourne, from the fact that in times of drought or floods the roads for teams to the present terminus of the Great Western line of railway are impassable, many clips of last season's wool having been held over for the steamers that were only able to take it away in consequence of the late rains, thus causing very serious loss to the district.

Trusting you will give instructions to have this work pushed on with all possible despatch.

I have, &c.,

RUSSELL BARTON.

This survey having been authorised by the Minister, memo. 3rd November, 1881, a surveyor may be sent as early as practicable.—J.W., 18/4/82. Mr. Palmer. I have instructed Mr. Whitlock to carry out this survey, and to commence at Brewarrina.—H.P., 24/4/82.

No. 4.

3

No. 4.

## The Engineer-in-Chief for Railways to R. Barton, Esq., M.P.

Sir, Department of Public Works (Railway Construction Office), 25 April, 1882.

In reply to your letter on behalf of the inhabitants of Brewarrina and surrounding districts, dated 3rd instant, that the trial survey from the Bourke line to Brewarrina *via* Gongolgon should be proceeded with at once, I have the honor to inform you that a surveyor has received instructions to commence at Brewarrina.

I have, &amp;c.,

W. H. QUODLING,

(For the Engineer-in-Chief).

No. 5.

## Minute Paper.

RESIDENTS of Brewarrina (R. Barton, M.P.) urging construction of a branch line of railway from Brewarrina to the line from Dubbo to Bourke.

Surveys of this line have been made, but I am not aware of the intentions of the Government as to its construction.—J.W., 17/5/83. Resubmit in a month.—F.A.W., 5/6/83. Under Secretary, B.C. Resubmitted as requested by the Minister.—C.H.A.G., 9/7/83. These papers may be put away, as it is not my intention to recommend the construction of this line.—F.A.W., 28/7/84.

To the Honorable the Minister for Public Works.

The humble petition of the residents of the town and district of Brewarrina,—

RESPECTFULLY SHOWETH :—

1. That the main line of railway from Dubbo to Bourke is distant from here, at its nearest point, about 45 miles, from whence to Brewarrina a trial survey has been made.

2. That the construction of a branch line from the aforementioned point would be in fulfilment of the expressed policy of the Government, to construct feeders to all trunk lines where such branches are likely to become payable.

3. That during the past six months the settlers, and other inhabitants of the district, of which Brewarrina is the centre, have been highly inconvenienced, and in many cases suffered from the want of the common necessaries of life, owing to the difficulties and extreme rates of carriage of goods from Sydney, and the staple industry of the district has been paralyzed at the most critical time of the year, owing to the utter impossibility of obtaining the necessary requisites for shearing purposes.

4. That the wool produce of this district will amount this year to about 35,000 bales, and the quantity thereof is yearly increasing, owing to many of the stations substituting sheep for cattle.

5. That when the river is navigable, which is the case in two seasons out of three, the bulk of the traffic connected with the transport of the wool of the district to the seaboard will be lost to this Colony, inasmuch as the growers will prefer making one shipment thereof on board steamer, to having the same transhipped several times, as will be the case unless accommodation be established by rail between Brewarrina and the trunk line.

6. That we estimate the quantity of goods required for consumption in this district amounts to 15,000 tons annually, and that the certainty of rail carriage to the centre of the district will ensure the goods being obtained from Sydney, whereas the want of such certain means of transit as a railway, will throw the whole of the trade, during navigable seasons, into the hands of Victorian and South Australian traders to the serious detriment of the commerce of this Colony.

7. That we believe the construction of the branch line now sought, will tap the trade of a very large portion of South Queensland, which will not be effected by any line now in course of construction by this Colony.

And we, therefore, pray that you will place the before-mentioned branch line of railway from Byrock to Brewarrina in the next schedule of lines to be proposed to Parliament for construction.

And your petitioners, as in duty bound, will ever pray.

[Here follow 490 signatures.]

No. 6.

## Report of Deputation.

Railway from Brewarrina to Bourke.

A DEPUTATION, comprising Messrs. Machattie, Ferguson, Coonan, and Abigail, M's.P., waited upon me to-day, to ask for a railway from Brewarrina to Bourke. It was pointed out that the line could be constructed cheaply, as the distance was not great and the country level. Brewarrina also received a large quantity of goods annually, and sent away a great deal of wool, and a large number of live stock. Petition presented in favour of line herewith. I informed the deputation that I could promise nothing definite in the matter further than that I would give their representations the fullest consideration. If the prospect of traffic indicated that the railway would pay I would be prepared to recommend it, but then such recommendation would have to be ratified by my colleagues, and finally approved of by Parliament. A comprehensive scheme of railway extensions would, as early as possible, be submitted to Parliament, but I was not in a position to say whether Brewarrina would be included in this scheme.

I had statistical and other information by me, and would give their application every consideration.

F.A.W., 21/12/83.

No. 7.

## No. 7.

## Report of Deputation.

## Proposed Railway to Brewarrina.

A DEPUTATION, introduced by Mr. R. Barton, and accompanied by Messrs. Hammond, W. F. Ferguson, Machattie, Cass, and T. R. Smith waited upon me to-day, urging the construction of a railway from Byrock to Brewarrina. The petition enclosed was presented, setting forth the advantages that would be gained by the adoption of the proposed line, and giving fully the nature and extent of the traffic that the line would probably carry.

I informed the deputation that I could give them no further promise than that which I made when a previous deputation waited upon me on the same question, viz., "That when I submitted a scheme of branch railways to Cabinet a line to Brewarrina would be included in such scheme."

They were aware that the Government had recently submitted and carried a comprehensive list of railways, and it was not intended that anything further would be submitted this year by the present Government; in fact, all the available labour and capital that the Colony could raise would be utilised in making the railways already approved of for a few years to come, and it was not probable therefore that any railway scheme would be submitted for some time. I promised, however, that should I be in power I would not overlook their claims, and would adhere to what I had stated.

I took occasion to point out that they were in error in calculating the expense that would be incurred, as the line in place of being a cheap one would be, owing to the nature of the works that would have to be provided, a comparatively expensive one.

F. A. W., 2/4/85.

[Enclosure.]

To the Honorable the Minister for Public Works, Sydney.

The Petition of the Residents of the town and district of Brewarrina,—

HUMBLY SHOWETH:—

That your petitioners are strongly of the opinion that it is desirable to construct a branch line of railway from Byrock to Brewarrina, and in support of this claim would submit the following arguments in its favour:—

1. Brewarrina, situated on the Darling River, is about 500 miles distant from Sydney, and 100 miles from the Queensland border, and is the centre of one of the largest and most important pastoral districts in the Colony.

2. This pastoral district contains forty-four sheep stations, within an average distance of 72 miles, carrying over 3,500,000 sheep, and fifteen cattle stations, within an average distance of 61 miles, carrying over 130,000 head of cattle, the quantity of wool represented thereby being 36,000 bales annually, and from these stations 1,000,000 fat sheep would be available for export annually, besides 30,000 cattle, and a large number of horses.

3. From the Customs returns the revenue collected at Brewarrina during the past six months, in the face of a very severe season, has been at the rate of £6,879 18s. 10d. per annum, showing an increase of nearly 200 per cent. since 31st July, 1877, the date of the establishment of a Custom House here.

4. During the past five years a large trade has been developed between Brewarrina and the south-western districts of Queensland, which will be largely increased if the facilities now sought for be provided, Brewarrina being the natural outlet for the trade of that portion of Queensland.

5. We anticipate that the requirements of the district, together with that portion of Queensland of which it forms the centre, would amount to a trade of the extent of 28,000 tons of merchandise, required from the seaboard, the profit on which traffic alone would more than pay interest on the cost of the construction of the line, independent of the revenue derivable from the carriage of exports of wool, sheep, cattle, horses, hides, skins, &c.

6. That, owing to difficulties of land carriage, the bulk of the trade of the district in past years has been through Victoria and South Australia, both as to imports of merchandise and exports of wool, and, notwithstanding the railway extension to Bourke, a large portion thereof will still continue to drift in the same channels, especially during the periods the river is navigable, unless direct communication be established between Brewarrina and Sydney by means of the branch line now asked for by your petitioners.

7. The length of line now advocated is under 50 miles. A trial survey has been made, which shows that no engineering difficulties exist, and that the line proposed will, if constructed, be the cheapest line ever made in the Colony.

Your petitioners therefore pray that you will be pleased to take into favourable consideration the request now presented. And your petitioners, as in duty bound, will ever pray.

[Here follow signatures.]

## No. 8.

Telegram from R. R. Machattie, Esq., M.P., to The Secretary for Public Works.  
Brewarrina.

WOULD you kindly meet deputation, Brewarrina, Friday, 28th instant, re railway. Have been deputed by influential body to wait on you.

R. R. MACHATTIE, M.P.

## No. 9.

## Report of Deputation.

Deputation.—R. R. Machattie, M.P.—Railway, Byrock to Brewarrina.—11:30.

Department of Public Works, Sydney, 28th August, 1885.

THE deputation introduced by Mr. R. R. Machattie, and accompanied by Messrs. Barton, Olliffe, Murray, Hammond, and Targett, M's.P., waited upon me to-day to ask that the claims of the Byrock-Brewarrina railway might be considered. Their presence, they stated, was not due to any fear that the promise previously given concerning this line would not be kept, but rather to strengthen the hands of the Government, and give them greater justification for submitting this extension to Parliament. It was said that the line would prove easy and economical in constructing, as the country passed through was almost a dead level, and no expensive bridges or other works would be required. The Brewarrina district ranked second to none in the west, and its importance could at once be seen by looking at the business done at the local Lands Office, the residents appreciating the new Land Bill, and taking up a great area of land under the homestead leases. In fact, while there were nine Lands Offices in the west, and some of the districts were four times as large as Brewarrina, the business done at this place equalled almost one-fourth of the whole transactions in the western pastoral area. In

In regard to traffic, almost the whole of the fat cattle for the metropolitan market passed through Brewarrina, the stock coming from the cattle stations in Queensland, and they would pass over the extension if constructed, while in good seasons the district itself supported 2,000,000 of sheep, the clip from which would go to the line.

I informed them that I was fully alive to the importance of their district, and the value of the railway to it. I heard with great pleasure that the people of Brewarrina appreciated the Land Bill, and the provision made for homestead leases, which appeared to me one of its best clauses, and one which would produce great good.

With regard to the railway, I fully intended to carry out my promise that, should the Government submit a scheme for branch lines to Parliament, Brewarrina would be recommended by me as a place entitled to a branch line. During the coming Session the Government did not intend to submit any fresh railway scheme, although they would ask for approval for the Narrabri-Walgett and Dubbo-Coonamble lines, but these, I pointed out, were not fresh lines, but simply a modification of a Government proposal last Session, Parliament deciding by a large majority to have these lines in place of the one proposed by the Government, viz., from Mudgee to Walgett. They were aware that the Government had to withdraw the last loan, and as there were still some 14,000,000 already voted to be raised, the Government would not at present be justified in submitting further proposals for new railways. At the same time, I would renew my promise that, should the Government decide at any time while we remained in power to submit a scheme of branch lines to Parliament, I would recommend that the line to Brewarrina should be included; or if such a line were submitted at any time when I was a Member of the Legislature, I would give it my support.

F.A.W.

No. 10.

W. Sawers, Esq., M.P., to The Secretary for Public Works.

Sir,

Parliament House, 7 December, 1885.

I have the honor to direct your attention to the claims of Brewarrina and district to a branch line of railway. You may shortly be asking the consideration of your colleagues to fresh railway proposals for the approval of Parliament. Should such be the case, I beg that the well-known proposal to construct a branch line from Byrock to Brewarrina will not be overlooked. Many depositions have pleaded the claims of this line, and Mr. Wright, the late Minister for Works, became so satisfied of the necessity for this railway, that he pledged himself, should he remain in office, he would never submit a fresh scheme to Parliament without including the Byrock-Brewarrina line. The Department is doubtless in possession of ample evidence as to the probable paying character of this line, as also details as to nature of the country and estimated cost, but information can readily be produced. The survey has long been completed, and I believe estimated vote required made up. The distance is about 56 miles. I am sure the line could be completed at less than £150,000, and pay good interest on its cost. This line would draw much Queensland trade to Sydney, and tend to develop much valuable country. Brewarrina is the favourite Lands Office for homestead lease applications, and much settlement of this character is taking place.

I believe that more than one of your colleagues has expressed himself as favourable to the construction of this line. I submit, Sir, that should you bring down a railway proposal to Parliament, without including this line, it would be felt as a great hardship by a large section of my constituents. I am confident that if Parliament, in temper, to pass any railway proposals, the Brewarrina line would scarcely be questioned, as many Members favourable and the money vote so small. The Brewarrina people are anxious to send down a deputation, to wait upon you on this railway question, but refrain from doing so, at my request, as I desire to avoid such public action during present political crisis.

I have, &c.,  
W. SAWERS.

My colleague Mr. Russell Barton is equally in favour of this line.

Place this with other papers on the subject and submit to Cabinet.—W.J.L., 8/12/85.

No. 11.

Report of Deputation.

Railway to Brewarrina.

Department of Public Works, Sydney, 17 June, 1886.

A DEPUTATION, introduced by Mr. Sawers, M.P., from Brewarrina, accompanied by Messrs. Abbott, W. Clarke, Dalton, Cass, Olliffe, O'Sullivan, Hungerford, Moore, Stephen, and D. A. Ferguson, M'sP., waited upon me to-day, with reference to the proposal for a railway from Byrock to Brewarrina. The statement enclosed was submitted by Mr. Sawers, showing the estimated traffic, and the probability that the line would prove a paying one from the commencement, while, as time went on, the traffic would increase as the district was developed, and it was said the line was promised by a previous Government. It was mentioned that Brewarrina was a very suitable place for an irrigation scheme to be initiated, and following such scheme a large population would settle on the Barwon. That without the railway the traffic would pass by the river from this Colony into Victoria and South Australia. That Brewarrina was already an important place, as was evidenced by the extent of land selection and the Customs revenue a greater increase in these particulars being shown at Brewarrina than in any other district. That the line would be easy of construction (no engineering difficulties being met with), and the cost would be small. In connection with this matter, Mr. Abbott remarked that it seemed to him the earthworks to Bourke were much more extensive than the requirements warranted, and that the traffic and wants of the district would be fully met by a train three times a week instead of daily, as at present, the reduction of the trains lessening the expenditure, and, consequently, making the lines more remunerative. They considered the Brewarrina line could be made for a sum not much exceeding £150,000.

I informed them that I looked upon this line as one that would come within the category of cheap lines, as proposed by Sir John Fowler in the report he submitted to me. I quite concurred in his opinion, that it was unwise to expend large sums in making expensive lines over the level plains of the interior; and

and, so long as I was in office, I would, whenever practicable, adopt the system of cheap railways, as by this means we would be able to construct railways to localities which otherwise would not obtain railway facilities. A principle was laid down in some recent railway proposals that where a railway went into a district, and enhanced the value of the local properties, the land actually required for the railway should be given free, and I trusted this principle would be observed in this case. It was pointed out that this line would pass almost wholly through Crown lands. I was under the impression that some proposal was to be made in connection with this line, that the Government, if they constructed the line, would be guaranteed against any loss, but no such proposal had been made. I had had an estimate prepared of the probable cost, and found it to be £247,000 or £4,500 per mile, but this seemed to me altogether too high an estimate for a branch line, such as the Byrock-Brewarrina Extension would be. Regarding irrigation, I mentioned that the Commission was fully aware of the importance of Brewarrina, and that a surveyor was now in the locality taking levels, &c. I stated finally I was not in a position to give any definite promise, but I would submit the matter to my colleagues and, personally, I was in favour of it, provided the line could be carried out cheaply and gave promise of a paying return. It would be a strong argument in favour of it if the people would guarantee the Department against loss.

W.J.L.

[Enclosure.]

## Byrock to Brewarrina.

THE country between and surrounding both these places is entirely pastoral, and for the most part good. Both towns are small. Byrock has only had an existence since the extension from Dubbo was commenced. Brewarrina, though on all sides the land is good, has not advanced as it might have been expected it would. It is virtually the head of the navigation of the Darling, as, just above there, is a ledge of rocks forming part of the famed fisheries, over which vessels cannot get unless the river is very high.

The country about the proposed line being pastoral, the population is small and very scattered.

From Byrock to Brewarrina the country is practically level, and the engineering difficulties to overcome would be small.

The line, if constructed, would be a great boon to those who have now to send produce to or receive stores from Sydney by the present roads. These, in fine weather, are good, but a very little rain as the soil is heavy, sticky, and clogging, renders them impassable for wheeled vehicles.

A very close approximate idea of what the returns from this railway should be could be obtained from the Byrock books.

This line should attract some of the Queensland traffic, which now goes by other roads.

A matter for consideration with regard to this line is the competition which it would have to meet of the steamers on the Darling. But judging from what the extension to Bourke has already taught us, in the end the river unless locked would interfere very little with the railway.

Navigation is so uncertain (in my experience the Darling has only been open on an average for a period once in every three years), the chance of a steamer being caught in one of the bends when the river is falling so imminent, the danger when the river is low so great, that until matters be very much ameliorated, either by locking or some other means, a certain service by rail must prevail over the uncertain means of the river.

With regard to all extensions into the interior of the Colony, if they are to pay properly, a very different system of construction must be adopted in the future from what has prevailed in the past.

In the purely pastoral portions of New South Wales, the population is so small and so scattered, that in fixing a service, it may be neglected.

For the goods and the goods only should trains be run. To give an example of what I mean—I left Bourke not so long ago, and I believe I was the only passenger in the train. At that time a train for passengers and mails only ran right through to Bourke. It being conceded that the goods traffic only is to be considered (of course there would be accommodation for passengers on every train), a much less rate of speed than that at present attempted will suffice, and consequently a much cheaper line,—half ballasted, no fencing, sleepers on the sod—why in level country these are put on a bank not consolidated, while the earth is available and is consolidated, is, to the unprofessional mind, incomprehensible. No station buildings except sheds and residences which may be absolutely necessary, not as at present, erections which, in many cases, are more than equal to the traffic of fifty years hence—such is the line which, in my opinion, is suitable for our inland extensions. Let everything be good as far as it goes, and capable hereafter of being made equal to the present lines, which are undoubtedly excellent—but such excellency is not at present required.

## No. 12.

The Under Secretary for Public Works to T. Waddell, Esq.

Sir,

Department of Public Works, Sydney, 13 April, 1889.

In compliance with your personal request, I have the honor to inform you that the Secretary for Public Works will receive a deputation, in reference to the construction of a line of railway from Byrock to Brewarrina, on Thursday, the 18th instant, at 11:30 o'clock a.m.

I am to add that Messrs. Willis and Davis, M's.P., have been apprised of the arrangement.

I have, &amp;c.,

J. BARLING,

Under Secretary.

## No. 13.

The Under Secretary for Public Works to Messrs. Willis and Davis, M's.P.

Gentlemen,

Department of Public Works, Sydney, 13 April, 1889.

I am directed to inform you that, in compliance with a personal request made by Mr. Waddell, M.P., the Secretary for Public Works will receive a deputation, in reference to the construction of a line of railway from Byrock to Brewarrina, on Thursday, the 18th instant, at 11:30 o'clock a.m.

I have, &amp;c.,

J. BARLING,

Under Secretary.

No. 14.

## No. 14.

## Report of Deputation.

Department of Public Works, Sydney, 18 April, 1889.

Deputation:—Construction of Railway from Byrock to Brewarrina.

TO-DAY a deputation, consisting of Messrs. Waddell, Davis, Lakeman, Hayes, and Gormly, M's.P., with other gentlemen, waited upon the Minister to urge the desirability of the construction of a light line of railway from Byrock to Brewarrina.

Mr. Waddell, M.P., who was the first speaker, said their object was to ask the Government to take into consideration the construction of this line. The matter, he said, had been under the attention of previous Governments, and Mr. Wright, when Secretary for Works, had expressed himself in favour of it, and had stated that it would be included in the first batch of lines submitted by his Government. He (Mr. Waddell) further pointed out that Brewarrina was the centre of a large pastoral district, the richest in the colony, and was certain to be a town of considerable importance in a few years. As a proof of the richness of the district he would refer to the large number of homestead leases there were in the district, which could be seen by a glance at the map. Further, there were no engineering difficulties in the way of the work, and on account of the level nature of the country a railway could be made at the cheapest possible rate, and that if the line were not constructed the Government would be compelled to make roads. He also stated that no district in the colony was more suitable for carrying out irrigation works. The Barwon runs close to the town, and there were other rivers in the locality; and when the irrigation works, proposed by the Government, were carried out, this district would be certain to be one of the first for their operation.

Mr. Davies, M.P., said he supported all that had been said in favour of the line by the previous speaker.

Mr. Rich said that as an old resident of the district he could strongly advocate the line. In wet weather traffic between the two places was greatly impeded owing to the boggy nature of the country. Traffic with Walgett would be served by the line, and it would also cause a considerable trade with the Queensland district.

Mr. Gormly, M.P., stated that it would cost more to construct and maintain a proper road in this district than it would for a railway, which could be made in the cheapest possible way; and he considered the fact of the saving of a large expenditure in road construction should be placed against the cost of the line. He further stated that there was a rocky bar in the river at Brewarrina which rendered it very suitable for the construction of dams for conserving water for irrigation purposes. He added that the line would have the effect of diverting traffic to Sydney which at present goes to Brisbane.

Mr. Hayes, M.P., said he was well acquainted with the level nature of the country, and he considered that a light line of railway would cost little more to construct than a proper road. He desired to refer the Minister to a report on the subject of light lines of railway which was made some time since by Sir John Fowler.

Mr. Lakeman, M.P., said a great deal of money had been thrown away in trying to make roads in country similar to this. A properly metalled road would cost £1,000 a mile more than a railway; and instead of spending money in roads, he considered light lines of railway should be built. He thought the estimate of the cost of the line by the Department was excessive, and he stated that a private company had estimated the cost at £1,800 per mile, exclusive of rails and rolling-stock.

Mr. Waddell said the Queensland Government were getting a line built from Normanton to Croydon, through similar country to that between Byrock and Brewarrina, only more swampy, and therefore worse, at the rate of £2,250 per mile.

Mr. Bruce Smith, in reply to the deputation, said he knew nothing of the country in question, except from the papers in the office. These he had had the advantage of perusing, and they extended back, he found, to the year 1885. Deputations had at different times waited upon Ministers, but he found they had always received the stereotyped answer, which pleased a deputation without committing the Government, viz., that they would look into the matter, and, if possible, recommend it for the consideration of the Cabinet. [The Minister then read to the deputation minute of 2nd December, 1887 (Railways, 87-21,810), and extracts from replies given to previous deputations by Mr. Wright and Mr. Lync.] He further said that not knowing the country he could only say he would look further into the matter and get together all the information on the subject and endeavour, with the assistance of the professional knowledge of the Department, to form such an opinion as would enable him to determine whether or not he could recommend the application to the Cabinet.

BRUCE SMITH.

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Send on to Railway Commissioners.—B.S., B.C., 20/5/89. Railways.

## No. 15.

## Report of Railway Commissioners.

Office of the Railway Commissioners of New South Wales, Sydney, 15 July, 1889.

Proposed Railway from Byrock to Brewarrina—55½ miles.

IN compliance with the request of the Honorable the Secretary for Public Works (89-1115), we beg to report as under on the above proposal:—

This line traverses a purely pastoral country, with a very limited population.

With regard to the township of Brewarrina, there is no evidence of any advance having been made during the past five or ten years, and it is very doubtful whether the construction of a railway would give it any great impetus. During the past four years large areas of Crown lands have been taken up as homestead leases, and by this means the population of the district has been increased, but, even with this improvement, the whole population which would be served by the railway is limited, and the freights produced

produced by and required of it at present, and in the immediate future would fall far short of that necessary to bring a profitable revenue to a railway. There is, it was alleged by some of the residents of Brewarrina, a prospect of an extensive stock traffic arising north of this place, and extending some distance into Queensland, which would drift to Brewarrina. This may be so, but it is exceedingly doubtful, as it is unlikely that traffic now going to Bourke, where there is a railway, and to Moree, where there probably will be one, is likely to be diverted to Brewarrina. For these reasons the construction of a line cannot, upon commercial grounds, be recommended.

There is, however, another aspect of the case which is, perhaps, not altogether beyond our province, and may be mentioned in connection with the necessity for means of communication between Byrock and Brewarrina. At present there are practically none, and to make roads would be expensive, both the first cost and maintenance, and consequently the question as to whether an inexpensive railway both as regards construction and working, should be provided, may be worthy of consideration, not as a commercial undertaking, but as of affording a means of communication which the Government should provide.

We have not given the usual statement of estimated working expenses and traffic, as the figures cannot be laid down with any degree of certainty.

*Estimated Cost.*

The estimated cost of construction cannot be given, as no proper survey of the line has been made by the Engineer-in-Chief.

The Seal of the Railway Commissioners of New South Wales was affixed hereto this 16th day of July, 1889, in the presence of,—	W. V. READ.	}	E. M. G. EDDY, (L.S.) Chief Commissioner. W. M. FEHON, (L.S.) Commissioner. CHARLES OLIVER, (L.S.) Commissioner.
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No. 16.

T. Waddell, Esq., M.P., to The Secretary for Public Works.

Sir,

Legislative Assembly, 24 July, 1889.

On behalf of the people of Brewarrina, I would like to know the estimated amount of traffic that would be necessary to make the Byrock-Brewarrina railway pay; also, if the Government would accept a guarantee from a number of responsible people in the Brewarrina district that the line will return a fair interest on the outlay.

Yours, &c.,

T. WADDELL.

No. 17.

Further Report of Railway Commissioners.

Office of the Railway Commissioners of New South Wales, Sydney, 8 August, 1889.

Railway—Byrock to Brewarrina—56 miles.

WITH reference to the estimated annual cost of working the Byrock to Brewarrina line, the cost of the line is set down at £242,400; and the interest on this sum at  $3\frac{1}{2}$  per cent. would amount to £8,484; the working expenses are estimated at an additional £9,500; making the value of traffic to be obtained, £17,984.

It may be pointed out that only the proportion of the revenue that would be earned for the traffic actually passing over the section must be given to it, and credit must not be taken for the total rate to be received for carriage from and to Sydney and Brewarrina.

No. 18.

The Under Secretary for Public Works to T. Waddell and W. W. Davis, Esqs., M's.P.

Sir,

Department of Public Works, Sydney, 26 July, 1889.

I am directed to acknowledge the receipt of your letter of the 24th July, on the subject of estimated amount of traffic required to make the Byrock-Brewarrina line pay, and to inform you that the same has been forwarded to the Railway Commissioners, and when the requisite information has been obtained, a further communication will be made to you.

I have, &c.,

J. BARLING,

Under Secretary.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(ALTERNATIVE ROUTES FOR RELIEVING CONGESTION OF TRAFFIC ON GREAT WESTERN LINE.)

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*Ordered by the Legislative Assembly to be printed, 5 November, 1890.*

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25th October, 1890.

The Under Secretary for Public Works,  
Sir,

I have the honour to submit the following Report on the commercial and industrial aspects of the suggested loop-line from Blacktown to Blayney, and also of the proposed line from Richmond to Esk Bank.

Blacktown to Blayney.

To obtain a personal knowledge of the country traversed I accompanied Mr. Burge and Mr. Gipps over the line from the Warragamba valley to Blayney, and subsequently examined the country between the Nepean and Blacktown and Liverpool.

*Liverpool connection.*

The line originally suggested by Mr. Gipps would start from Blacktown, but Liverpool has since been proposed by various persons as a more suitable connection.

The distance from Sydney to the Nepean is the same by either route.

As regards engineering the Blacktown connection would probably be a little easier.

But on the other hand the line from Liverpool would open up a larger area of good land now deprived of railway communication; and, in the event of the Marrickville and Liverpool loop-line being constructed, would keep the traffic clear of the present suburban line.

*Description of country.*

By either route the line would pass through good agricultural land for 17 miles as far as the Nepean at Mulgoa.

From thence it runs for 14 miles up the narrow gorge of the Warragamba.

Here there is some good land along the slopes of the sandstone cliffs, but the strip is so narrow and steep that when the necessary land is taken for the railway there will be little left for cultivation.

The route then lies up the valley of the Cox for 5 miles. Here, and also in the neighbouring Wollindilly valley, some patches of very rich land occur, but they are only patches in comparison to the extent necessary to feed a railway.

The good land has long since been taken up, and the greater part is now under cultivation.

The line then leaves the Cox and winds up a ridge between Butcher's Creek and the Kowmung River. It follows this ridge for about 60 miles to where it joins the main range, near Shooter's Hill.

There are patches of good land along the ridge, and some nice flats and swamps at Colong and Bendock, but nothing of sufficient area to produce a traffic large enough to support a railway. In fact, the precipitous and broken character of the country precludes the idea of its being cultivated to any extent.

From Shooter's Hill to Blayney, a distance of about 60 miles, fully three-quarters of the land is good, much of it being of a superior volcanic nature suited for the growth of English cereals and fruit.

This district would produce in time a large traffic, though at present it is undeveloped, owing to want of railway communication.

*Agricultural*

*Agricultural products.*

As regards agricultural traffic, therefore, I consider that the first 17 and the last 60 miles would eventually yield a traffic of importance, but that over 70 miles of the central section would produce practically nothing.

*Timber.*

The timber along the route as far as Mount Werong, or for half the distance, consists principally of stringybark, ironbark, and gums. What grows on the ridges is generally of a poor quality.

In some of the ravines good timber is visible, and I was informed that large quantities of good ironbark are found higher up the River Cox.

Cedar is also said to still exist in the Kowmung valley.

Though we descended into several ravines I saw no really first-class timber of sufficient commercial value to become an item of traffic, except in one valley near Mount Werong. Here there was a good forest of blackbutt, stringybark, turpentine, and gum, but yet not to be compared with what grows on the North Coast.

The long railway carriage would prevent this timber from being sent to Sydney, but there would be a good market for it out west.

From Mount Werong to Blayney the timber is of no commercial value, being principally white gum and willow.

*Timber products.*

I have therefore come to the conclusion that, though sufficient timber could be got for construction purposes, the timber traffic would be small, and principally local and westwards.

*Minerals.*

Valuable coal seams occur on the Warragamba which cannot possibly be worked without a railway.

At Mount Werong is an extensive gold-field, which has been very little worked. Silver has also been found in the district.

It is probable that with railway communication this field would be developed—the present workings being only alluvial—and support a moderate population, and consequent traffic.

The Warragamba coal-mines are only 50 miles from Sydney; so a large traffic could be relied on, especially as the analysis shows the coal to be of good quality.

*Population.*

The country as far as the Nepean at Mulgoa supports a very small population. It is principally held under old grants, and is unimproved.

At Mulgoa a new settlement is springing up; and if Messrs. Chaffey Bros.' irrigation scheme is carried out it will rapidly increase.

All good land along the Warragamba and Cox has been taken up and supports about ten families.

From the Cox to Mount Werong is practically uninhabited, and is used as a cattle run.

Near Werong are half a dozen miners and two or three selectors. From thence to Blayney the land is held by several large owners and a few selectors.

There is, however, a considerable area of good land along this section still unalienated.

*Probable traffic.*

For the present I exclude the question of through traffic derived from the Western Line.

*Goods.*

With regard to goods it will be seen from the description of the country that over 70 miles of the line would be through country from which little or no agricultural traffic could be derived, and that the only mineral traffic of consequence would be in coal from the Warragamba, only 50 miles from Sydney.

The first 17 miles of the line would have a traffic in fruit and vegetables for Sydney markets of considerable importance.

The traffic from the last 60 miles would be principally grain, potatoes, and other root crops, as well as fruit.

Sheep are only kept west of Shooter's Hill, so the wool traffic would not be large.

Cattle and sheep, except fat stock, would seldom use the railway.

Pigs are now driven in considerable numbers to Camden, after being collected from the different selectors. These, if fat, would probably be trucked or else come as dead meat.

*Passengers.*

As far as the Nepean a considerable suburban passenger traffic might be expected in course of time, and probably a tourist traffic up the Warragamba and Cox, and to the Jenolan or Whombeyan Caves.

The line would pass within 12 miles of the Jenolan and 15 of the Whombeyan Caves.

It is also certain that settlement would immediately increase on the Warragamba with the opening of the coal mines.

*Total traffic.*

Making every allowance, therefore, for further development along the line, I am forced to the conclusion that at least 50 miles of this line would be devoid of wayside traffic.

*Arguments*

*Arguments for and against.*

Unless it can be shown that the loss sustained through constructing and working this 50 miles of most expensive line is compensated for in other ways, it should be sufficient to condemn the route.

It may be argued that the opening up of 17 miles of good land at the beginning, and 60 miles at the end, is sufficient compensation.

But this good land can be opened up at much less expense, and equally well, by the construction of a line as far as Mulgoa, and by extending the proposed branch from Perth to Rockley, a little further.

A private line from the Nepean would be sufficient to develop the coal mines. The Government can hardly be expected to construct a line for the sole benefit of a Mining Company.

*Diversion of traffic.*

The main contention, however, of the promoters of the Blacktown-Blayney loop is, that the relief it would afford to the present congestion of traffic on the Mountains, by the diversion of all the traffic to and from places west of Blayney over the new line, and the saving in working expenses effected by having to haul it over a 1 in 60 grade line, instead of over the existing railway with its ruling grade of 1 in 30, would not alone compensate for all disadvantages, but actually pay off the whole capital cost within a few years.

Pamphlets have been published professing to prove this. They are, however, entirely wrong in their premises, and therefore false in the conclusions arrived at.

Briefly, it is argued that because a line has a ruling grade of 1 in 60, it must have a larger traffic than one with a steeper grade. This is absurd!

The traffic depends not on the grade, but on the resources of the country passed through.

The working expenses alone will be reduced by having a flatter grade, and this in a much less degree than is commonly supposed.

"Figures," it is said, "are dangerous things," and "will prove anything;" in the case referred to they have proved an absurdity.

In order to be in a position to judge of the commercial value of the Blacktown-Blayney Line, as an alternative to the Western Line, it will be necessary to investigate these two questions of relief to congestion of traffic, and saving in working expenses.

*Means of relieving traffic congestion.*

There are four ways of relieving congestion of traffic—

1. Increasing the weight of locomotives. This can only be done to a limited extent.
2. Improving the grades and curves. The grades on the Western Line cannot be improved to any extent, except by cutting out the two Zig Zags. The curves are now being improved.
3. Constructing an alternative line.
4. Duplicating the track.

*Comparison of an alternative with a duplicate line.*

An alternative or loop line with similar grades, length, summit, level, and character, will simply double the capacity of the railway system affected.

But to duplicate the existing track would increase the capacity twelve-fold, as will be explained further on.

The Blacktown-Blayney Line, it is claimed, will have no grade steeper than 1 in 60. To obtain this, the length must be increased by 5 or 6 miles in one place alone.

The summit level will, I believe, be several hundred feet higher than the present line.

The line will therefore be longer, and rise to a greater elevation than the Western Line, but will be superior as to grades.

Steep grades involve reduced loads and increased working expenses.

The gross weight of a train varies directly with the grade, but the gross working expenses do not thus vary.

*Capacity.*

It will be shown later on that the capacity of the Blacktown-Blayney Line will be about double that of the present Western Line, so that by its construction the capacity of the Western system would be increased threefold.

As regards capacity, therefore, it would be four times as advantageous to duplicate the present track.

By capacity is meant the greatest amount which, under the most perfect arrangements and with improved appliances, can be carried over a line. In practice of course the amount would be much less.

Capacity depends upon two things:—(1) The number of trains it is possible to work; and (2) the weight of each train.

*Single track capacity.*

On a single line, with trains passing each other every 5 miles, and travelling at 15 miles per hour, allowing 10 minutes loss at each passing-place, it would be possible to run one train each way every hour = 48 trains per day.

An average "Consolidation" engine will draw (exclusive of its own weight) 196 tons up a 1 in 30 grade:  $48 \times 196 = 9,408$  train tons per day. The same engine will draw 410 tons up a 1 in 60 grade:  $48 \times 410 = 19,680$  train tons per day.

*Double track capacity.*

On a double track, with automatic block signals every mile, trains might safely follow each other a mile apart, or (say) at five-minute intervals = 12 each way every hour, or 288 trains per day. This on a 1 in 30 grade would amount to  $288 \times 196 = 56,448$  train tons per day each way.

These figures are given for the purpose of showing that where the number of trains must be necessarily great, a duplicate track possesses enormous advantages over a single one, even though this single line has better grades, and provided that both are high grade lines.

*Difficulties*

*Difficulties of working present traffic.*

The goods traffic on the Western Line is now very large, and the congestion is severely felt between Penrith and Lithgow, owing to the single track and heavy grades. The grades necessitate the trains being broken up, so increasing the number of trains and train-crossings. If the track were double, this inconvenience would not be felt, as the trains would simply follow each other at short intervals.

The working capacity of a single track is limited, but with continuous brakes and a proper block system the capacity of a double track is almost unlimited, amounting to a constant stream both ways.

These remarks apply to slow goods traffic.

Fast passenger trains running over the same tracks will of course disorganise the procession of goods trains, so that sometimes it becomes necessary to quadruple the lines.

By the time it becomes necessary to quadruple the Western Line, the Colony will have become wealthy enough to construct half a dozen alternative railways.

Single track railways, where the tonnage carried per mile is small, are more economical than double tracks, especially when constructed through level country.

For instance, to duplicate the line from Junee to Hay, would add about 60 per cent. to the capital cost without reducing the working expenses at all.

*Economy of double tracks for heavy traffic.*

But when the grades are heavy, and the traffic is large and increasing, the proportion of the total working expenses chargeable to shunting and delays at passing places becomes so great, that it is a matter of economy to duplicate.

This time must soon arrive for the Mountain section of the Western Line.

It is claimed by the promoters of the Blacktown-Blayney Line that it would be better to construct their line than to spend any money on the improvement of the existing one. In fact, if their argument is pushed a little further it would be better to close the Western Line altogether.

*Estimate of cost of duplication and improving.*

Mr. Deane, Acting Engineer-in-Chief for Railways, has furnished me with the following rough estimate of the cost of duplicating the existing line the whole way between *Penrith* and *Blayney*. The line is already duplicate as far as Penrith:—

Permanent-way ... ..	per mile.	
Ordinary works ... ..	£2,000	
	2,500	
	<hr/>	
140 miles at ... ..	£4,500	£630,000
Tunnels ... ..		200,000
		<hr/>
		£830,000

This includes the avoidance of the two Zig Zags.

For the expenditure of (say) £850,000 the carrying capacity would be increased fully twelfefold, delays avoided, and working expenses per ton reduced.

*Branch Lines.*

Add to this the cost of the Perth and Rockley branch—estimated at £196,000—with a further extension of about 10 miles, costing (say) altogether £260,000.

Also add the cost of a short branch from Liverpool towards Mulgoa, say 15 miles, at £6,000=£90,000, or a total extra sum of £350,000, which will be necessary to tap the traffic-producing areas of the Blacktown-Blayney Line, and the result is, that for the expenditure of £1,200,000, as much advantage will accrue to the country at large as if the Blacktown-Blayney Line were constructed.

*Private Coal Line.*

The few settlers on the Cox River and Warragamba would not be long without a railway in the event of a branch being made to Mulgoa—that is, if the coal seams are as good as the analysis would lead one to suppose.

*Tourist traffic.*

I have excluded the question of tourist traffic, as I believe the larger proportion would continue to visit the Caves by the present routes. Tourists like generally to visit Katoomba or Mount Victoria, and take in the Caves as one of their excursions. The shortening of the road journey to 12 miles would hardly compensate for the tamer scenery of the new route.

In any case, whatever traffic there was might be said to have been stolen from the present line.

It must be now seen whether the saving in working expenses on the Blacktown-Blayney Line would compensate for the additional expenditure it would involve in its construction to what would be required to duplicate the Western Line, and construct the two branches referred to.

*Engineering—Cost of Blacktown-Blayney Line.*

Mr. Burge, who has had large experience in railway construction in this and other countries, has gone into the engineering merits of the line.

He reports that, in his opinion, the 1 in 60 grade claimed can be got throughout, but only at great expense, and that he is very doubtful if 12-chain curves can be obtained.

He estimates the cost of construction at £2,193,000, and remarks that it might be much more, and is not likely to be less.

I fully concur with him, and consider that, if anything, he has underestimated the difficulties and cost.

It is, of course, impossible in a case like this for anyone to give more than a rough estimate of the probable cost previous to actual survey. Barometric levels will show whether a line is possible, but are useless in determining details, an estimate of which can only be formed from one's previous knowledge of railway construction.

*Total*

*Total cost.*

If the cost of survey is added to Mr. Burge's estimate, the total will amount to about £2,200,000, or £1,000,000 in excess of what it would take to duplicate the present line and construct the Perth and Rockley branch, and also the branch from Liverpool to the Nepean.

The question therefore resolves itself into this: Will the saving in working expenses pay 4 per cent. interest on £1,000,000? Otherwise, will the saving be £40,000 per annum?

*Working expenses.*

Comparing the Blacktown-Blayney Line with the Western: The summit level of the former will be higher than the present line. But allowing that they are equal; then the actual work done in foot-pounds in hauling a given gross load to the top will be the same in both instances.

If the traffic was light the working expenses would also be practically the same, although one may have a grade of 1 in 60 while the other has 1 in 30; that is to say, if one train per day each way would carry all the traffic.

It must be borne in mind that if one line has steeper gradients than another over similar country, it will also have more stretches of level or of low grade.

And it is quite possible to have a line with a ruling grade of 1 in 60 between two places which will be more expensive to work than another line with 1 in 30.

This would occur where the 1 in 60 was obtained at the expense of a great increase of length, or where the 1 in 60 grades were scattered, while the 1 in 30 was all in one place, and could be worked advantageously with an assistant engine.

*Good location.*

Many things have to be considered besides grades when laying out a line; for instance, first cost, wayside traffic, bunching of grades, direction of traffic, length and cost of future maintenance.

If too much weight is attached to one of these to the neglect of others, the resulting line may prove a financial failure.

If the Western Line had still to be constructed, less weight would be attached to the question of first cost, which at the time must have seriously hampered the engineers.

*Improvements to Western Line.*

Several improvements had to be given up on account of the extra expense entailed.

For instance, the avoidance of both Zig Zags, the great Zig Zag especially, where the direction of the grade is against the heavy mineral traffic.

This can be avoided by a tunnel, the cost of which, as well as the doing away with the other Zig Zag, has been included in Mr. Deano's estimate.

All things being equal, a line with 1 in 60 grade must be much superior to a line with 1 in 30, so that if the western line were not already constructed, the Blacktown-Blayney should be certainly surveyed, even though it would leave out many important towns and districts; a true balance could then be struck.

The present line being constructed, the case is totally different.

It cannot be closed; the same staff of station-masters, porters, &c., must be maintained, as well as the additional staff required for the new line from Blayney to Blacktown.

So that the only saving in working expenses will be the amount represented by the cost of keeping that number of additional locomotives in steam which would be necessary to work the present goods traffic over a 1 in 33 grade instead of over a 1 in 60; and from this should be deducted the cost of the additional staff required for the new line—not to speak of the cost of maintaining so many more miles of works other than permanent-way.

To arrive at the number of additional locomotives required we must investigate the effects of grades upon haulage.

*Effect of grades upon haulage.*

The tractive power of an engine depends on—

- (1.) The weight on its driving wheels—constant for the same engine.
- (2.) Adhesion, or the proportion of that weight which can be turned into traction before the wheels slip. This varies from one-third to one-fifth, and depends on the state of the rails whether dry, or very wet, or moist and dirty. Average (say) one-fourth.
- (3.) Internal power of engine.—Constant for each engine, and supposed to be always greater than adhesion, and therefore can be disregarded except in calculation of speed.

*Typical Locomotive.*

The economy of using heavy locomotives has long been recognised, and the tendency is to increase the weight still more.

I have therefore taken as a standard the average consolidation type from Baldwin's catalogue:—

Average Consolidation Engine.	American— Tons (2000 lbs).	English— Tons (2,240 lbs).
Total weight of engine and tender in working order ... ..	75	66·75
Do do only do ... ..	51	45·4
Do on all driving wheels do ... ..	44	39·16
Total tractive power (one-fourth adhesion) ... ..	11	9·8

*Rolling friction.*

The rolling friction of a train moving at 15 miles per hour may be taken at about 8 lb. per ton. This has been determined by actual experiment by Sir Daniel Gooch and others.

Using American tons of 2,000 lb. so as to avoid complications.

The consolidation engine could haul  $\frac{11 \times 2000}{8} = 75 = 2,675$  tons on the level.

On a grade, by the first principles of mechanics, the weight sustained by a given pull, is to the pull as the length of the grade is to its height, or  $\frac{W}{P} = \frac{l}{h}$ . This is when friction is so small that it may be disregarded.

In all except English countries grades are expressed by the number of feet risen in 100 feet. This simplifies calculations. Thus:—

1 in 60 = 1.66 per cent. grade.

1 in 40 = 2.5 " "

1 in 33 = 3 " "

1 in 30 = 3.33 " "

Then for a 1 in 60 grade  $\frac{W}{P} = \frac{100}{1.66}$ .

To move the load rolling friction must be overcome as well as grade resistance—8 lb. per 2,000 lb. = 0.4 per cent. grade.

Therefore, for a moving train up 1 in 60  $\frac{W}{P} = \frac{100}{1.66 + .4}$   $W = \frac{100 P}{2.06} = \frac{100 \times 11 \text{ tons}}{2.06} = 533$  tons gross.

Deducting weight of engine, tender, and (say) a 4-ton brake-van, in all 79 tons:—

534 - 79 = 455 = weight of loaded trucks.

*Paying load.*

If we allow the paying load of a goods train to average 60 per cent. of the total waggon weight, and calculating for other grades in the same manner, remembering that rolling friction is constant for a given speed and for all grades, and in fact varies hardly anything under any circumstances when once the train is started, we obtain the following table:—

*Table showing effect of grade upon haulage.*

Loads hauled by Average Consolidation Engine. Traction = 11 American tons.				Paying Load.	
Grade.	Grade. Per cent.	Gross Load. American tons.	Waggon Load. American tons.	American Tons (2,000 lbs.)	English Tons (2,240 lbs.)
Level	0	2,750	2,671	1,602	1,430
1 in 60	1.66	534	455	273	244
1 in 40	2.5	379	300	180	160
1 in 33	3	323	244	146	130
1 in 30	3.33	294	216	130	116

It will be seen that the paying load for 1 in 60 is a little less than twice the paying load of a 1 in 33, and a little more than twice that of 1 in 30.

*Ruling grade.*

Though the steepest incline on the Western Line is 1 in 30, only a short length ( $1\frac{3}{4}$  miles) of this occurs, and all in the direction of the heaviest traffic— $16\frac{1}{2}$  miles of 1 in 33 grades occur; they also are, with one exception, in the right direction, so that properly speaking 1 in 40 is the grade which might be taken as the limiting grade; 1 in 40 would necessitate loads being about one third less than on 1 in 60.

If therefore I assume that the net paying loads on the Blacktown-Blayney Line would be twice as heavy as on the present line, it cannot be said that I have underrated the advantage of a 1 in 60 grade.

*Expenses per mile.*

It might be hastily assumed that because an engine could haul double the load over the Blacktown-Blayney Line its working expenses would be only half. This is not so.

If it were possible to use an engine twice as heavy on the present line the same net tonnage could be hauled for about 15 per cent. extra to what it would cost on the line with 1 in 60 grades.

I find that this result has been obtained on American lines.

Our typical engine could not be doubled in weight, therefore the number of trains must be double.

Then the total extra expense per train mile including interest on cost of additional Locomotives would be under 50 per cent. This means that supposing the working expenses of the Mountain section of the Western Line amount to three-quarters of a penny per ton per mile, then the working expenses of the Blacktown-Blayney Line would amount to one half-penny per ton per mile.

Unfortunately I cannot find what the working expense per ton per mile of the Mountain section is. It would be obviously unfair to take the working expenses of the whole line, and divide by the number of tons.

*English railways.*

The average working expenses on English railways with moderate traffic is about 3s. per train mile.

*American*

*American Railways.*

On American railways it amounts to about 1 dollar = 4s. 2d., per train mile.

Mr. A. M. Wellington, M. Inst. C.E., one of the greatest living authorities on Railway Economy, who has studied the subject for years, in the last edition of his work on Railway Location, gives many valuable tables.

The question of the extra cost of working steep grades is fully gone into by him.

The following table is based on his American experience and has been amended since the former edition of his work was published, though the totals remain the same :—

*Estimated average cost per train mile of doubling the number of trains to haul a given traffic, or proportion of expenses which varies directly with the number of trains—the car tonnage remaining constant.*

Item.	Cost per cent. or in cents.	Per cent. added by doubling number of trains.	Added cost—cents.
Fuel ... ..	7.6	67 per cent.	5.1
Oil, waste, and water ... ..	1.2	67 "	0.8
Engine repairs ... ..	5.6	75 "	4.2
Shunting engines ... ..	5.2	Unaffected.	
Train wages and supplies ... ..	15.4	100 per cent.	15.4
Car maintenance ... ..	12.0	10 per cent. less.	(-1.2)
Renewals—rails ... ..	2.0	100 per cent.	2.0
Adjusting track ... ..	6.0	100 "	6.0
Renewals—ties ... ..	3.0	100 "	3.0
Earthwork and ballast ... ..	4.0	100 "	4.0
Switches and sidings ... ..	2.5	100 "	2.5
Bridges and buildings ... ..	5.5	Unaffected.	
Station terminal and general... ..	30.0	20 per cent.	6.0
<b>Total for operating items ... ..</b>	<b>100.0</b>	<b>47.8</b>	<b>47.8</b>
<b>Add for interest on cost of extra locomotives ... ..</b>			<b>1.7</b>
<b>Grand total cost per mile per cent. added ... ..</b>			<b>49.5</b>

Thus if we double the number of trains to carry a given traffic—otherwise double the train miles—the cost per each additional train mile will be only 50 per cent. of the cost of the original train mile.

*Relative cost per train mile.*

Therefore the average cost *per train mile* for the two lines will be as :—

$$1 : \frac{1 + .50}{2} \quad \text{or as} \quad 1 : .75$$

*New South Wales Railways.*

The average cost *per train mile* for all the New South Wales Railways—as given in the Railway Commissioners' Report, was 49.91 pence for year ending June, 1890.

The items are given thus :—

*Working Expenses, 1890.*

Maintenance of way, works, and stations... ..	d.
Locomotive power ... ..	13.24
Carriages and waggons ... ..	15.95
Traffic expenses ... ..	4.75
Compensation ... ..	13.64
General expenses ... ..	0.32
	2.01
<b>Total ... ..</b>	<b>49.91d.</b>

It is curious that this should agree so exactly with the amount given by Mr. Wellington as the average of American Railways, viz 1 \$ = 50 pence.

The Blacktown-Blayney Line, with 1 in 60 ruling grades, and supposing 12 chain curves also to have been obtained, would be about an average line to work.

Assuming, therefore, that all the traffic in goods and stock to and from places west of Blayney, to and from places east of Blacktown passed over the line when constructed, we may fairly say it would be carried at 50d. *per train mile*.

Then, applying the result arrived at in a previous Table, we find that the same tonnage could be carried over the existing line for  $\frac{2}{3}$  = 37.5d. *per train mile*.

This result may appear strange, but when it is recollected that a train mile on the Blacktown-Blayney line would mean 244 tons of paying load moved 1 mile, against 130 tons for the present line, it will not be wondered at, especially when it is remembered that *locomotive power* bears such a small proportion to total working expenses.

*Relative*

*Relative cost of working a given traffic.*

Grade.	Cost per Train mile.	Cost per Ton mile.
1 in 60.	50 pence.	·20 pence.
1 in 33.	37·5 „	·29 „

*Traffic Returns.*

I have had considerable difficulty in obtaining a return of the traffic that would be diverted from the existing line to the Blacktown-Blayney, owing principally to the press of work in the Traffic Department.

Where the return was incomplete I have extracted the information from the last Annual Report of the Railway Commissioners.

*Traffic which would be diverted over the Blacktown-Blayney Alternative Line.*

General goods ... ..	81,643 tons = 13,607 trucks.
Live stock ... ..	= 8,737 „
Wool ... ..	25,771 „ = 4,295 „
Total ... ..	26,639 „

Allowing average load for goods truck to be 6 tons, and average gross weight for all, 12 tons. This would be an average traffic of 86 trucks per day, allowing 310 working days per year.

To carry this traffic over present line would require 8 trains per day or 4 each way, and over Blacktown-Blayney Line 4 trains per day or 2 each way per day.

*Relative working expenses.*

Then giving the Blacktown-Blayney Line the benefit of supposing it to be as short as the present line—say 150 miles:—

$150 \times 8 \times 310 \times 37\cdot5d. = £58,125 =$  Annual working expenses of that portion of traffic to be diverted.

$150 \times 4 \times 310 \times 50d. = £38,750 =$  Future cost by new route.

To working expenses of new route must be added cost of maintenance of over 100 miles of additional line and annual cost of at least ten additional stations and platforms, to what would be required on the Rockley and Mulgoa branches.

By maintenance I mean wages of milesmen or track walking. Other items, such as wear of rails, have been allowed for in estimate of cost per train mile.

Maintenance men, at £25 per mile ... ..	2,500
Stations' wages, ten at £300 ... ..	3,000
...	£5,500
Traffic working expenses ... ..	38,750
Blacktown-Blayney annual expenses ... ..	£44,250

*Loss sustained by construction of Blacktown-Blayney Line.*

The actual saving in working present traffic would be £13,875.

Or over £26,000 short of what is required to pay 4 per cent. interest on the excess of cost of the Blacktown-Blayney Line over the sum required to duplicate the present line from Penrith to Blayney, and construct the Perth-Rockley branch, and a branch from Liverpool to Mulgoa.

It would be necessary then for the present traffic to considerably more than double itself, in order for the saving in working expenses to justify the construction of the alternative line.

But as the traffic from places west of Blayney is not one-fourth of the whole traffic of the western system—the Lithgow Valley coal trade alone exceeding it—the relief afforded by the Blacktown-Blayney Line would be completely nullified by an increase of one-third in the whole of the western traffic.

The duplication of the western line across the mountains is, therefore, inevitable, and the sooner it is done the better, unless a really good alternative line can be got from the Lithgow Valley.

**Richmond to Eskbank.***Description of route.*

This line would cross the Hawkesbury about half a mile above the road bridge at Richmond, and wind up the Kurrajong slopes, tunnelling through the summit unto the long ridge forming "Bell's Line," which extends to Mount Wilson, or Bell Siding. The length is about 42 miles.

Land.—For the first 12 miles the land is of the richest quality, and the high grounds are gradually becoming covered with fruit gardens.

About one mile of worthless sandstone then intervenes, after which Bell's Line is reached. The soil along this ridge, as far as Mount Tomah (about 28 miles from Richmond), is generally poor and sandy; some better patches, however, occur here and there.

Mount Tomah is covered with basaltic soil of the richest kind.

The remaining 12 miles are through worthless sandstone country.

*Summary as to Soil.*

It will be seen, therefore, that out of a total length of about 42 miles, 14 miles is through very rich soil, 10 miles through light soil of not much value, and extending only a short distance on either side, and 18 miles through absolutely worthless land.

Timber.—Hardwood of a good quality grows on the Bilpin Forest Reserve, and in the ravines, also near Mount Tomah.

There would be sufficient to construct the line and produce a small traffic. There are about 6 square miles of forest reserve in all.

*Kurrajong.*

*Kurrajong.*

Population.—The first 12 miles is pretty thickly populated. The Kurrajong is a favourite place for summer residence, and with railway communication established it would at once rival and probably surpass all other summer resorts.

The rise from the Hawkesbury is sudden yet not precipitous, so that magnificent building sites can be got at any elevation up to 2,000 feet, from which beautiful views can be obtained.

From what is locally known as "The Top," the Hawkesbury Plain and Richmond appear as on a map.

In its rich soil the Kurrajong possesses enormous advantages over Katoomba or Mount Victoria. It is also 30 miles nearer Sydney traffic.

The wayside traffic for the first 12 miles would consist principally of fruit, firewood, and probably milk.

Very good fruit could also be grown at Mount Tomah, but the area of good land is too small to produce a large traffic.

The passenger traffic with the Kurrajong during summer months would eventually prove very large.

*Conclusion as to traffic.*

The conclusion, therefore, I have arrived at is that the first 12 miles would pay for the construction of a *cheap line*, but the remaining portion would not earn any revenue.

Unfortunately the large bridge which is required across the Hawkesbury would so swell the cost of the short line required that a cheap line cannot be obtained at present.

At some future time the road bridge will require rebuilding, and the new bridge should be constructed to carry both road and railway.

*Relief to traffic on Western Line.*

The main question, however, is whether the line would relieve the traffic of the present Western line sufficiently to justify its construction. This depends on the grade obtained and the cost.

*Engineering.*

On the question of grade I find a difference of opinion among the surveyors who have been engaged on the trial survey.

Mr. Sharkey maintains that 1 in 50 can be obtained, while Messrs. Cumming and Lloyd say that 1 in 40 is the lowest ruling grade possible.

From my own inspection of the country I believe that 1 in 40 is the best grade that can be got on the 10-mile rise from the Hawkesbury, but that from there on 1 in 50 might be obtained at a greatly increased expense.

To get 1 in 40 heavy works will be required over 30 miles of line.

Tunnels, viaducts, and bridges, will prove a large item.

The bridge over the Hawkesbury will require an open approach nearly a mile long, while the bridge itself will be about 1,000 feet long and 60 feet high; costing, if made as cheaply as the Hawkesbury bridge, fully £100,000.

*Rough estimate of new line.*

A line with 1 in 40 grades would cost about £1,000,000 to construct as far as Bell Platform.

I do not include the cost of cutting out the great Zig Zag, as that portion of the project really belongs to the improvement of the Western line, and therefore for purposes of comparison may be excluded from the estimate.

*Cost of duplication.*

To duplicate and improve the present line as far as Bell would cost, according to Mr. Deane's rough estimate, about £300,000 or £700,000 less than what it would cost to construct the alternative line from Richmond.

*Saving in working expenses*

The saving in working expenses and wayside traffic should, therefore, produce £28,000 per annum before the line would pay interest on cost of construction.

*Relative loads.*

Referring to tables previously given.

	Tons.	Average Trucks.
Paying load on 1 in 40	= 160	= 26
" " 1 in 33	= 130	= 21
Difference...	30	5

or a 1 in 40 grade would increase the nett paying load a little less than one-fourth = 23 per cent actually.

*Relative cost per mile of working.*

Thus the reduction in engine mileage would be so small that the cost per train mile would be much the same as at present, or—

Grade.	Cost per Train Mile.	Cost per Ton Mile.
1 in 40	42 pence	0.26 pence.
1 in 33	37.5 "	0.29 "

*Traffic to be diverted.*

The traffic which could be diverted over this line amounted last year to about 60,000 trucks—allowing an average truck of 12 tons—equal to an average of 196 trucks per day or 18 trains on the present line.

A 1 in 40 grade would reduce the daily number of trains to 14.

Taking the distance as being the same by each route, then we obtain :—

*Cost of working traffic West of Bell, over different routes from Bell to Blacktown.—Estimated cost of working per annum.*

	miles.	days.	trains.	pence.	
Present line ... ..	60	310	18	37.5	= £52,312.
Via Richmond ... ..	60	310	14	42	= 45,570.
Difference ... ..					£6,742.

*Wayside revenue.*

The Kurrajong would eventually produce a nett revenue of £5,000 per annum, while the passenger traffic to Mount Tomah and Mount Wilson would pay for cost of stations and maintenance men.

*Total revenue.*

The net revenue from the line from all sources would therefore only amount to about £12,000 per annum, or £16,000 less than what is required.

A 1 in 50 grade would reduce the working expenses considerably; but I fear that, even if it were possible, this grade could only be obtained at such an enormous expense that 1 in 40 would show a better return for the money invested.

*Concentration of grade.*

It would, however, be worth spending a good deal of money to concentrate the 1 in 40 grade in one place, namely, the rise from the Hawkesbury to the top of the Kurrajong, and so derive the full benefit from an assistant engine.

*Reward for survey and plans.*

As Mr. Sharkey appears so confident that he can get a grade of 1 in 50 with 12-chain curves right through, would it not settle the matter if a suitable reward were offered for complete plans and sections showing this grade and curves, with line staked on the ground—cost of railway not to exceed (say) £25,000 per mile, or whatever amount it is considered might be spent in order to obtain a suitable line?

**Conclusions.**

As the result of my investigations I have arrived at the following conclusions :—

- (1.) That it is necessary to take steps to relieve the congestion of traffic on the Mountain section of the Western Line.
- (2.) That the Blacktown-Blayney Line would not divert a sufficient proportion of the traffic to give permanent relief, or the saving in working expenses and wayside traffic be sufficient to justify its construction.
- (3.) That the traffic producing districts opened up by the Blacktown-Blayney Line could be more economically served by branches from the main line.
- (4.) That the line from Richmond to Eskbank would divert fully half the traffic of the whole Western system, and therefore its point of connection is geographically correct.
- (5.) That the ruling grade of the Richmond-Eskbank Line would be so little superior to that of the present line that the consequent working expenses would be little reduced.
- (6.) That the saving in working expenses on the Richmond-Eskbank Line, together with the wayside traffic would not pay interest on its cost of construction.
- (7.) That it would be more economical, and better serve the interests of the country, to duplicate the present track and construct branches than to make either the Blacktown-Blayney or Richmond-Eskbank alternative Line.
- (8.) That the construction of a branch from Liverpool to Mulgoa and from Perth to Rockley is well worthy of consideration.
- (9.) That the extension of the Richmond Line into the Kurrajong would eventually pay interest on the cost of the construction of a cheap railway, and, therefore, no permanent concessions should be granted to any private company.

I have, &c.,

EDWD. B. PRICE.

[One Plan.]



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(ROYAL COMMISSION APPOINTED TO INQUIRE INTO PROPOSED EXTENSION INTO THE CITY.)

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*Ordered by the Legislative Assembly to be printed, 1 May, 1890.*

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*[Laid upon the Table of the Legislative Assembly in accordance with a promise made by the Secretary for Public Works, in reply to Question No. 14 of the 1st May, 1890.]*

VICTORIA, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen,  
Defender of the Faith, and so forth,—

To our trusty and well-beloved—

SYDNEY BURDEKIN, Esquire, M.P., Mayor of the City of Sydney, President,  
The Honorable SAMUEL ARON JOSEPH, M.L.C.,  
The Honorable JOHN MACINTOSH, M.L.C.,  
The Honorable WILLIAM HILSON PIGOTT, M.L.C.,  
HENRY CHRICILARD FRASER, Esquire,  
JOHN HAY GOODLET, Esquire,  
JAMES HAYES, Esquire, M.P.,  
ALEXANDER KETHEL, Esquire,  
JAMES MARTIN, Esquire, M.P.,  
GEORGE MUNRO, Esquire,  
JOHN MACPHERSON, Esquire,  
CHARLES FREDERICK STOKES, Esquire,—

Greeting :

Know ye that we, reposing great trust and confidence in your ability, zeal, industry, discretion, and integrity, do, by these presents, authorize and appoint you, or any seven of you, as hereinafter mentioned, to make a diligent and thorough examination and investigation into the several proposals which have been made for extending Railway accommodation into the City of Sydney; to inquire into the whole subject for the information of the Government;—such inquiry to be primarily in view of the present circumstances of the Colony and the present wants of the City population; and secondly and independently in view of the progress of the Country, the extension of the metropolis and its suburbs, and the increase of the population within the next twenty years or other estimated period. Further, to include in such inquiry the expediency of bringing into existence such suburban lines as may be necessary in connection with the main Railway system, and also the expediency of connecting the North Shore by means of a Bridge not obstructing the harbour navigation: And we do, by these presents, grant to you, or any seven of you, at any meeting or meetings to which all of you shall have been duly summoned, full power and authority to call before you all such persons as you may judge necessary, by whom you may be better informed of the truth in the premises, and to require the production of all such books, papers, writings, and all other documents as you may deem expedient, and to visit and inspect the same at the offices or places where the same or any of them may be deposited, and to inquire of the premises by all lawful ways and means: And we do give you power at your discretion to procure such clerical and other assistance as you may deem necessary for enabling you duly to execute this our Commission: And our

further will and pleasure is that you do within three months after the date of this our Commission, certify to us, in the Office of our Colonial Secretary, under your or any seven of your hands and seals, what you shall find touching the premises: And we hereby command all Government Officers and other persons whomsoever within our said Colony, that they be assistant to you and each of you in the execution of these presents: And we appoint you the said Sydney Burdekin, Esquire, M.P., to be President of this our Commission, which said Commission we declare to be a Commission for all purposes of the Act 44 Victoriae No. 1, intituled, "An Act to regulate the taking of Evidence by Commissioners under the Great Seal."

In testimony whereof, we have caused these our Letters to be made Patent, and the Great Seal of our said Colony of New South Wales to be hereunto affixed.

Witness, our right trusty and well-beloved Councillor, CHARLES ROBERT, BARON CARRINGTON, Knight Grand Cross of our Most Distinguished Order of Saint Michael and Saint George, our Governor and Commander-in-Chief of our Colony of New South Wales and its Dependencies, at Government House, Sydney, in New South Wales aforesaid, this nineteenth day of March, in the fifty-third year of our Reign, and in the year of our Lord one thousand eight hundred and ninety.

(J.S.) CARRINGTON.

By His Excellency's Command,

BRUCE SMITH.

Entered on record by me, in Register of Patents, No. 13, pages 515-16, this nineteenth day of March, one thousand eight hundred and ninety.

For the Colonial Secretary and Registrar of Records,

CRITCHETT WALKER,

Principal Under Secretary.

1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

## RAILWAYS.

(CONDITIONS, SPECIFICATIONS, &amp;c., OF THE CONTRACTS FOR RELAYING AND DUPLICATING THE SOUTHERN LINE.)

*Ordered by the Legislative Assembly to be printed, 19 December, 1890.**[Laid upon the Table in reply to Question No. 1, 10 December, 1890.]*

## Questions.

- (1.) DUPLICATION OF SOUTHERN RAILWAY LINE:—MR. McCOURT asked THE COLONIAL TREASURER,—
- (1.) Have the contractors for relaying or duplicating the Southern line any responsibility beyond employing and controlling the men?
  - (2.) What price per day are such contractors allowed for gangers, platelayers, and pick and shovel men?
  - (3.) What is the amount per day paid by such contractors to gangers, platelayers, and pick and shovel men?

## Answers.

New South Wales Railways.—Duplication of Existing Lines.

## SPECIFICATION.

1. This Contract is for the completion of Duplications of the following lines:—  
Hurstville to George's River,  
Sutherland to Waterfall,  
Campbelltown to Picton,  
Strathfield to Ryde,  
Teralba to Adamston,  
and from Granville to Campbelltown.

2. The works for which tenders are invited, and to which this specification refers, comprise the providing of all materials (except such as hereafter specified to be otherwise provided), labour, scaffolding, tools, implements, and every other thing requisite and necessary for the full and proper completion of all the earthwork, brickwork, masonry, timberwork, fencing, and ballasting required in the construction of a single line of railway, in accordance with this specification, and to the entire satisfaction of the Commissioners for Railways.

3. The contractor shall state in his schedule prices per cubic yard at which he will execute all the excavation, brickwork, and masonry; the timberwork at per cubic foot; the ironwork in bolts, straps, and other similar ironwork at per lb.; the fencing per lineal yard; the ballasting at per cubic yard, at the thickness specified hereafter; and ironwork in the construction of iron bridges at per ton, finding all materials and labour, the work being paid for on the net measurements as executed.

*Earthwork.*

4. A ditch at least 3 feet wide at top, 1 foot wide at bottom, and 1 foot 6 inches deep, shall be made on the higher side of the ground to be occupied by the railway, and at a minimum distance of 12 feet from the top of cutting or foot of embankment. These drains are to be made to fall into the ditches or water-course at present existing for the drainage of the adjoining lands, or into the diverted channels, as the case may be; the side ditches are in all cases to be executed in advance of the cuttings and embankments.

5. The bottom of the cuttings is to have 5 inches rounding, unless otherwise ordered.

6. The cuttings to be sloped at such batters, as may be ordered during the progress of the work.

7.

7. The embankments throughout the contract to have slopes of  $1\frac{1}{2}$  to 1 properly trimmed, and the width of formation to be as may be directed.

8. The formation of the cutting shall be trimmed to such level, and be of such width as may be directed during the progress of the works. No ballast shall be laid in cuttings or on embankments until the formation has been properly trimmed.

9. The excavations shall at all times be kept free from water, and so conducted as always to afford the utmost facilities for the escape of water, by casting and keeping properly cleaned out ditches (which shall in no case be deeper than the formation level) on each side of the excavation, and also by pumping if necessary.

10. No compensation will be paid for any damage or loss caused by slips, heavy rainfall, or floods. The actual excavation only will be paid for at schedule rates.

11. The contractor must deposit the material from the cuttings to such place, not exceeding a mile lead, that may be directed during the progress of the works, at the price stated in the schedule for "excavation from cuttings taken to embankments."

12. Any stone or gravel that may be found in the cuttings suitable for ballasting may be laid aside by the contractor, at his expense, instead of being taken to embankments; but any deficiency in the embankments caused by such appropriation of materials from the cuttings shall be supplied entirely at the expense of the contractor.

13. The price stated in the schedule for excavations from cuttings is to be the average price per cubic yard, whatever the nature of the material excavated may be, and the contractor must therefore satisfy himself as to the nature of the excavations in the different cuttings before sending in his tender.

14. The earthwork must be well punned for such distance as may be required on either side, and one yard in depth, over the top of all culverts, to ensure their safety during tipping, without any charge beyond the price stated in the schedule for earthwork.

15. In cuttings which have already been formed and embankments which have already been tipped, the formation of which has been interfered with by carting will have to be reformed by the contractor at a price per yard super.

16. On embankments, the stumps of trees, &c., must be cut off 2 feet below formation, or removed altogether, if necessary, before the earthwork is commenced. On the sites of bridges and waterways, when required, all stumps must be removed. This cost will not be paid for as a specific charge, but must be included in the price stated in the schedule for earthwork.

17. All embankments which have to be formed on side-lying ground must have benchings cut, so as to prevent the bank from slipping, and such benchings shall be done to the satisfaction of the superintending officer. The excavation for these benchings to be paid for at the price stated in the schedule for side cuttings.

18. During the progress of the works every protection shall be afforded to the public by the erection of proper fences alongside all excavations which join upon any public road; and when the road is crossed by the railway, temporary crossings or diversions shall be made at the expense of the contractor, and lights shall be kept burning between the hours of sunset and sunrise at all intersections or diversions of all public roads. (Temporary fencing must also be erected between the works in progress and the existing line.) The contractor will be held responsible for any accidents which may occur at any of these crossings during the progress of the works.

19. Four miles of rails or fastenings for a single line of railway will be lent to the contractor if necessary.

20. All rails and fastenings lent to the contractor for temporary purposes must be returned by him and stacked in the line where ordered, having been first straightened to the satisfaction of the Engineer. Any rails or fastenings cut, broken, lost, or so damaged by the contractor as to be rendered useless must be paid for by him at the price per ton at which similar articles are valued in the Colony. (No rail must be bent to suit sharper curves than 7 chains radius.)

21. Benchings not less than 2 feet on the base must in all cases be made on the slopes of original embankment where directed. These will be paid for at per chain. If necessary, all grass must be chipped off the slopes of original embankments, and the seats of new embankments, if considered necessary by the superintending officer. The cost of this work will not be paid for as a specific charge, but must be included in the price stated in the schedule for earthwork.

### Bridges, Culverts, &c.

#### *Brickwork and Masonry.*

22. The brickwork and masonry in bridges, culverts, &c., is to be similar in every respect to that already built in the original line between Adamstown and Teralba, Ryde and Strathfield, and Mlawarra lines, unless otherwise directed by the engineer or superintending officer; but between Granville Junction and Picton new drawings will be made.

23. No masonry or brickwork shall be commenced without an order from the engineer or superintending officer; and when the excavation is ready to receive the brickwork or masonry, the contractor must give notice to the engineer or superintending officer to that effect, so that the foundations may be inspected before the work is commenced.

24. If any work shall sustain damage from carelessness on the part of the contractor in not sufficiently backing up the masonry or brickwork, the whole of such work will be condemned, and must be rebuilt at the expense of the contractor.

25. If earthenware pipes be used for drains they shall in all cases be sunk not less than their outside diameter below the surface of the ground, and the joints made with properly tempered clay.

#### *Concrete.*

26. When the foundations, in the opinion of the engineer, require it, the contractor shall provide cement concrete, composed of one part of Portland cement and six parts of stone and sand or of approved gravel, the stone to be broken to a 2-in. gauge and the sand to be in such proportion as the engineer may direct; the whole to be mixed with water and carefully filled into the foundation pits in layers not less than 1 ft. in thickness, every portion being carefully punned. The sand and stone to be measured separately to make up six parts.

*Cement.*

*Cement.*

27. The cement to be Portland cement of the best quality and of approved brand, gauged in the proportion of four of clean sharp sand to one of cement, or in such other proportions as may be ordered, and must be used fresh.

The contractor is to submit samples of every brand of cement used by him on the contract (as often as he may be required to do so) to the Department of Harbours and Rivers, for the purpose of being tested as to its tensile strength, weight, and fineness; and he must produce satisfactory certificates of the results of such tests, together with samples of the cement so tested, before any cement will be accepted for use in the works.

*Timberwork.*

28. The timberwork in viaducts, bridges, &c., is to be constructed in every respect similar to that already built in the original line, unless otherwise directed by the engineer or superintending officer; but *no round timber will be allowed.*

29. White gum timber shall not be used for any purpose in this contract.

30. The timber used in the viaducts and bridges must be free from sap, wane, knots, gum-veins, and all other defects, and must be sound and well-seasoned. All timber less than 12 in. x 12 in. scantling must be free from heart. Great care must be taken in forming the work and fitting the ironwork, which must be done with the greatest accuracy.

31. The girders, trusses, headstocks, sleepers, transoms, and corbels shall be of ironbark timber, perfectly square, and the walings, braces, planking, and sheeting shall be of sawn timber of any approved hardwood, straight and sound. All beds and joints of the timberwork to have a thick coat of red lead and oil previous to being fixed. The cost of this is to be included in the price stated in the schedule for timberwork.

32. When the piles are being driven every precaution must be taken to prevent splitting during the driving, as no split piles will be allowed to remain in the work.

33. Each pile must be driven with an iron ram, weighing not less than 25 cwt., and every pile shall be driven to such depth as may be required by the superintending officer.

34. The contractor must ascertain for himself the required length of each pile, as no scarfing to any of the piles will be permitted, and all piles pitched too short must be drawn and others substituted of the required length.

35. An allowance will be made to the contractors of 3 feet in each road pile beyond the net measurement (when cut off for the reception of the headstock) for waste in driving. No allowance will be made on wing piles or on trestles fixed on sills, as the length of these can be ascertained beforehand.

36. The whole of the bolts, nuts, straps, spikes, plates, washers, strap bolts, and pile shoes to be of wrought iron of the best quality, and of similar form and dimensions to those in the original bridges.

The whole of the ironwork, excepting pile shoes, to be heated and dipped in linseed oil before being taken on to the works.

37. The whole of the exposed timber work is to have three coats of lead and oil, two coats to be put on as the work is finished, the third coat to be put on just before the completion of the contract of approved colour. The wings to bridges, sheeting, and decking which will be covered, to have two coats of tar laid on hot. This work will be paid for at the price named in the schedule.

*Permanent Way and Ballasting.*

38. All iron work for the permanent way, rails, fishplates, bolts, nuts, spikes, and screws will be provided for the contractor. These permanent way materials will be delivered to him where required, free of cost.

39. The bottom ballast shall consist of broken stone of approved quality not larger than a 4-inch cube, to be laid to a thickness of 9 inches. (See clause 61.)

40. The ballasting, as described in clause 39, when laid complete, will be paid for at per cubic yard at the price stated in the schedule, and no allowance will be made for any loss by subsidence in embankment or otherwise.

41. The price per lineal yard for laying the permanent way includes laying down and fixing the line of rails to the sleepers and to lifting and boxing up with top ballast provided by the Commissioners in accordance with drawings that can be seen at the office of the Engineer for Existing Lines.

42. The sleepers will be provided by the Commissioners, and must be placed such distance apart as may be directed. The bed for rails to be machine planed by the contractor.

43. The rails must be fixed to the sleepers with screws and spikes, the holes for which must be bored in the sleepers to prevent their splitting when inserting the fastening.

44. The rails must be laid with the joints at nearly right angles with each other as the length of rail will permit, but in no case shall the joint of one line of rails have a lead or be in advance of the joint in the opposite rail of more than 3 inches.

45. All the sleepers must be laid as nearly as practicable at right angles to the centre line of railway; they must be well and thoroughly packed so as to cause the upper surface of the rails when finished to be at such level as may be directed; and the two lines of rails shall be laid uniformly parallel to the centre line throughout, and must be perfectly straight on all the straight portions, and on the curves they must be laid to a uniform specified curve.

*Miscellaneous.*

46. The contractor shall maintain all works which he may have executed under this contract in good order and repair for a period of six months after they have been certified by the engineer to have been satisfactorily completed.

47. The contractor shall pay all stamp and other duties which the Government may now or hereafter require to be paid on any document forming part of this contract.

48. The Government foremen, gangers, mechanics, and labourers at present employed on these duplication works must be employed in their present position by the contractor for a period of one calendar month after the contract is signed.

49. The plant at present in use on these duplications is to be taken by the contractor at a valuation.





the matter in dispute shall stand referred to a sole arbitrator in default of the appointment by the other party, and such sole arbitrator shall die, the party by whom he was appointed shall appoint another sole arbitrator in his place; and every arbitrator so to be substituted in either of the cases aforesaid, shall have the same powers and authorities as were vested in the former arbitrator at the time of his death or disability.

6. If more than one arbitrator shall be appointed, such arbitrators shall, before they enter into the matter or question referred to them, nominate and appoint, by writing under their hands, an umpire to decide on the matter so referred; and if such umpire shall die or become incapable of acting, they shall forthwith, after such death or incapacity, appoint another umpire in his place, and the decision of every such umpire on the matters referred to him shall be final.

7. If, in either of the cases aforesaid, the said arbitrators shall refuse, or shall, for seven days after request of either party, neglect to appoint an umpire, a Judge of the Supreme Court, upon application made to him by either party, shall appoint an umpire whose decision shall be final.

8. If a single arbitrator shall be appointed, and he shall die or become incapable to act before he shall have made his award, the matters referred to him shall be determined by arbitrators appointed hereunder, as if the arbitrator so dying had not been appointed.

9. If more than one arbitrator be appointed, and either of them shall refuse or for seven days neglect to act, the person by whom such defaulting arbitrator was appointed shall, within seven days after notice in writing, proceed to appoint another arbitrator to act for the arbitrator so refusing or neglecting, or the other arbitrator may proceed *ex parte*; and the decision of such other arbitrator shall be as effectual as if he had been the single arbitrator appointed by both parties.

10. If more than one arbitrator shall be appointed, and neither of them shall refuse or neglect to act as aforesaid, then if such arbitrators shall fail to make their award within thirty days after the day on which the last of such arbitrators shall have been appointed, or within such further time as may be granted by a Judge of the Supreme Court on application by either party, the matters so referred to them shall be determined by the umpire appointed as aforesaid.

11. The arbitrators, or any two of them, shall have power to hear, receive, and examine evidence; and the witnesses on any reference herein may be examined on oath or affirmation. Neither of the parties hereto shall be at liberty to appear before the arbitrators by counsel or solicitor.

12. The award of the arbitrator or arbitrators or umpire shall be in writing, ready to be delivered to either party within the time appointed for making the said award. This submission may be made a rule of the Supreme Court. The amount of costs, umpire's and arbitrators' fees, shall be decided by the arbitrators, arbitrator, or umpire; the amount of costs, including arbitrators' and umpire's fees and witnesses' expenses, the items thereof, being shown in the account annexed to said award.

13. If upon an arbitration in respect of claims made by the contractor the sum awarded to the contractor shall be less than one-half of the amount of his said claim, all the costs, charges, and expenses of and incident to the said arbitration and award shall be borne and paid by the contractor; but if the amount awarded shall exceed one-half of the amount of the said claim, then each party shall pay his own costs and one-half of the arbitrators' and umpire's fees.

14. It is to be distinctly understood that all claims by the contractor or by the Minister to have any of the matters which under paragraph number 2 may be submitted to arbitration so dealt with, must be made upon the whole of the work being completed, and before payment to the contractor of the retention money or of the money deposited as security for the due performance of the contract, and that the acceptance by the contractor of payment of the retention money in case where a bond to secure the completion of the works has been given, and in other cases of the retention money or of any balance thereof, and of the money deposited as security for the due performance of the contract, shall be conclusive proof that the contractor has no such claim or claims.

### Duplication of Existing Lines.—General Conditions.

#### *Interpretation clause.*

1. The words "Superintending Officer" in these conditions shall mean any person who may from time to time be appointed by the Engineer for Existing Lines of Railways to supervise the works or buildings, and the word "Engineer" shall mean the Engineer for Existing Lines of Railways for the time being of the Commissioners for Railways.

#### *Dismissal of workmen, removal of improper materials, &c.*

2. The engineer shall have the power of immediately dismissing any agent or workman employed by the contractor, and of having removed off the line of railway (or any land belonging to the Commissioners) any materials, plant, or implements which in his opinion are insufficient for the purpose intended, or at variance with the meaning and intention of this specification. The cost of the removal of any such plant, materials, or implements, to be paid by the contractor.

#### *Instructions to be obeyed.*

3. Should the contractor refuse or neglect to carry out the instructions of the engineer or the superintending officer, the engineer shall have the power of suspending the usual monthly certificate until such instructions have been complied with.

#### *Extra works, omissions of works, &c.*

4. If at any time whilst the works are in hand it shall be deemed expedient by the engineer to increase or diminish the dimensions of any works to be done under this contract, or to alter their situation, or to vary the materials or form or dimensions of any of the said works, or of any part thereof, he shall have full power to do so, and to order and direct any such increase, diminution, or alteration, which

which shall be executed by the contractor if of the class of works provided for in the schedule of prices; and no such increase, diminution, or alteration of works shall in any way annul or set aside this contract, or extend the time for the completion thereof, but such additions or alterations shall be measured and allowed and paid for, or such deductions credited to the Commissioners for Railways as the case may require, according to the schedule of prices; and if any portion of the works so ordered to be done shall not be of the class of works provided for in the schedule of prices, the same shall be executed by the contractor at such price as may be agreed for with the engineer; but if the contractor and the engineer cannot agree as to the works required to be done, which are of a class not provided for in the schedule of prices, the engineer may order and direct the same to be done by such person or persons as he may think fit.

*Measurements.*

5. The whole of the work to be executed as per instructions of the engineer, and to the dimensions given on the drawings.

*Labour, materials, plant, &c.*

6. The contractor shall provide, at his own costs and charges, all materials, labour, tools, plant, tackle, machinery, scaffolding, &c., for the proper completion of the works at the prices stated in his schedule.

*Damages, &c., to be paid for by contractor.*

7. The land inside the fences of the railway may be used for the purpose of carting the materials for the works on this contract, but all damage that may be done to any land not actually the property of the Commissioners must be paid for by the contractor, whether such damage be caused by the carting of materials, or the straying of cattle in consequence of the destruction by the contractor or his workmen of the original fences, or of the fences alongside the railway, or by any other cause connected with the construction of the works; and should such damage not be at once paid for, such an amount as shall appear reasonable to the Commissioners may be paid by him in compensation for the same, and deducted from any money that may be due to the contractor for work done under this contract.

*Setting out works.*

8. The works will be set out for the contractor, but he must satisfy himself of their accuracy, as no work incorrectly set out or improperly executed will be paid for by the Commissioners.

*Contractor to be represented.*

9. The contractor, at all times during the progress of the works, when he is not personally superintending them, must have a responsible agent or overseer stationed on them to receive instructions from the superintending officer or Engineer for Existing Lines of Railways, and to represent the contractor for all the purposes of this contract.

*Progress of works.*

10. Should the engineer be at any time dissatisfied with the mode of proceeding, or at the rate of progress of the works or any part thereof, the Commissioners shall have full power, without vacating this contract, to take the works wholly or in part out of the hands of the contractor, and to employ, procure, and make use of all labour or materials which they may deem necessary for completing the works, the cost of such labour and materials to be deducted from any money that may be then due, or may hereafter become due to the contractor; and if the money then due, or thereafter becoming due to the contractor, shall not be sufficient for that purpose, the balance remaining unpaid may be recovered in an action for damages for breach of contract, or as money paid for the use of the contractor.

*Cancellation of contract.*

11. The Commissioners shall have the option, and full power and authority, in lieu of proceeding under the last preceding clause of these conditions, if the contractor fail to proceed in the execution of, and to carry on the works in the manner and at the rate of progress required by the engineer, of cancelling this contract so far as relates to the works remaining to be done; and in such case the moneys which shall have been previously paid to the contractor on account of the works executed shall be taken by him as full payment for all works done under the contract; and upon notice in writing under the hand of Commissioners that they, under the authority of this condition, cancel the contract, being served upon the contractor, or left at his last-known place of abode, the contract shall be cancelled, and thereupon all sums of money that may be due or unpaid to the contractor, together with all implements in his possession, and all materials provided by him, upon the ground upon which the work is being carried on, or adjacent thereto, and all sums of money named as penalties for the non-fulfilment of the contract within the time specified, and the sum of four thousand pounds, which, under section 20 of these conditions, the contractor shall have deposited as security for the completion of the contract, shall also be forfeited and become payable to or receivable by the Commissioners, and the said implements and materials shall become and be the absolute property of the Commissioners, and with the moneys so forfeited and payable or receivable as aforesaid shall be considered as ascertained damages for breach of contract.

*Time of completion.*

12. The contractor shall complete the whole of the works comprised in this contract on or before the thirty-first day of May, one thousand eight hundred and ninety-one; and in the event of their non-completion at the specified time, should the Commissioners not have proceeded under clauses Nos. 10 and 11 of these conditions, or either of them, the contractor shall forfeit and pay fifty pounds sterling per week or every part of a week that shall elapse after such specified time until their completion, and which sum or sums may be deducted from any money payable to the contractor under this or any other contract or (as hereinafter provided) from the money deposited by the contractor as security for the due completion of the contract.

*Delay*

*Delay by Commissioners, &c.*

13. If the contractor shall not be able to obtain possession of any portion of the ground required for the formation of the railway, or of any of the works to be done in connection therewith, or if from the non-delivery, or any delay in the delivery to the contractor of any materials which under the contract the Commissioners for Railways are to supply, or from any cause whatever arising out of the acts or defaults of the Commissioners for Railways, or any officers or servants in their employment, or from any accident happening to the said works during their progress not arising from the neglect or default of the contractor or his servants or workmen, the contractor shall be delayed or impeded in the execution of his contract, the contractor may, from time to time, within seven days of the happening or occurring of such act, default, or accident, apply in writing, setting forth the cause of such application, to the Engineer for Existing Lines of Railways for an extension of time on account of such act, default, or accident, who shall, if he shall think the cause sufficient, but not otherwise, allow by writing under his hand such an extension of time as he shall in his uncontrolled discretion think adequate; and the penalties, sets-off, and deductions to which under the contract the contractor is liable shall not attach until the expiration of such extension of time, but shall attach and the contractor shall become liable to the same from the date of the expiration of such extended time or times. And unless the contractor shall make such application within the time and in manner aforesaid, and unless and until the Engineer for Existing Lines of Railways shall allow such extension or extensions of time as aforesaid, the contractor shall not, by reason of any delay arising from the cause or causes aforesaid, or any of them, be relieved in any way or to any extent of his liability to finish and complete the works within the time in this contract specified; and in default of his so doing to pay and be subject to the penalties, deductions and sets-off as in these conditions provided; nor shall the Commissioners for Railways be deprived in any way or to any extent of their right to deduct or recover penalties or liquidated damages, or to make deductions or sets-off which under the contract they are entitled to make, receive, deduct, set-off, or receive from the contractor for or by reason and on account of any delay in the completion of the work or any portion of the same, nor shall the rights, powers, and authorities, by these conditions given to or vested in them be in any way affected. And the Commissioners will not be responsible for any compensation for any delay that may be caused through the working of the ordinary traffic.

*Copies of drawings, &c.*

14. Copies of all drawings will be supplied to the contractor whose tender is accepted.

*Free passes, &c.*

15. No free passes on any of the Government Railways will be granted to the contractor or his agents, but the material and plant will be conveyed from Sydney and Newcastle and along the various sections free of charge.

*Liability of contractor.*

16. The care and maintenance of all works under this contract shall remain with the contractor until six months after their completion, and until the Engineer for Existing Lines of Railways shall, by notice in writing under his hand, inform the contractor that he has taken charge thereof; and until such notice shall have been given, the contractor shall be responsible for all accidents from whatever cause arising, and shall make good all damage thereto.

*Contractor not to assign works or moneys.*

17. The contractor shall not assign over this contract or assign all or any of the moneys payable or to become payable under the contract, or all or any part thereof, or any other benefit whatsoever arising, or which may arise under this contract, to any other person, without the consent in writing under the seal of the Commissioners for Railways first obtained. The contractor, for each and every breach of this condition, shall pay to the Commissioners for Railways the sum of five hundred pounds as and for liquidated damages; and the sum or sums payable as such damages may be deducted from any sum or sums due to the contractor under this or any other contract with the Commissioners for Railways. And any permission to assign over this contract shall not discharge the contractor from liability to see that the works so assigned are executed and completed in terms of this contract, unless on the assignment thereof the Commissioners expressly declare that the contractor is discharged from further liability.

*Truck system not allowed.*

18. The workmen, tradesmen, and labourers of every class employed on the works to which these conditions refer, shall be paid their wages, in full, in money, current coin of the Colony, at least once in every month, and no ticket or other system of payment by provisions, liquors, or goods, will on any pretence be allowed; nor shall the contractor, or any person or persons employed by him, or in any way connected with him, establish any shop for the supply of provisions, liquors, or goods; nor shall the contractor oblige his workmen to take provisions, liquors, or goods of any kind from any person in particular. The workmen of every class shall be paid on the works if it be possible, or in some building adjoining; and in no case shall they be paid at a public-house or other place where liquors or refreshments are sold.

*Bankruptcy or insolvency.*

19. If the contractor shall become insolvent, have his estate placed under sequestration, or shall make an assignment of his estate for the benefit of his creditors, it shall be lawful for the Commissioners, without previous notice to the contractor, or to the official or other assignee or assignees of his insolvent estate, or to the trustee or trustees under the assignment, to take the works out of the hands of the contractor and of the assignees or trustees of his estate, and to recontract with any other person or persons to proceed with and complete the same, upon such terms, stipulations, and conditions as shall be deemed expedient; and all the then remaining materials, implements, and plant aforesaid may be used in and applied for the purposes of the works; but on the final completion of the works, the surplus of such materials, implements, and plant shall cease to belong to the Commissioners, and shall become the property of the said assignees or trustees, without any allowance for or payment by the Commissioners, or on account of any loss or diminution, wear, tear, or injury they may have sustained in the meantime.

*Security.*

*Security.*

20. Within six days after notice of the acceptance of his tender shall have been given to the contractor or posted to the address of his last-known place of business or residence, the contractor shall deposit with the Commissioners or at the option of the Commissioners in some bank or banks in Sydney, upon fixed deposit in the name of the Commissioners the sum of four thousand pounds, to be held by the Commissioners as security for the due and proper performance and completion of the contract until the Engineer for Existing Lines of Railways has certified that the whole of the work in the said contract has been completed to his satisfaction, or until the contract has been cancelled by the Commissioners under the power given to them in that respect under clause 11 of these conditions—in which last-mentioned event happening the money so deposited will become forfeited. If however the contract shall not be declared to be cancelled under the said 11th clause, and if the works comprised in this contract are not completed within the time mentioned in clause 13 of these conditions, the weekly penalty which under the said last-mentioned clause will be payable to the Commissioners may be deducted and taken from the money so deposited.

Should the contractor fail to deposit the said sum of four thousand pounds as hereinbefore provided, within six days from the acceptance of the tender, or should the contractor fail to execute the contract for the due performance of the works mentioned in the said tender, the Commissioners will have the option of and full power and authority to declare such acceptance to be annulled.

No tenderer will be allowed to proceed with the work tendered for until he has made the deposit as aforesaid, and has executed the required contract for the due performance of the said works—it being hereby declared that for all or any work done or materials found and provided by the contractor before the due execution of the said contract, or the said money being deposited as aforesaid, he shall not have any right of action, claim, or demand against the Commissioners.

The contractor will be entitled to receive any interest that may be payable upon the fixed deposit of the money if the money shall be placed in a bank at fixed deposit as such interest becomes payable, but it is expressly declared that the Commissioners are not to be held liable or answerable in any way for any loss of the money so deposited by reason of the same having been deposited in a bank as fixed deposit, or for any loss of interest from the fixed deposit not being renewed.

*Progress payment without prejudice, &c.*

21. No certificate given to the contractor for the purpose of any progress payment shall prevent the Engineer for Existing Lines of Railways from at any future time before the termination of the contract rejecting all unsound materials and improper workmanship discovered subsequently to the giving of the last previous certificate; and notwithstanding the giving of any certificate that portions or the whole of the works have been satisfactorily performed, the Engineer for Existing Lines of Railways may require the contractor to remove and amend at any future time previously to the final payment on account of the construction or maintenance of the works, any work that may be found not to have been performed in accordance with the contract; and the contractor must remove and amend at his own cost all such work when so required, notwithstanding any approval made or given by the superintending officer; and the Commissioners shall have power, on the report of the Engineer for Existing Lines of Railways that the work approved of as aforesaid is not in accordance with the contract, to deduct from any moneys that may be due or that may become due to the contractor, the whole amount that has been paid on account of such work.

If, in the opinion of the Engineer for Existing Lines of Railways, further inquiry is necessary or desirable before any certificate is given, he shall have power to withhold such certificate for a period not exceeding one month from the date at which in the ordinary course the certificate would have been given.

None of the conditions of this contract shall be varied, waived, discharged, or released, either in law or in equity, unless by the express consent of the Commissioners testified in writing under their seal.

*Payments.*

22. Payments will be made once in every month, unless same shall become not payable by reason of anything contained in these conditions, on the engineer's certificate, as the work proceeds, in the proportion of 90 per cent. of the value of the work satisfactorily executed, and the remaining 10 per cent. will be paid in the proportion of 5 per cent. on the expiration of the contract, the remaining 5 per cent. to be paid at the expiration of the six months' maintenance.

23. Should any portion of the contract be opened in sections, the contractor's maintenance for such sections will commence on the dates of such openings, and his retention moneys will be dealt with in accordance with such openings.

New South Wales Government Railways, Office of Engineer for Existing Railways,  
Sydney, , 188 .

New South Wales Government Railways.—Relaying, Reballasting, &c.—Southern Division.

SPECIFICATION to be observed in carrying out a contract for relaying, reballasting, draining, fencing, and other extra works in connection with the Permanent-way of the Southern Division of the New South Wales Railways.

*Position and mileage of division.*

	Miles.	yards.
From Picton to Goulburn ... ..	81	528
„ Goulburn to River Murray ... ..	252	66
„ Goulburn to Cooma ... ..	130	550
„ Cootamundra to Gundagai ... ..	33	1,144
„ Demondrille to Cowra ... ..	63	1,144
„ Junee to Hay ... ..	167	688
„ Narrandera to Jerilderie ... ..	65	220
Total length of line ... ..	793	760

Conditions of Contract.

*Contractors' workmen.*

The contractor will be required to provide men for carrying out the various works specified on any portion of the division, and at such times as may be determined. These men, when relaying, to consist of gangs with not less than thirty-six men and one ganger, and one leading man, who will have to work under instructions from the engineer for the division, and who will have the right to object and cause to be discharged any ganger, foreman, or workman whom he may consider incompetent, or who fails to carry out any order or instructions given by his inspector.

*Machinery and tool repairs.*

The contractor will also have to provide and keep in repair all and every kind of tools and machinery necessary for the due performance of such work, viz., bars, levers, beaters, picks, shovels, augers, hammers, spanners, portable and other drilling machines, adzing and boring machines, portable engines for driving same, and any other tool or tools found requisite for the due performance of the work, as also portable forge or forges for tool repairs.

*Materials for relaying.*

The Railway Commissioners will provide all the necessary materials for relaying, viz., rails, chairs, fishplates, fishbolts, screws, spikes, and sleepers, as also ballast, drain-pipes, and all fencing materials.

*Loading and unloading materials.*

The contractor will be required to load and unload all such materials at any place where directed on the division, and to distribute same on the ground in such a manner as to facilitate relaying and other operations.

*Loading and unloading ballast.*

The contractor will also be required to load and unload ballast required for relaying.

*Traffic not to be obstructed.*

It must be distinctly understood that under no circumstances will any delay, impediment, stoppage, interference, or obstruction of whatsoever kind to the traffic, either on the railway or public roads, be permitted in carrying out this contract, and the whole of the works under the same must be done in such manner and at such times as not in any way to interfere with such traffic. The contractor will be required to provide at his own expense, and at all times during the currency of the contract, all necessary means and provisions that may be required for the carrying on of the traffic as before described, without obstructions or delay; and he must carry out without delay any instructions, whether verbally or in writing, that may be given for this purpose by the engineer or the superintending officer. And it must further be understood that the contractor will be held strictly and exclusively responsible for all delays, accidents, or damage to property or persons, of whatever nature, that may occur through the carrying out of the work.

If the contractor refuse or fail to carry out immediately any instructions given by the engineer or the superintending officer during the currency of the contract, the said engineer shall have full power, without vacating this contract, to take the works wholly or in part out of the contractor's hands, and carry the same out by his own Department, at the expense of the contractor.

The contractor must make himself thoroughly conversant with the time-tables and the rules and regulations in force for working the traffic on the railways (copies of which will be furnished to him on application), and a responsible foreman or overseer, who must also be thoroughly acquainted with the said time-tables and regulations, shall be placed wherever directed while the works are in progress. The contractor must also comply with all usages of conducting the traffic on the public roads.

*Passes.*

The contractor will be provided with one first-class pass for himself, one second-class pass for one foreman, and second-class passes for gangers and workmen. The passes for the contractor and foreman will be made available from Sydney and over the division. The workmen's passes will be confined to the division only.

No portion of this work to be sublet by the contractor.

The contract to be let for a term of five years from date of signing contract.

Nature

## Nature of Relaying.

### *Relaying.*

The contractor will have to remove the old sleepers, rails, fishplates, spikes, and screws; also chairs where they exist. This old material to be loaded into ballast wagons, and unloaded at the various depôts arranged for old materials on the division. After unloading all sleepers, if any have chairs attached, the chairs must be unspiked and removed from the sleepers, as also all old spikes and screws, and each kind of material must be stacked in such a manner as will be directed by the Permanent-way Inspector for the district.

### *Description of bottom and top ballast.*

On removal of the old permanent-way material, the ballast, if worn out, will have to be removed, and new bottom ballast substituted of a thickness not less than 9 inches. Such ballast will consist generally of broken sandstone or other similar stone, not less than 4-inch cubes. The top ballast will consist of hard broken stone, not less than 1½-inch cubes, or larger than 2-inch cubes. This ballast will have a thickness of 5 inches below the sleeper, and be boxed up level with the top of sleeper, or not more than 1 inch above same. (See drawing, Fig. 1.)

### *Lowering formation.—Variable widths of ballast.*

It may be necessary in some cases to lower and remove the formation between station platforms and under overbridges, in order to maintain the rail level at their respective heights (or such heights as will be directed). In some cases the existing ballast may be found sufficiently good, not requiring the full depth of 9 in. of bottom ballast, or it may be found that only the top or hard ballast of 5 in. below the sleeper and to the top of the sleeper may be necessary, but all such depths and widths of bottom and top ballast will have to be carried out as may be directed.

### *Number and position of sleepers under 30-ft. rails.*

After the ballast has been properly levelled for the reception of the sleepers, the latter must be placed at their respective distances, which in no case must exceed 2 ft. 8 in. from centre to centre; the position of joint sleepers to be so arranged as to allow the intermediate sleepers to be so spaced. Any alterations in this respect, viz., reducing the distance of 2 ft. 8 in. to a less distance, will be paid at a rate per extra sleeper or sleepers which reduces this distance. (See drawing, Fig. 2.)

### *Size of sleepers.*

The sleepers will generally be of the following dimensions, viz., 9 ft. x 10 in. x 5 in., but cases will occur when sleepers of a less size, viz., 8 ft. x 9 in. x 4 in. to 4¾ or 5 inches will be used. In all such cases the space between the sleepers, more especially on sharp curves and soft formations, will be reduced in distance.

### *Adzing and boring sleepers.*

The sleepers must be adzed by machinery to allow of the proper gauge, either in case of chairs or T rails, and also to give a true bed for the chair or T rail, and for the proper cant. All the holes for the spikes and screws must be bored to such a depth, and be of such a diameter as to allow of these being driven so as not to split the sleepers (the size of augers used in boring to be decided by the engineer), and if the contractor fails to carry out these conditions, and is found driving the screws and spikes without boring, he will have his contract cancelled.

This condition will be strictly enforced, and contractor must carefully consider same.

### *Gauge of line, and packing with ballast.*

After the chairs (if chaired road be laid down) or T-headed rails have been properly secured to their respective gauges—for straight line and curves over 15 chains radius the gauge must not exceed 4 feet 8½ inches, and for curves between 8 chains and 15 chains must be laid to 4 feet 8¾ inches—the road must be properly packed and lifted, such packing to be stiffly done for a length of 12 inches from the centre of the rail on either side, the middle and extreme ends of the sleepers to be only slightly packed, and it would be advisable for the road to be thoroughly bedded before it is finally packed and straightened, preparatory to completing the boxing up. (See drawing, fig. 3.)

### *Expansion at joints.*

The rails must be fished-up with the plates, and screw-bolts provided, and such expansion given as the engineer may direct, but not less expansion than one quarter of an inch must be given at each joint for 30-foot rails.

### *Fishplates and nuts.*

The fishplates must be screwed up, and the nuts of each bolt left with the square or hexagon sides of same in one level, as shown in drawing. (See drawing, fig. 3.)

### *Rail joints.—Short rails for curves.*

The rail joints must be placed opposite each other, and as square as can practically be done. The sleepers must also be equally spaced, and placed square to the rails. In going round sharp curves, great care must be used in keeping the joints square by putting in short rails (these short rails to be picked out by the men when laying out the rails preparatory to relaying).

### *Cant for curves.*

The necessary cant will be decided by the engineer, and each curve must have its full cant at the tangent, and be run out on to the straight, if it is straight road, with a grade of not less than 50 feet for every inch of cant given. In the case of reverse curves with little or no straight intervening, the full cant cannot be given for some distance from the tangent, but such cases will be specially directed by the engineer.

*Drainage*

*Drainage.*

In some cases it will be found necessary to lay in socket drain-pipes at a depth of not less than 12 inches below formation level; and as the size of pipes will vary in diameter, the contractor must put in a price for laying pipes, as given in his schedule of prices. He will also have to load and unload same.

*Fencing.*

The contractor must state a price per lineal yard for removing old fencing, and loading and unloading and erecting new fencing, as per drawings Nos. 14 and 15, and for loading up the old material, and unloading and stacking same at the depôt.

*Removal of earthwork, refuse material, and worn out ballast. Measurement for loading and unloading bottom and top ballast. Hopper ballast wagons and ploughs.*

It may also be found necessary to load and unload earthwork from slips and cuttings where silting up of grips has taken place, as also worn out ballast and refuse earthwork generally, such material to be paid for by the cubic contents of the wagon—the wagons to be full in all cases. Bottom and top ballast will also be paid for in the same manner. As the sizes of the wagons may vary, the wagon numbers and sizes will be registered, and when the contractor returns his statement of wagons loaded and unloaded, he must specify the wagon No. Special wagons for ballast are being provided with hopper doors in the bottoms to drop the ballast into the 4-foot, and a brake van with a plough is also being provided for levelling down the top ballast. These wagons and ploughs will be introduced as early as possible.

As cases may occur where measurement cannot be arrived at, the contractor must give a schedule of day-work prices.

*Laying in points and crossings.*

The contractor will be required to use great care in laying in points, crossings, and diamonds to the drawings provided. In every case the points from the toe to heel of points will be laid on special-sized sawn timber; as also the entire crossing, which includes crossing, Vs, wings, and check rails. Diamonds in all cases to be placed on similar timbers, and they must be laid in long enough to allow of double slip points being put in, the timbers to extend from heel to heel of crossings, as shown on drawing. The leads between heel of points and heel of crossings, or between diamonds and junction leads may or may not be laid with sleepers or timbers, as directed.

*Size of augers for boring timbers.*

All holes in timber for securing chairs or rails must be bored with an auger of suitable size for either screws or spikes. The timbers for all points, crossings, and diamonds will have one sawn face.

*Payment.*

The contractor will be paid monthly for the whole of the work executed, no retention money being held.

The contractor will also have to deposit the sum of £100 on sending in his Tender, which amount will be retained until the expiration of the contract, and to find two responsible sureties for the due performance of the work.

*Supply of materials.*

In the event of the Commissioners being prevented from supplying any of the materials in connection with the above contract, by causes reasonably supposed by them to be beyond their control, thereby causing delay to the contractors in the carrying out of the works, or should delay arise from the exigencies of the working of the traffic of the railways, or from any other cause or causes whatever occasioned by the act or default of the Commissioners, which in their opinion could not be reasonably avoided, the contractor shall have no claim upon the Commissioners for compensation for such delay.

*Terminating contract.*

Provided also that the Railway Commissioners have the option of terminating this contract at any time by giving three months' notice in writing to the contractors, should the Commissioners at any time be dissatisfied with the progress of the works, or find in their opinion that the contract is interfering in any way with the working of the railways, and the contractor shall not, by reason of such termination of the contract, have any claim whatever against the Commissioners for such termination of contract.

It is also agreed that the contractor, on his part, may at any time terminate the contract by giving to the Commissioners three months' notice in writing of his intention so to do.

J. ANGUS.

SCHEDULE OF PRICES FOR RELAYING SINGLE LINE OF RAILWAY.

		Rate.	
		£	s. d.
Taking out old sleepers rails, fish-plates, spikes, screws, and unspiking chairs, loading same into wagons, and unloading and stacking at Depot, as specified		per lin. yd...	0 0 6
Loading and unloading new materials for relaying, viz., sleepers, chairs, rails, fish-plates, fish-bolts, keys, spikes, and screws		"	0 0 6
Adzing sleepers, and relaying new material (see Drawing, Fig. 3), as specified		"	0 1 5
Loading, unloading, spreading, and levelling bottom ballast 9 in. thick, as specified (see Drawing, Fig. 1)		per cub. yd...	0 1 6
Loading and unloading top ballast, levelling, packing, and boxing up, as specified (see Drawing Fig. 1)		"	0 1 6
Lowering formation not exceeding 12 inches :—			
Excavation in rock		"	0 3 0
Do clay or other earthwork		"	0 1 9
Removing old ballast, loading and unloading, as specified		"	0 1 2
Laying in socket drain-pipes at an average depth of 3 ft. 6 in. below surface of rails (including excavation and jointing same with either clay or cement), also for laying in perforated pipes without sockets :—			
6 in. Socket Pipes (see Drawing, Fig. 4) jointed	{ cement	per lin. yd...	0 1 0
	{ clay	"	0 0 11
9 in. do do do	{ cement	"	0 1 1
	{ clay	"	0 1 0
12 in. do do do	{ cement	"	0 1 2
	{ clay	"	0 1 0
6 in. Perforated Pipes (see Drawing, Fig. 8)	"	"	0 0 10
9 in. do do	"	"	0 1 0
12 in. do do	"	"	0 1 0
6 in. Single Junctions (see Drawing, Fig. 5 and 5a) jointed	{ cement	"	0 1 4
	{ clay	"	0 2
9 in. do do do	{ cement	"	0 1 5
	{ clay	"	0 1 4
12 in. do do do	{ cement	"	0 1 8
	{ clay	"	0 4
6 in. Double Junctions (see Drawing, Fig. 6 and 6a) jointed	{ cement	"	1 8
	{ clay	"	0 1 4
9 in. do do do	{ cement	"	0 1 8
	{ clay	"	0 1 9
12 in. do do do	{ cement	"	0 2 0
	{ clay	"	0 2 0
6 in. Bends (see Drawing, Fig. 7) jointed	{ cement	"	0 1 0
	{ clay	"	0 1 0
9 in. do do do	{ cement	"	0 1 0
	{ clay	"	0 1 0
12 in. do do do	{ cement	"	0 1 3
	{ clay	"	0 1 0
14 in. x 14 in. brick cesspits and grids set in cement (as per Drawing, Fig. 2), the inside depths of same to be 4 ft. 6 in. below surface of rails, the top of grids 10 in. below surface of rails, and to have ½ brick openings left on each side from formation level to underside grid frame, to be put in where directed		each	.....
Taking down old fencing, loading same into wagons, and unloading same at depot		per lin. yd...	0 0 4
Loading and unloading new fencing and erecting same, as per drawings, Figs. 14 and 15		"	0 1 1 ½
Loading and unloading earthwork and old ballast, as specified		per cub. yd...	0 1 2 ½
Price for cutting rails		each	0 1 0
Price for drilling holes		"	0 0 8
Ganger.....Rate per day—8 hours		{	Platelayers ... 0 12 0
		{	Excavators ... 0 10 0
Excavator	do do		0 9 0
Platelay	do do		0 9 0
Bricklayer	do do		0 13 0
Mason	do do		0 13 0
Carpenter	do do		0 11 3
Laying in points and crossings, single junction to heel of crossing, as shown on Drawing, Fig. 9		per lin. yd...	0 5 0
Laying in cross-over road, as shown on Drawing, Fig. 10		"	0 5 0
Laying in plain set diamonds, as shown on Drawing, Fig. 11		"	0 6 0
Set diamonds and single slip, as shown on Drawing, Fig. 12		"	0 8 6
Set diamonds and double slip, as shown on Drawing, Fig. 13		"	0 10 0
Excavating for and fixing point boxes		each	0 5 0
Horse and cart hire—Cost per day of 8 hours—			
Hire of cart, one horse and driver			0 13 0
Hire of cart, two horses and driver			0 16 6
Hire of one horse and driver (no cart)			0 11 0



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

LIGHT RAILWAYS.  
(INFORMATION RESPECTING.)

*Ordered by the Legislative Assembly to be printed, 26 August, 1890.*

[Laid upon the Table in answer to Question No. 4, of 4 June, 1890.]

Questions.

(4.) LIGHT RAILWAYS:—MR. O'SULLIVAN asked THE SECRETARY FOR PUBLIC WORKS,—

- (1.) Is it a fact there has recently been adopted in France a system of light railways, which can be laid down for £1,200 per mile, on gradients of from 1 in 12 upwards, and with engines, carrying water and fuel, weighing only 12 tons?
- (2.) Is it a fact that these railways are now being sent from France to various portions of the world at the rate of 120 miles per month, and that one of them is now in operation in Melbourne in connection with the Metropolitan Gasworks?
- (3.) Will he lay upon the Table of this House all the information he may have respecting these railways, in order that it may be ascertained if they are suitable to the plain country of New South Wales?
- (4.) If he has no information respecting these light railways, will he have a report made upon the matter without delay?

Answers.

- (1.) The system referred to is probably Decauville's, or some other such system of portable railways, but the idea is by no means new. From the lightness of the engines and the steepness of the grade, it is evident that the system is only applicable when extremely small loads have to be drawn.
- (2.) I am unable to answer this question at present, but am seeking information on the point.
- (3 and 4.) I have already given orders that the necessary information be obtained, which shall, with pleasure, be placed at the disposal of Parliament.

Royle's Chambers, Bond-street, Sydney, 10 April, 1890.

Cheap Railways for Australia.

Sir,

The great success obtained by the Decauville system of narrow-gauge railways has long since been practically demonstrated in nearly every part of the world, and a splendid test of the carrying capacity, general utility, and adaptability of this famous railway was only recently afforded at the late International Exhibition at Paris.

Over the Company's line connecting the Concorde Station with the Champ de Mars an aggregate of no less than 6,000,000 passengers were conveyed without accident or impediment of any kind, the maximum for one day alone numbering 63,276. The line was of 2-feet gauge, with 19lb. steel rails riveted on steel-dished sleepers. The locomotives, on the compound system, weighed 12 tons in working order, and were able to run over curves of 65 feet radius, and to ascend 8% gradients.

The comparatively small cost of the plant, and the easy and speedy method of construction, would render this narrow-gauge system best adapted to parts of this country where a more extended means of railway communication would not be warranted by reason of the greatly-increased cost, and where probably no Government railway could be expected for many years to come.

The Decauville railway is fully capable of meeting all the requirements of a large passenger and freight traffic, and no system, it may be confidently asserted, would so adequately open up the country and assist in developing its many and varied resources.

I shall be prepared to afford all practical assistance by every possible means in furthering the construction of railways on this principle, where it can be sufficiently shown that an adequate return on the outlay can be obtained.

There is ample evidence as to the financial success of narrow-gauge railways wherever they have been tried, and there is no reason to believe that their success would be less in Australia.

I shall be gratified to afford any information on the subject which may be required.

To Hon. Bruce Smith, M.L.A.

I am, &c.,  
CLEMENT VAN DE VELDE, C.E.

Department of Public Works, Railway Construction Branch,

Sir,

Sydney, 4 June, 1890.

Allusion having been made in the Legislative Assembly here to the light railway now in operation in Melbourne, in connection with the Metropolitan Gasworks, I have the honor to request that you will kindly furnish me with the fullest information in your power relative to the same.

I have, &c.,

HENRY DEANE

(*pro* A.R.M.),

Acting Engineer-in-Chief.

R. Watson, Esq., Engineer-in-Chief for Railways, Melbourne.

Sir,

Railway Department, Engineer-in-Chief's Office, Melbourne, 7 June, 1890.

In reply to your letter 90-252, dated 4th instant, I have the honor to inform you that, on inquiry, I find the Metropolitan Gas Co. have constructed a small Decauville railway from the wharf to their works.

It is about 18 or 20 feet above the level of the street which it crosses, and is used for conveying coals, &c., from the ships to the works. Its length is about 300 yards, and there are branches at both ends. The gauge is 2 feet 6 inches, and it is worked by a small Decauville locomotive engine. No doubt full particulars could be obtained by writing to the Secretary or Manager of the Company.

I have, &c.,

ROBERT WATSON,

Engineer-in-Chief.

H. Deane, Esq., Acting Engineer-in-Chief, Sydney.

Mr. Deane,—Please add your own remarks to this. Is it necessary to seek further information?—  
J.B., 21/7/90.

I think little may be said. It is evident that the system is not capable of carrying a large amount of traffic, and quite unsuitable for adoption as a substitute for the present tramways or railways.—H.D.,  
5/8/90.

[*3d.*]

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

## RAILWAYS.

(GROSS RETURNS OF THE COOMA LINE FROM DATE OF OPENING TO 31st MAY, 1890.)

*Ordered by the Legislative Assembly to be printed, 27 August, 1890.*

[Laid upon the Table in answer to Question No. 6, of 10th June, 1890.]

### Question.

(6.) COOMA RAILWAY:—MR. STEVENSON (for MR. MILLER), *asked* THE SECRETARY FOR PUBLIC WORKS,—Will he inform the House of the gross returns of the Cooma Railway Line for the first twelve months?

### Answer.

RETURN showing the Value of Inwards and Outwards Traffic at all Stations on the Cooma Line from date of opening to 31st May, 1890 (12 months).

Description.	INVERLOCHY.		BANGALORE.		LAKE BATHURST.		TARAGO.		FAIRY MEADOW.		BUNENBORO.	
	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.
Coaching	£ s. d. 20 7 10	£ s. d. 11 13 6	£ s. d. 100 4 2	£ s. d. 18 16 6	£ s. d. 253 12 5	£ s. d. 24 2 7	£ s. d. 2,528 8 3	£ s. d. 3,216 5 5	£ s. d. 11 15 4	£ s. d. 22 7 4	£ s. d. 1,420 16 9	£ s. d. 2,128 12 9
Goods	£ s. d. 6 10 7	£ s. d. 245 11 4	£ s. d. 84 11 8	£ s. d. 150 17 7	£ s. d. 84 0 0	£ s. d. 210 18 2	£ s. d. 2,840 7 0	£ s. d. 2,377 16 10	£ s. d. 0 9 11	£ s. d. 0 8 0	£ s. d. 7,287 6 6	£ s. d. 5,156 8 3
	£ s. d. 32 18 5	£ s. d. 257 4 10	£ s. d. 184 16 10	£ s. d. 169 14 1	£ s. d. 342 12 5	£ s. d. 235 0 9	£ s. d. 5,377 15 3	£ s. d. 0,094 2 3	£ s. d. 18 5 3	£ s. d. 22 10 10	£ s. d. 8,708 3 3	£ s. d. 7,285 1 0
Description.	MOLOSLO.		QUEANBYAN.		TUGGERONG.		ROB ROY.		MICHELAGO.		COLINTON.	
	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.
Coaching	£ s. d. 9 10 3	£ s. d. 4 10 2	£ s. d. 1,601 6 7	£ s. d. 2,075 13 7	£ s. d. 37 10 9	£ s. d. 45 9 11	£ s. d. 12 12 10	£ s. d. 19 9 11	£ s. d. 256 15 3	£ s. d. 606 16 11	£ s. d. 32 3 5	£ s. d. 158 17 3
Goods	£ s. d. 11 11 8	£ s. d. .....	£ s. d. 4,200 1 11	£ s. d. 4,954 12 9	£ s. d. 45 1 3	£ s. d. 8 12 6	£ s. d. 9 13 11	£ s. d. .....	£ s. d. 543 15 0	£ s. d. 647 18 0	£ s. d. 78 3 3	£ s. d. 61 14 2
	£ s. d. 21 1 11	£ s. d. 4 10 2	£ s. d. 5,791 8 6	£ s. d. 7,030 6 4	£ s. d. 83 1 0	£ s. d. 54 2 5	£ s. d. 22 6 9	£ s. d. 19 9 11	£ s. d. 890 10 3	£ s. d. 1,164 14 11	£ s. d. 110 6 8	£ s. d. 220 11 5
Description.	BREDBO.		UMERALLA.		BUNYAN.		COOMA.		TOTAL.		Grand Total all Stations.	
	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	Inwards.	Outwards.	£ s. d.	
Coaching	£ s. d. 70 18 9	£ s. d. 174 17 7	£ s. d. 9 16 2	£ s. d. 79 7 5	£ s. d. 15 13 3	£ s. d. 70 7 7	£ s. d. 4,055 9 0	£ s. d. 5,563 12 8	£ s. d. 34,694 9 6	£ s. d. .....	£ s. d.	
Goods	£ s. d. 282 15 6	£ s. d. 703 11 8	£ s. d. 34 11 5	£ s. d. 130 19 3	£ s. d. 74 3 9	£ s. d. 342 6 4	£ s. d. 8,657 15 8	£ s. d. 10,221 3 3	£ s. d. .....	£ s. d. 39,894 3 8	£ s. d.	
	£ s. d. 353 14 3	£ s. d. 878 9 3	£ s. d. 44 7 7	£ s. d. 210 6 8	£ s. d. 89 17 0	£ s. d. 412 13 11	£ s. d. 12,713 5 2	£ s. d. 15,784 15 11	£ s. d. 34,694 9 6	£ s. d. 39,894 3 8	£ s. d. 74,588 13 2	



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RAILWAYS.**

(RETURN OF COAL CONTRACTS FOR 1890.)

*Ordered by the Legislative Assembly to be printed, 1 October, 1890.*

*[Laid upon the Table in answer to Question No. 8, of 1st October, 1890.]*

Questions.

(8.) CONTRACTS FOR SUPPLY OF COAL TO RAILWAY DEPARTMENT:—MR. BARBOUR *asked the COLONIAL TREASURER*,—

- (1.) The names of the firms owning collieries (and the names of the collieries owned by them) which have entered into agreements to supply the Government Railways with coal during the current year?
- (2.) The total quantity of coal required for all the New South Wales Government Railways?
- (3.) How is this total amount subdivided among the various collieries; will he table a statement showing the subdivision of supply, if any?
- (4.) If more than one contract has been entered into for supply of coal for the Government Railways for the current year, will he, in addition to giving information as to subdivision of the whole quantity, table the price per ton quoted by either one or several contractors?

Answers.

(1.) Names of firms owning collieries, and names of collieries, contracting to supply coal during 1890.

Price per Ton.	Contractors' Names.	Names of Collieries.
s. d. 7 0	Metropolitan Coal Co. (Gresley Lukin, Manager) .....	Helensburgh Mine
3 9 and 3 10	Thomas Wilton .....	Eskbank, Lithgow Valley, and Hermitage Coal Mines.
4 1	Vale of Clwydd and Zigzag Coal Association (D. Chadwick, Secretary).	Vale of Clwydd and Zigzag Mines.
5 6	Mittagong Coal Co. (Thomson Moore, Secretary) .....	Mittagong Coal Mine.
4 6	Cullen Bullen Coal and Coke Co. (W. H. Chapman, Secretary).	Cullen Bullen Mine.
9 10	Waratah Coal Co. ....	Waratah Colliery.
7 3	Read and Longworth .....	Rix's Creek Colliery.
6 6 and 8 9	Centenary Coal and Coke Co. (J. Barnard, Secretary)	Curlewis Colliery.

(2.) Total estimated quantity of coal during year 1890, 221,700 tons. Mittagong Coal Company's contract was cancelled in June, 1890, and the supplies were ordered from Mr. Wilton for the remainder of month.

(3.) How is it subdivided amongst contractors? Metropolitan Coal Co., 31,000 tons; Mittagong Coal Co., 19,100 tons; Thomas Wilton, 109,500 tons; Cullen Bullen Co., 1,800 tons; Vale of Clwydd and Zigzag Association, 13,800 tons; Waratah Co., 22,000 tons; Read and Longworth, 10,000 tons; Centenary Coal Co., 15,000 tons.

(4.) If contract has been entered into to supply from more than one colliery, how is it subdivided? Thomas Wilton's contract is for supply from three mines—Esk Bank, Lithgow Valley, and Hermitage. The Department has not specified particular quantities from any one of these mines; the distribution is therefore left to option of contractor, who has supplied to 31st August as under:—Esk Bank, 26,443 tons; Lithgow Valley, 32,490 tons; Hermitage, 26,656 tons.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAYS.

(RATE FOR THE TRACTION OF COAL ON THE NEW SOUTH WALES.)

*Ordered by the Legislative Assembly to be printed, 9 July, 1890.*

[Laid upon the Table of the House, in accordance with a promise made by the Colonial Treasurer, in reply to Question No. 1, of the 9th July, 1890.]

Questions.

1. MR. BURNS asked THE COLONIAL TREASURER,—

- (1.) Is there any general rate for the traction of coal on the New South Wales Railways?
- (2.) The different traction rates for coal in the owners' waggons and in the Government waggons respectively?
- (3.) Has permission been given to any company to use its own locomotives on the Government Railways; and, if so, for what distance, and at what rate?
- (4.) The minimum rate charged for coal traction at Newcastle?
- (5.) The rate payable by the Commissioners to the contractors for shipping coal at Sydney, Wollongong, and Newcastle respectively?
- (6.) The difference in the rate per mile for traction in the Government and owners waggons in the Southern and Western districts?
- (7.) The like information in relation to the Northern districts?
- (8.) Are the Commissioners prepared to provide waggons for the Northern collieries on the same terms as they are provided for the Southern and Western?

Answers.

- (1.) Yes.
- (2.) On the Southern and Western lines the rate for coal in owners' waggons is 1d. per ton per mile, with a minimum charge of 2s. for the first 50 miles; for distances over 50 miles the rate is  $\frac{3}{4}$ d. per ton per mile, plus the rate for 50 miles, with a terminal charge of 3d. per ton added. Minimum charge 4s. 3d. per ton.

On the Northern lines the rates in owners' trucks are as follows:—

	per ton. s. d.		per ton. s. d.
For distances not exceeding 1 mile.....	0 6	Over 20 miles and not exceeding 22 miles .....	1 6
Over 1 mile and not exceeding 7 miles .....	0 10	" 22   "   "   "   24   " .....	1 7
" 7   "   "   "   10   " .....	1 0	" 24   "   "   "   26   " .....	1 8
" 10   "   "   "   12   " .....	1 1	" 26   "   "   "   28   " .....	1 9
" 12   "   "   "   14   " .....	1 2	" 28   "   "   "   30   " .....	1 10
" 14   "   "   "   16   " .....	1 3	" 30   "   "   "   32   " .....	2 0
" 16   "   "   "   18   " .....	1 4	" 32   "   "   "   34   " .....	2 2
" 18   "   "   "   20   " .....	1 5	For distances exceeding 34 miles, $\frac{3}{4}$ d. per ton per mile.	

The rates for coal in Commissioners' trucks are the same on all lines, and are made up on the following basis:—

- For the first 15 or portion of 15 miles, 1s. 6d. per ton.
- For every mile exceeding 15, but not exceeding 35,  $1\frac{1}{4}$ d. per ton per mile, plus the rate for 15 miles.
- For every mile exceeding 35, but not exceeding 55, 1d. per ton per mile, plus the rate for 35 miles.
- For every mile exceeding 55, but not exceeding 150, 1d. per ton per mile for the whole distance. Minimum, 5s. 3d. per ton.
- For every mile exceeding 150, but not exceeding 250,  $\frac{3}{4}$ d. per ton per mile, plus the rate for 150 miles.
- For every mile exceeding 250,  $\frac{1}{2}$ d. per ton per mile, plus the rate for 250 miles.

Modified rates are charged for coal when sent in truck-loads of not less than 6 tons, as follows:—

Rate per Truck.											
	£	s. d.									
120 miles	2	17 10	220 miles	4	3 10	320 miles	5	5 7	420 miles	6	4 3
125 "	2	19 2	225 "	4	5 0	325 "	5	6 7	425 "	6	5 2
130 "	3	0 6	230 "	4	6 4	330 "	5	7 7	430 "	6	6 0
135 "	3	1 9	235 "	4	7 8	335 "	5	8 7	435 "	6	6 11
140 "	3	3 0	240 "	4	8 11	340 "	5	9 7	440 "	6	7 10
145 "	3	4 4	245 "	4	10 2	345 "	5	10 8	445 "	6	8 9
150 "	3	5 9	250 "	4	11 5	350 "	5	11 8	450 "	6	9 8
155 "	3	7 1	255 "	4	12 5	355 "	5	12 7	455 "	6	10 7
160 "	3	8 4	260 "	4	13 5	360 "	5	13 5	460 "	6	11 5
165 "	3	9 8	265 "	4	14 5	365 "	5	14 4	465 "	6	12 4
170 "	3	10 11	270 "	4	15 5	370 "	5	15 3	470 "	6	13 3
175 "	3	12 2	275 "	4	16 6	375 "	5	16 2	475 "	6	14 2
180 "	3	13 6	280 "	4	17 6	380 "	5	17 0	480 "	6	15 0
185 "	3	14 10	285 "	4	18 6	385 "	5	17 11	485 "	6	15 11
190 "	3	16 1	290 "	4	19 6	390 "	5	18 10	490 "	6	16 10
195 "	3	17 4	295 "	5	0 6	395 "	5	19 9	495 "	6	17 9
200 "	3	18 8	300 "	5	1 6	400 "	6	0 8	500 "	6	18 8
205 "	4	0 0	305 "	5	2 6	405 "	6	1 7	505 "	6	19 8
210 "	4	1 3	310 "	5	3 6	410 "	6	2 5			
215 "	4	2 6	315 "	5	4 6	415 "	6	3 4			

(3.) Yes. The following Coal Companies have been granted permission to haul coal in their own wagons, and by their own locomotives, from their junctions with the main line to the Southern Coal Company's junction with the same:—

Mount Keira Coal Company, 3 miles, 2d. per ton.

Mount Pleasant Coal Company, 3 $\frac{1}{2}$  miles, 2 $\frac{1}{2}$ d. per ton.

Corrimal Coal Company, 6 $\frac{1}{2}$  miles, 3 $\frac{1}{2}$ d. per ton.

Bellambi Coal Company, 7 $\frac{1}{2}$  miles, 3 $\frac{1}{2}$ d. per ton.

Illawarra Coal Company, 11 $\frac{1}{2}$  miles, 6d. per ton.

as it is not convenient for the Department to provide locomotive power.

(4.) Sixpence per ton for distances not exceeding 1 mile.

(5.) The Commissioners do not undertake the shipping of coal at Sydney and Wollongong. They pay 1 $\frac{1}{2}$ d. for the service at Newcastle, in addition to providing cranes, &c.

(6.) This is shown fully in answer to question No. 2, but it may be mentioned that the Commissioners are not required to haul coal in owners' wagons on the Southern or Western Lines.

(7.) This information is contained in the answer to Question 2.

(8.) The Commissioners would be prepared to provide wagons for the Northern Line on the same terms as they are provided for the Southern and Western Lines.

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAYS.

(RETURN OF GOODS CARRIED TO GLEN INNES AND GUYRA RAILWAY STATIONS DURING YEAR 1889.)

*Ordered by the Legislative Assembly to be printed, 8 May, 1890.*

[Laid upon the Table of the Legislative Assembly, in accordance with a promise made in answer to Questions No. 7, of 8th May, 1890.]

Questions.

- (7.) GOODS TRAFFIC AT GLEN INNES AND GUYRA RAILWAY STATIONS:—MR. WRIGHT *asked* THE COLONIAL TREASURER,—
- (1.) The number of tons of goods carried by rail to Glen Innes for the year 1889?
  - (2.) The number of tons of goods (exclusive of wool) despatched by rail from Glen Innes for the year 1889?
  - (3.) The number of bales of wool (and weight of same) sent from Glen Innes during the year 1889?
  - (4.) The like information regarding Guyra station?

Answer.

New South Wales Government Railways.—Comparative Statement showing the Goods traffic at Glen Innes and Guyra Stations for the year 1889.

Description.	Glen Innes.	Guyra.
Number of tons of goods carried by rail .....	7,090 tons.	1,587 tons.
Number of tons of goods (exclusive of wool) despatched by rail.....	2,992 „	2,395 „
Number of bales of wool sent by rail .....	6,191 bales.	1,060 bales.
Weight of bales of wool sent by rail .....	1,288 tons.	225 tons.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RAILWAYS.**

(RETURN OF RECEIPTS ON DURING MONTH OF AUGUST.)

*Ordered by the Legislative Assembly to be printed, 11 June, 1890.*

[Laid upon the Table of the Legislative Assembly in accordance with a promise made by the Colonial Treasurer, in reply to Question No. 1, of 2nd October, 1889.]

Questions.

- (1.) RECEIPTS ON GOVERNMENT RAILWAYS FOR MONTH OF AUGUST:—*Mr. Hugh Taylor* (for Dr. Ross) asked the COLONIAL TREASURER,—
- (1.) The amount of receipts for first-class passengers, and the number carried, during the month ending 31st August, on the Government Railways?
  - (2.) The same for second-class passengers during the same period?
  - (3.) Amount received for parcels?
  - (4.) Amount received for mails?
  - (5.) Amount received for horses, cattle, sheep, pigs, and dogs, and numbers?
  - (6.) Amount received for goods?
  - (7.) Amount received for minerals?
  - (8.) The same information for the corresponding month of last year?
  - (9.) Total number of miles run for same period, and amount of expenses incurred for coal, wages, wear-and-tear, &c.?
  - (10.) Same information, corresponding number of miles, last year?

Answers.

				1888.	1889.
(1 & 2.)	Number of passengers, 1st class	...	...	259,699	279,680
	Number of passengers, 2nd class	...	...	517,192	581,156
	Amount for passengers, 1st and 2nd	...	...	£56,210	£57,909
(3.)	Amount for parcels	...	...	£5,191	£5,690
(4.)	Amount for mails...	...	...	£4,574	£4,637
(5.)	Amount for live stock traffic—				
	Number of horses in horse-boxes	...	850	1,171	
	Dogs	...	1,526	1,853	
	Horses in cattle trucks...	...	626	980	
	Cattle	...	13,050	11,790	£26,133
	Calves	...	959	1,149	£24,444
	Sheep	...	176,441	188,854	
	Pigs	...	3,973	3,304	
(6.)	Amount for goods...	...	...	£90,342	£86,310
(7 & 8.)	Amount for minerals	...	...	£18,750	£15,835
(9.)	Train mileage	...	...	679,170	679,170
(10.)	Running expenses	...	...	£28,740	£26,129



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAYS.

(CORRESPONDENCE, &c., IN CONNECTION WITH DUPLICATION OF LINE FROM TERALBA TO  
ADAMSTOWN.)

*Ordered by the Legislative Assembly to be printed, 1 May, 1890.*

[Laid upon the Table of the Legislative Assembly, in accordance with a promise made by the Colonial  
Treasurer, in reply to Question No. 18, of the 18th December, 1889.]

Memo. to The Secretary for Railways.

Office of Engineer for Existing Lines, Sydney, 27 February, 1889.

EXTRACT from the minutes of the Railway Commissioners on their recent tour of inspection of the Great Northern Railway, viz. :—

“Cockle Creek—Engineer to submit plan for duplicating line, West Wallsend Company’s Junction to Newcastle.”

Plan herewith. The total estimated cost is £35,500, in which is included making all the duplicate bridges of iron on brick abutments and piers. The present timber bridges are very much attacked by the white ants, and consequently it would not be a wise policy to continue constructions in timber on this section.

G.C.

Mr. Cowdery.—Please say what would be the cost of duplicating line from West Wallsend Company’s siding to Teralba.—H.M.L. (*pro* Secretary), 11/3/89. About £7,000.—G.C., 12/4/89. Secretary. Refer to Mr. Angus.—H.M.L., 13/4/89.

Memo. to Mr. Cowdery.

58, Bridge-street, 5 July, 1889.

Will you please furnish me with your estimate for duplicating the bridges between Teralba and Adamstown.

J. ANGUS.

Detailed estimate herewith. Estimated cost between Teralba and West Wallsend Junction, £4,712; from West Wallsend crossing to Adamstown, £11,528.—M.T. (*pro* Engineer for Existing Lines), 9/7/89. Mr. Angus.

G.N.R.—Duplication of Bridges, Teralba to Adamstown—Approximate Bill of Estimated Quantities and Cost.

No.	Item.	Amount	Total Amount.
		£ s. d.	£ s. d.
1	Bridge at 89 miles 69 chains...	1,297 0 0	
2	"   90   "   25   "   ...	657 0 0	
3	"   90   "   38   "   ...	928 0 0	
4	"   90   "   68   "   ...	942 0 0	
5	"   91   "   13   "   ...	788 0 0	
	Between Teralba and West Wallsend Junction		4,612 0 0
6	"   92   "   4   "   ...	1,996 0 0	
7	"   92   "   55   "   ...	1,038 0 0	
8	"   93   "   61   "   ...	701 0 0	
9	"   94   "   0   "   ...	723 0 0	
10	"   94   "   8   "   ...	811 0 0	
11	"   94   "   27½   "   ...	990 0 0	
12	"   94   "   35   "   ...	509 0 0	
13	"   97   "   34   "   ...	2,443 0 0	
14	"   97   "   47   "   ...	2,237 0 0	
	West Wallsend Junction to Adamstown		11,628 0 0
			£16,240 0 0

G.F., 9/7/89. M.T., 9/7/89.

Will you please furnish full details of your estimate for each bridge.—J.A., 17/7/89. Engineer for Existing Lines. No detailed estimates have as yet been made for these bridges, as the plans for the same are only just being prepared. The estimates submitted are merely approximate.—M.T. (*pro* Engineer for Existing Lines), 28/7/89. J. Angus, Esq. Recommended to be carried out in timber departmentally.—G.C. (*per* D.H.A.), 11/10/89.

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### Memo. to Secretary for Railways.

Office of Engineer for Existing Lines, Sydney, 25 July, 1889.  
Will you please let me know whether plans are to be prepared in this office for the bridges, culverts, &c., in connection with the duplication of the line from Adamstown to Teralba.—G.C.

Yes, in your office.—H.M'L. (*pro* Secretary), 26/7/89. George Cowdery, Esq. Mr. Fischer to carry out.—G.C., 31/7/89.

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### Memo. to Mr. Cowdery.

58, Bridge-street, 4 September, 1889.  
I WOULD like to see you early with reference to the bridges between Adamstown and Teralba. The progress of the work is being greatly retarded in consequence of the work of widening the structures not being carried out.

J. ANGUS,  
(*per* G.L.)

Mr. Kendall as to plans.—G.C. (*per* D.H.A.), 5/9/89. Mr. Shaw. Robt. Kendall, 24/9/89.

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### To Engineer for Existing Lines.

MR. ANGUS intimates that the earth-works on the duplication, Teralba to Adamstown, is progressing rapidly.

The Commissioners will be glad if you will submit at once the plans of bridge works necessary.

H. M'L.,  
(*pro* Secretary), 22/8/89.

I recommend that these bridges be carried out in timber in accordance with attached memo.—GEO. COWDERY (*per* R.K.), 11/10/89. Secretary.

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### Memo. to Engineer for Existing Lines.

*Re* widening bridges between Teralba and Adamstown.

THE existing timber bridges on this section are of recent construction and in very good order. I therefore suggest that the widening be also carried out in timber, and as this work will necessitate some alteration in the existing bridges, which, if carried out by contract, would require for the safety of the traffic a great deal of supervision, owing to the work being distributed. I therefore recommend the work be carried out departmentally.

The total estimated cost of widening the bridge and culverts is £6,000.

ROBT. KENDALL.

The Chairman verbally approved yesterday of these bridges being constructed by day labour. Have the work put in hand and completed without delay.—J. ANGUS, 29/10/89. Mr. Kendall. This work has now been let to Angus & Co.—J.A., 12/12/89.

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### Extracts.

EXTRACT from Draft List of Works submitted by Commissioners to the Honorable the Minister for Railways:—

Duplicating Railway Lines.—Teralba to Adamstown, £35,300.

E.M.G.E.,  
W.M.F.,  
C.O.,  
27/8/89.

Amount passed, 10th October, 1889.

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### Tenders.

Department of Railways, Sydney, 13 November, 1889.

TENDERS will be received at the Railway Commissioners' Office until 12 o'clock on Monday, the 25th November, from persons willing to contract for the completion of the duplication of the following Railway Line:—Adamstown to Teralba.

Specification, form of Tender, and further particulars may be obtained at the office of the Acting Engineer for Existing Lines, 58, Bridge-street, on and after the 8th instant.

Tenders are to be endorsed "Tender for duplication of Railway Lines."

The Commissioners do not bind themselves to accept the lowest or any Tender.

By order of the Commissioners,  
H. M'LACHLAN,  
Secretary.

Twelve tenders received. Messrs. Angus & Co.'s accepted, as per attached schedule of prices.

The





1890.

LEGISLATIVE ASSEMBLY,  
NEW SOUTH WALES.

**RAILWAYS.**

RETURN OF TRAVELLING ALLOWANCES TO OFFICERS ENGAGED IN ENGLAND FOR SERVICE IN THE COLONY.

*Ordered by the Legislative Assembly to be printed, 11 June, 1890.*

[Laid upon the Table in accordance with promise made in answer to Question 2, Votes 19, 10 June, 1890.]

Questions and Answers.

(1.)

The names of all the Officers engaged by the Commissioners from any place outside the Colony.	The positions and salaries for which they were so engaged.		The positions and salaries they now occupy and receive.		The amount paid for passage money and expenses to each of them.	The date on which their salaries commenced.
	Position.	Salary.	Position.	Salary.		
		£ per annum		£ per annum	£	
D. H. Neale . . . . .	Mechanical Engineer.	550	Mechanical Engineer	550	47	1 December, 1888.
James Angus . . . . .	Civil Engineer . . . . .	600	Acting Engineer for Existing Lines.	900	63	1 January, 1889.
J. G. S. Carns . . . . .	Traffic Officer . . . . .	500	Traffic Officer (Acting District Supt.)	500	70	1 December, 1889.
Thomas Hall . . . . .	Chief Accountant . . . . .	1,000	Chief Accountant . . . . .	1,000	70	1 January, 1890.
C. A. Hodgson . . . . .	Traffic Officer . . . . .	500	Traffic Officer . . . . .	500	70	" "
W. T. Foxlee . . . . .	Deputy Engineer . . . . .	700	Deputy Engineer . . . . .	700	£87 Ss.	" "
William Thow . . . . .	Locomotive Engineer . . . . .	1,200	Locomotive Engineer . . . . .	1,200	Nil.	1 May, 1889.

(2.) Did any of such Officers receive passage money for other members of their families besides themselves? Yes.

(3.) If so, which—specify the relations and the amount in each case? Mrs. Angus and family, £153; Mrs. Hall and three sons, £230; Mrs. Neale, £47; Mrs. Foxlee and children (part of expenses), £170.

(4.) Did any of such Officers receive passage money for any servants? No.

(5.) If so, which, and how much in each case? Answered by Question No. 4.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(TIME OF ARRIVAL AT SYDNEY AND ALBURY OF SOUTHERN EXPRESS TRAINS, FROM 1st JANUARY  
TO 31st OCTOBER, 1890.)

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*Ordered by the Legislative Assembly to be printed, 14 November, 1890.*

*[Laid upon the Table in answer to Question No. 1, 7 November, 1890.]*

Question.

- (1.) ALBURY EXPRESS TRAIN:—MR. LYNE *asked* THE COLONIAL TREASURER,—  
How many times since 1st January last has the Albury express train run late, and how late on each occasion, both from and to Albury.

Answer.

RETURN showing the arrival at Sydney and Albury of the Southern Express Trains, from 1st January to 31st October, 1890.

*Up Train.*

Number of days arrived Sydney to time ...	...	...	...	8
Daily average number of minutes late ...	...	...	...	34½

*Down Train.*

Number of days arrived Albury to time ...	...	...	...	85
Daily average number of minutes late ...	...	...	...	16½

Owing to the defective state of the line, which has been reported upon to Parliament, and which has seriously increased by the exceptional rainfall experienced for so many months, it was necessary, in order to ensure the safety of the travelling public, to run the trains at reduced speed, varying from 4 to 25 miles per hour, over long sections of the line, during a large portion of the time referred to. The lines are now getting into better condition, and it is hoped ere long that punctual working will be obtained.

The more punctual working on the down journey arises in consequence of thirty-five minutes additional running time being allowed.



1890.

## LEGISLATIVE ASSEMBLY.

## NEW SOUTH WALES.

## RAILWAYS.

(PROPOSED PLATFORM AT OR NEAR OURIMBAH CREEK.)

*Ordered by the Legislative Assembly to be printed, 19 August, 1890.*

RETURN to an *Order* made by the Honorable the Legislative Assembly of New South Wales, dated 26th June, 1890, That there be laid upon the Table of this House,—

“Copies of all petitions, letters, reports, minutes, and other documents relating to a proposed platform at or near Ourimbah Creek, on the Great Northern Railway Line.”

(*Mr. Crick, for Mr. Edmunds.*)

## SCHEDULE.

NO.	PAGE.
1. Memorial from certain residents of Wyong to the Hon. the Minister for Works, forwarded by R. Stevenson, Esq., M.P. ....	2
2. Report by Mr. Mann, of Engineer-in-Chief's Department.....	2
3. Minute by the Secretary for Railways .....	3
4. Letter from Commissioner for Railways to R. Stevenson, Esq., M.P. Minister has decided that question of providing platform is to remain in abeyance .....	3
5. Letter from Commissioner for Railways to R. Stevenson, Esq., M.P., <i>re</i> Mr. Allison, offering land free .....	3
6. Letter from Hon. John Davies, M.P., C.M.G., to Commissioner for Railways asking that a party be set down at Ourimbah Creek; also <i>re</i> petition for platform at the spot .....	3
7. Letter from Secretary for Railways to Hon. J. Davies, M.P., C.M.G. Party of gentlemen will be set down .....	3
8. Extract from letter from R. Stevenson, Esq., M.P., presenting petition and urging erection of platform .....	4
9. Memorial from certain residents of Tuggerah Lakes and others, presented with letter by R. Stevenson, Esq., M.P. ....	4
10. Memorial from certain residents of Tuggerah Lakes and others, presented by the Hon. John Davies, C.M.G., M.L.C., in conjunction with a petition presented by R. Stevenson, Esq., M.P., on 7th May, for a siding on the north side of Ourimbah Creek .....	4
11. Letter from Mr. T. Hinchcliffe to Mr. Lee <i>re</i> waiting on Minister for Works with the Hon. John Davies, C.M.G., M.L.C., and presenting petition for platform .....	4
12. Letter from R. Stevenson, Esq., M.P., to the Commissioner for Railways urging the erection of a siding at Tuggerah Lakes, Ourimbah Creek .....	5
13. Report by Acting Traffic Manager, Mr. F. R. Neild; Memo. by Acting Traffic Inspector Willis; and minute of Commissioner for Railways .....	5
14. Letter from Secretary for Railways to R. Stevenson, Esq., M.P., informing that Commissioner does not intend to erect further accommodation on this line.....	5
15. Letter from R. Stevenson, Esq., M.P., to Railway Commissioners presenting petition and urging erection of siding. Chief Traffic Manager's report .....	5
16. Letter from Secretary for Railways to R. Stevenson, Esq., M.P. Commissioners cannot see their way to put siding in .....	6
17. Memorial from certain residents between Wyong and Ourimbah Creeks, presented with letter from R. Stevenson, Esq., M.P. ....	6
18. Extracts from Notes of Commissioners' visit to Newcastle. Engineer to prepare plan and estimate.....	6
19. Memo. by Mr. Commissioner Fehon. Mr. Stevenson, M.P., called and asked what has been done <i>re</i> putting in siding .....	6
20. Secretary for Railways to Mr. Angus asking what has been done <i>re</i> siding. Engineer's report and estimate. Commissioners' approval for work to be carried out .....	7
21. Letter from Mr. T. Smith to Chief Commissioner for Railways .....	7
22. Letter from Secretary for Railways to Mr. T. Smith. Plans prepared and submitted to Commissioners for approval .....	7
23. Memorial from certain residents and others between Ourimbah and Wyong Creeks, asking for early erection of platform and siding .....	7
24. Letter from Secretary for Railways to Mr. W. Smith and others. Commissioners have approved of accommodation being provided.....	7
25. Office memo. Engineer for Existing Lines asking for return of papers, with report .....	8
26. Letter from Mr. W. Smith to Railway Commissioners .....	8
27. Letter from Mr. W. Smith and others to Railway Commissioners <i>re</i> material for platform being laid down at 61 miles 10 chains, instead of 60 miles 50½ chains .....	8
28. Letter from Secretary for Railways to Mr. W. Smith acknowledging receipt of letter .....	8
29. Letter from W. J. Chapman, Esq., J.P., to Secretary for Railways; siding not necessary; bridge across the creek is what is required .....	8
30. Letter from Mr. T. Smith to Railway Commissioners <i>re</i> site for siding .....	9
31. Letter from R. Stevenson, Esq., M.P., to Railway Commissioners <i>re</i> site that siding should be erected at .....	9

448—A

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NO.	PAGE.
32. Report of Mr. C. A. Hodgson to Secretary for Railways <i>re</i> site .....	9
33. Memorandum by Mr. J. Angus to Chief Traffic Manager .....	9
34. Letter from R. Stevenson, Esq., M.P., to Railway Commissioners .....	10
35. Letter from Mr. G. Fowler to Railway Commissioners presented by R. Stevenson, Esq., M.P. ....	10
36. Letter from Mr. G. Fowler to Secretary for Railways <i>re</i> Thos. Smith, opposing the removal of material. ....	10
37. Memorial from certain inhabitants of Wyong and Tuggerah Lakes <i>re</i> removal of site 61 miles 10 chains .....	10
38. Letter from Mr. J. Lees to Secretary for Railways <i>re</i> petition being sent against the platform being erected at 60 miles 52½ chains .....	11
39. Letter from Secretary for Railways to J. Lees; question under consideration .....	11
40. Office memo. Engineer for Existing Lines to Chief Traffic Manager when arranging visit—Mr. J. Rankin and Mr. Stevenson, M.P., to be present .....	11
41. Letter from Mr. H. Dennie to Secretary for Railways in favour of platform being erected at 60 miles 50½ chains ...	11
42. Letter from Mr. H. Foote to Railway Commissioners. Platform would be of more benefit at 60 miles 52½ chains...	11
43. Letter from Mr. J. Dennie to Secretary for Railways in favour of it being erected at 60 miles 52½ chains .....	11
44. Letter from Mr. D. J. Goldie to Secretary for Railways. Siding should be put at 60 miles 52½ chains .....	11
45. Letter from Mr. F. Ebert to the Railway Commissioner forwarding letter from the Secretary of the Fishermen's Association, Tuggerah Lakes.....	12
46. Letter from Mr. G. Fowler to Railway Commissioners <i>re</i> site .....	12
47. Letter from Mr. C. Allison to the Railway Commissioners <i>re</i> site .....	12
48. Office memo. for Mr. W. H. Smith to visit the place and report .....	12
49. Report of Mr. E. Coole to Chief Traffic Manager .....	12
50. Telegram from Mr. T. Hinchcliffe to the Secretary for Railways, <i>re</i> work going on at 61 miles 10 chains .....	14
51. Letter from Secretary for Railways to Mr. W. H. Vivian, Esq., M.P. Chief Traffic Manager and Engineer for Existing Lines, going to visit site .....	14
52. Letter from the Secretary for Railways to R. Stevenson, Esq., M.P. Chief Traffic Manager and Engineer for Existing Lines, going to visit site .....	14
53. Memo. from Secretary for Railways to Chief Traffic Manager and Engineer for Existing Lines, to visit site .....	14
54. Memo. by Railway Commissioners; inspected site and find that accommodation is being provided at the right spot .....	14
55. Letter from Secretary for Railways to R. Stevenson, Esq., M.P. ....	15

### No. 1.

#### Memorial from certain residents of Wyong.

To the Honorable the Minister for Works,—

The Memorial of the undersigned residents of Wyong, in the district of Brisbane Water,—

HUMBLY SHOWETH,—

1. Lying between Wyong and Ourimbah Creeks, and the Gosford and Maitland Road and Tuggerah Lake, is a portion of country occupied by a large number of settlers.

2. The Homebush-Waratah railway now in course of construction passes through this land.

3. The railway stations or platforms as proposed are both on the opposite sides of the creeks named, and the residents of the locality referred to have no access to them but by travelling a distance of from 4 to 8 miles.

4. That though the distance between the stations or platforms referred to is probably not more than 4 miles, to give access to either of them from the land mentioned it would be requisite to build a very expensive bridge, and resume land along the route for the formation of a road.

5. That it will entail far less expense on the Government, and be more convenient for the inhabitants for a platform to be erected; that the best site for such platform is on the road nearest to Ourimbah Creek, leading from the Gosford and Maitland Road to the water reserve on the said creek, and thence to Tuggerah Lake; and that Michael Smith is prepared to give the Government half an acre of his land—lot No. 12—as a site for a platform.

6. Your Memorialists therefore ask that a platform be erected on the site indicated.

And your Memorialists, as in duty bound, will ever pray, &c.

[Here follow 32 signatures.]

I RECOMMEND the memorial to the favourable consideration of the Minister. It is probable that Mr. Allison will make a similar offer of land in order to get the platform erected on his private estate; but the site now submitted would be equally central, and far more available for the general public, as a road has, I am informed, just been opened to the spot named.

R. STEVENSON,  
Member, Wollombi.

12/12/86.

### No. 2.

#### Minute Paper.

Department of Public Works, Railway Branch, Engineer-in-Chief's Office.

MR. MANN for report.

W.H.Q., 3 January, 1887.

The position applied for for platform is near where surveyed road crosses line at 60 miles 51½ chains. This road leads from Tuggerah Lake to main road, between Gosford and Maitland, when there is a small settlement at the foot of Kangy Angy Mountain. This settlement is about 3½ miles north of Blue Gum Flat Station, 5 miles south of Wyong Station, and 2 miles from site of proposed platform. A platform at this place would accommodate the settlers on the western side of Tuggerah Lake, lying between Ourimbah and Wyong Creeks, for in order to get to Wyong or Blue Gum Flat Stations the traffic would have to go from 5 to 7 miles round by main road or means of crossing the creeks provided. The inhabitants of the district are small farmers and timber-getters, timber being the principal produce. About thirty families would use this platform: not the greater portion of the timber would probably go to Blue Gum Flat Station.—G.F.M., 6/1/87.

For the Minister's consideration.—J.W. *per* W.H.Q., 10/1/87. Railways, 12/1/87.—J.R. Submitted for Minister's decision.—CHAS.A.G., 15/1/87. For my successor.—W.J.L., 17/1/87. Better stand over for a time until experience shows what course the traffic will take.—J.S., 11/2/87.

No. 3.

3

No. 3.  
Minute Paper.

PLEASE let me have papers about a siding applied for at Ourimbah Creek on the Hawkesbury Line. Wanted to-day.

D. C. M'L., 25/2/87.

Papers *re* platform herewith.—C.H., 25/2/87. Chief Clerk. Mr. Stevenson, M.P., is moving again in this matter and requests an answer.—D.V., 1/3/87. Commissioner. Inform in terms of Mr. Secretary Sutherland's Minute of 11/2/87.—CHAS. A.G., 1/3/87.

No. 4.

The Commissioner for Railways to R. Stevenson, Esq., M.P.

Sir,

Department of Railways, Sydney, 3 March, 1887.

Referring to your personal interview on the subject of the application made for a platform at Ourimbah Creek, on the Hawkesbury line, I have the honor to inform you that Mr. Secretary Sutherland has decided that the question of providing a platform at this place shall remain in abeyance until experience shows what course the traffic will take.

I have, &c.,

CHAS. A. GOODCHAP,

Commissioner for Railways.

(Per D.V.)

Mr. Stevenson says he would like to know whether Mr. Allison offered any land for the crection of a platform. Please search records, and inquire at Construction Branch.—CHAS. A.G., 14/3/87. I can find no record, either in this office or Engineer-in-Chief's, of the offer of land by Mr. Allison.—M.A.O.B., 14/3/87. Inform Mr. Stevenson, and in so doing refer to memorial he presented, and to his subsequent personal inquiry.—CHAS. A.G., 21/3/87.

No. 5.

The Commissioner for Railways to R. Stevenson, Esq., M.P.

Sir,

Department of Public Works, Railway Branch, Sydney, 21 March, 1887.

Referring to the memorial presented by you from residents of Wyong for a platform at Ourimbah Creek, on the Homebush-Waratah Railway, and to your subsequent personal inquiry as to whether Mr. Allison offered any land for the purpose, I have the honor to inform you that inquiry has been made in this matter, but no trace can be found, either in this office or the Engineer-in-Chief's Branch, of any such offer being made.

I have, &c.,

CHAS. A. GOODCHAP,

Commissioner for Railways.

(Per A.R.)

No. 6.

The Hon. John Davies, M.P., C.M.G., to The Commissioner for Railways.

Casual Labour Board, 82, Goulburn-street,

My dear Mr. Goodchap,

Sydney, 22 March, 1888.

The Secretary of the Board, Mr. T. C. Hinchcliffe, Captain Thompson, of the Marine Board, and a party of twelve gentlemen, friends of mine, are going to spend their Easter holidays at the Tuggerah Lakes, leaving Sydney on Thursday, 29th instant.

Their camp is on Messrs. Hinchcliffe and Thompson's land at Ourimbah Creek, 2 miles on the Sydney side of Wyong station. Would you kindly send me memo. to give the station-master at Gosford, or officer in charge of trains, to set them down at Ourimbah Creek, as it is late at night when they arrive at Wyong, and there is no made road to return. I may mention that there is a station called Ourimbah, situated at Blue Gum Flat, but this is about 6 miles from where the train crosses Ourimbah Creek. They inform me that where they wish to alight the line is perfectly level and straight, and they promise not to detain the train more than half a minute.

I am, &c.,

JOHN DAVIES.

P.S.—A petition was sent some time back to the local Member, Mr. Stevenson, M.P., for presentation to the Minister, asking for a platform at this particular spot.—J.D.

No. 7.

The Secretary for Railways to The Hon. John Davies, M.P., C.M.G.

Sir,

Railway Department, Sydney, 24 March, 1888.

With reference to your letter of the 22nd instant, asking that a party of your friends may be set down near Ourimbah Creek on Thursday night next, I have the honor, by directions of the Commissioner for Railways, to inform you that he has approved of this being done, and instructions have been given accordingly. It will be necessary, however, for your friends to speak to the station-master at Mullet Creek when they arrive there and advise him as to the exact spot where they wish to alight.

I have, &c.,

D. VERNON,

Secretary for Railways.

Traffic Manager.—A.R., 26/3/88. I take it that the party wants to get out at Wyong, from the distance they give. Please see them on arrival at Mullet Creek and arrange for the stoppage.—F. R. NELL, 28/3/88. Arranged. The place they wanted to get out was 2 miles this side of Wyong.—H.C., 29/3/88.

No. 8.

## No. 8.

Extract from Letter from R. Stevenson, Esq., M.P., dated 17 April, 1888.

For erection of Railway siding at Ourimbah Creek.

In presenting the petition I recommend that the siding asked for at Ourimbah Creek be erected, for, as the Tuggerah Lakes become known, it will be a place of great resort for excursionists from Sydney and Newcastle, as well as the surrounding districts. At Easter last I am informed a large number visited the Lakes, which is a lovely spot, with plenty of fishing, shooting, and boating. All that is required is the erection of the siding, and the opening of the Government road, which does not exceed a mile from the site of the proposed siding, which has been wisely provided for in the construction of the line.

## No. 9.

Memorial from certain residents of Tuggerah Lakes, and others.

[Presented with letter by R. Stevenson, Esq., M.P.]

To the Honorable the Minister for Works,—  
Sir,

Kangy Angy, Brisbane Water.

We, the undersigned residents, landowners, and visitors to the Tuggerah Lakes, hereby humbly petition that you will be pleased to have a siding made at the public crossing leading through Michael Smith's, senior, property to the water reserve and Tuggerah Lake, on the Northern Line from Sydney to Newcastle.

There is a large settled population between the present stations, Ourimbah, situated at Blue Gum Flat, and Wyong, to which the siding would be a great public convenience; also to visitors to the Lake from Sydney and elsewhere it would be a great accommodation. Michael Smith, senior, will give 1 acre of ground free if required for siding.

By placing this siding here it will open up the surrounding country, and there will be dairy and agricultural produce and timber sent out by rail, which, at the present distance between the abovenamed stations, is not done.

And your Petitioners will ever pray.

[Here follow 52 signatures.]

## No. 10.

Memorial from certain residents of Tuggerah Lakes, and others.

[Presented by the Honorable John Davies, C.M.G., M.L.C., in conjunction with a Petition presented by R. Stevenson, Esq., M.P., on the 7th May, for a siding on the northern side of Ourimbah Creek.]

To the Honorable the Minister for Works,—  
Sir,

Ourimbah Creek, 29 March, 1888.

We, the undersigned residents, land-owners, and visitors, to the Tuggerah Lakes, hereby humbly petition that you will be pleased to have a platform erected at Ourimbah Creek, on the Northern railway line, from Sydney to Newcastle.

There is a large settled population between the present stations, Ourimbah (situated at Blue Gum Flat) and Wyong, to which the platform would be a great public convenience; to visitors to the lakes from Sydney and elsewhere it would also be a great accommodation, there being two Government roads from near the platform petitioned for, one on each side of Ourimbah Creek direct to the lakes, besides the waterway down the creek which is navigable for the largest boats.

A sufficient quantity of land to erect the platform, &c., will be handed over free to the Government at either side of the creek.

And your Petitioners will ever pray.

[Here follow 57 signatures.]

I should be glad to have a report on this matter.—J.S., 28/5/88. Traffic Manager, Newcastle.—  
A.R., B.C., 29/5/88. Please furnish a report.—F. R. NIELD (*per* J. BURNS), 30/5/88. Mr. Willis.

## No. 11.

Mr. T. Hinchcliffe to Mr. Lee.

Dear Mr. Lee,

103 and 105, Oxford-street, Sydney, 29 May, 1888.

In company with the Hon. John Davies, C.M.G., M.L.C., I waited upon the Minister for Works yesterday, and presented my petition for a platform at Ourimbah Creek. It seems that the petition presented some few weeks ago by Mr. Stevenson, asks for a siding at Ourimbah, not Ourimbah Creek. I told the record clerk that it was meant for Ourimbah Creek, and informed the Minister that the petition presented by Mr. Davies and myself was in conjunction with the one presented by Mr. Stevenson, and was intended to strengthen the hands of that gentleman in procuring the boon asked for. You will therefore see that it was very fortunate that I called on the Minister for Works, and got matters put straight. If there is anything required in the matter of roads I will be happy to assist at any time.

I am, &c.,

THOMAS HINCHCLIFFE.

5,

No. 12.

R. Stevenson, Esq., M.P., to The Commissioner for Railways.

Siding at Ourimbah Creek, Tuggerah Lakes.

Sir,

I am astonished to learn by the enclosed letter that the Railway Department has fallen into error in regard to the petition presented by me some few weeks back, and about which I have made frequent personal applications to know what was being done in the matter.

To the petition I attached a letter, pointing out not only the locality—which I am intimately acquainted with—but that provision was made by the department for the siding, which is absolutely necessary, as being about 1 mile, and the nearest point touched by the railway to the celebrated Tuggerah Lakes, which only requires the erection of the siding to make it a place of great resort for excursionists, not only from Sydney but Newcastle. Last Easter the train, by special request, was allowed to stop at this place, to enable visitors to alight who were bound for the Lakes, but apart from which, as the petition sets out, it is required for present public convenience.

Again asking that the matter may receive attention,

I am, &amp;c.,

R. STEVENSON,

For report with other papers; please expedite.—H.M'L., 4/6/88.

Mr. Neild.

No. 13.

Report by Acting Traffic Manager, Mr. F. R. Neild.

15 June, 1888.

88-2477c asks for a siding at Ourimbah Creek, and 88-2841c makes a request for a platform at same place. The distance between Wyong and Ourimbah Stations is only 6 miles, and the erection of a platform or siding, or both, between these places, distant only  $1\frac{1}{2}$  mile from Wyong, is not necessary for reasonable requirements. I think the department should pause for a long time to come, unless very great changes occur, before erecting any more platforms or sidings on this line. The Inspector's report enclosed, and I fully concur in it.

F. R. NEILD.

MEMO. by Acting Traffic Inspector Willis.

THE petition for a Siding at Ourimbah Creek is, I think, one and the same with another petition (herewith) for a platform at the same place. The place where these are required is about  $1\frac{1}{2}$  mile on Sydney side of Wyong Station, and from such information as I can gather I do not think there is yet sufficient trade round here to warrant a siding being put in. There is only a distance of 6 miles between Wyong and Ourimbah Station, and I am of opinion that at present they are quite adequate to the requirements of the district.

No doubt a platform would be a convenience for visitors to Tuggerah Lakes; but as platforms mean extension of journey time, very good reasons should be shown for putting up such, which I think are wanting here.

I notice also, that in the petition for the platform, out of 57 names attached to it 17 are residents of Wyong, where there is already a station.

A. WILLIS,

Acting Traffic Inspector, 5/6/88.

Acting Traffic Manager, Newcastle.

I am sure there is no necessity for a platform at this place at present. I visited it on 6th September, 1888.—C.A.G., 7/9/88.

No. 14.

The Secretary for Railways to R. Stevenson, Esq., M.P.

Department of Public Works, Railways Branch,

Sydney, 19 June, 1888.

Sir,

Referring to your representations in favour of the construction of a siding at Ourimbah Creek, and for a platform at the same place, I am desired by the Commissioner to inform you that the matter has had full and careful consideration, and under the reports of the traffic officers he is not prepared to erect further accommodation on this line for the present.

I have, &amp;c.,

D. VERNON,

Secretary for Railways.

No. 15.

R. Stevenson, Esq., M.P., to The Railway Commissioners.

Gentlemen,

5 August, 1889.

In presenting the enclosed petition, I would wish to point out that the land has been reserved for a siding at the spot indicated, and gates on either side of the line erected.

Before the Commissioners were appointed, petitions were presented, asking for the siding, and it was decided to leave the matter to be dealt with by them.

I would be very convenient for the residents of Tangy Angy, where there is a large centre of population, with a public school showing an enrolment of about 50 pupils; in addition to which it would be the nearest point for tourists bound for Tuggerah Lakes, which are largely resorted to in the summer months, as it is only about three-quarters of a mile distant, with a good Government road all the way. Under the circumstances, perhaps the Commissioners would have the previous papers looked up, as, in the season, the siding would be availed of by excursionists, apart from the regular trade it must develop.

I am, &amp;c.,

R. STEVENSON.

Chief

Chief Traffic Manager to report.—W.M.F., 8/8/89.

Ourimbah is a little more than 56 miles distant from Sydney, and Wyong is about 62½ miles distant. The siding asked for at 60 miles 52 chains would be about 4½ miles from Ourimbah and 1½ mile from Wyong. I am informed that many of the persons who have signed the petition reside either at Wyong or Ourimbah. Most of the others are labouring men and bushmen. There is nothing at the place named to induce a population to settle there, and if the siding were constructed the traffic dealt with at it would be withdrawn from either Wyong or Ourimbah. At the two stations named there is plenty of accommodation for dealing with the traffic, and, under these circumstances, I cannot recommend that the request be complied with.—D.K., 28/8/89.

Reply accordingly.—W.M.F., 30/8/89.

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No. 16.

The Secretary for Railways to R. Stevenson, Esq., M.P.

Sir,

2 September, 1889.

With reference to the memorial signed by Mr. George Fowler, Mr. David Goldie, and others, and presented by you, asking that a siding may be put in at 60 miles 52½ chains on the Great Northern Line, I am desired to inform you that the matter has had consideration, but the Commissioners regret they cannot see their way to comply with the request.

I have, &c.,

H. M'LACHLAN,

Secretary.

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No. 17.

Memorial from certain Residents between Wyong and Ourimbah Creeks.

[Presented with letter by R. Stevenson, Esq., M.P.]

To the Honorable the Minister for Railways,—

Gentleman,

Rosebank, Tuggerah, Wyong, 29 July 1889.

We, the undersigned residents, chiefly freeholders on our homesteads, living between Wyong and Ourimbah Creeks, in the parish of Tuggerah, in a prayer, hereby humbly petition that your Honor will be pleased to cause steps to be taken to have a siding erected on the Great Northern Railway, distant 60 miles and 52½ chains from Sydney, at the crossing of public road leading from Maitland and Gosford Road to water reserve and Tuggerah Lakes, as public money is being now expended to put the said road in fair order, as it would be a great advantage to the district in getting a large quantity of timber and other produce away to market, and bringing a large quantity of good land into cultivation.

We are at the present time most of us from 5 to 8 miles from Ourimbah Station by road, and 5 to 10 miles from Wyong Station by road. Our families, to get anything to or from the above stations, have to go the above distance, or trespass on railway line; whereas if the said siding were erected the majority of us would be within 1 mile of it, and timber and produce could be got away to advantage, and finding employment for our families. We still pray.

Yours, &c.,

[Here follow 35 signatures.]

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No. 18.

Extracts from Notes of Commissioners' visit to Newcastle.

Secretary's Office, Sydney, 2 December, 1889.

Memorial for a Platform and Siding at 60 miles 52½ chains, between Wyong and Ourimbah.

REPRESENTED that if a platform at this place were erected it would be most convenient for passengers visiting the Tuggerah Lakes, besides being the means of increasing the traffic. A siding was also much required to enable the farmers living in the neighbourhood to send their produce to market, &c. Mr. Angus instructed to have plan and estimate submitted at once. Work to be completed in time for taking away this season's produce.

J. Angus, Esq.,—Please submit plan and estimate as early as possible.—H.M'L., Secretary, 2/12/89.

Mr. Baxter to obtain the surveys relative to the proposed station at this place.—J.A.

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No. 19.

Memo. by Mr. Commissioner Fehon.

Memo. for Mr. Angus.

MR. STEVENSON, M.L.A., called this morning to know what had been done about putting in a siding at Ourimbah Creek, or more properly Tuggerah Lake siding. He also asks that the District Engineer see the Station-master at Gosford about a few small matters required while the workmen are there, such as water at the urinals, a little fencing at Station-master's house, &c.

Engineer is preparing plan.—H.M'L.

W.M.F., 3/1/90.

7

No. 20.

The Secretary for Railways to Mr. Angus.

Memorial for a Platform and Siding at 60 miles 52½ chains, between Wyong and Ourimbah

Government Railways of New South Wales,

Secretary's Office, Sydney, 16 January, 1890.

REFERRING to the special inquiries which you were requested by the Commissioners to make hereon when they were on their northern tour on the 22nd November last, will you kindly let me know how the matter stands?

H. M'LACHLAN,  
Secretary.

Herewith I forward tracing showing proposed platform, waiting-shed, and siding at 61 miles 10 chains, North Coast line. The estimated cost will be about £805.—J. ANGUS, 5/2/90. Secretary. If you concur, please initial plan and return to-day if possible.—H. M'LACHLAN (*per* J.J.S.), 6/2/90. Chief Traffic Manager. I have signed the tracing, but it appears to me that £805 is a large sum of money to spend at a place from which I fear we shall not get a great deal of traffic.—D.K., 8/2/90. Approved.—E.M.G.E., 11/2/90. C.O. J. Angus, please carry out early.—H.M'L. Mr. Halligan to carry out.—J. ANGUS, 13/2/90.

No. 21.

Mr. T. Smith to The Chief Commissioner for Railways.

Sir,

Tuggerah, Wyong, 30 January, 1890.

I hope you will excuse me for troubling about this platform. You may remember that you and other gentlemen came to see the place at about 60 miles 55 chains, and you saw me and another man at the crossing, when I told you about my crops that I wanted to send away by train. You said that the platform would be built so that I could get last year's crops away. It will be a big loss to me if I cannot do so. The old road is now blocked, so I cannot get away nohow. They say that it is not settled where it is to be put up. I might say the most suitable place would be anywhere near the main road (61 miles 10 chains crossing), it being the most central between the farmers, and would accommodate every one of us.

I am, &c.,  
THOMAS SMITH

No. 22.

The Secretary for Railways to Mr. T. Smith.

Sir,

5 February, 1890.

I have the honor to acknowledge the receipt of your letter of the 30th January, received to-day, relative to the provision of a platform between Ourimbah and Wyong, and to inform you that plans have been prepared, and will be submitted to the Commissioners for approval to-day, and the work if approved will be at once proceeded with.

I have, &c.,  
H. M'LACHLAN,  
Secretary.

No. 23.

Memorial from certain Residents and others between Ourimbah and Wyong Creeks.

Sirs,

Ourimbah, 8 March, 1890.

We, the residents and landowners between Ourimbah and Wyong Creeks, beg most respectfully to ask that you will cause to be erected, as soon as practicable, the platform and siding on the main public crossing between the afore-mentioned creeks, which was promised by you some months ago.

We would point out that a large quantity of farm produce is now raised in close proximity to the proposed platform, which at present can only be sent to market at immense cost of money and time, thus rendering our labour as farmers wholly unprofitable. This platform would also open up new timber country, which timber, when cut and sent to market, would prove a source of revenue to the Department. Trusting you will give this matter your favourable consideration.

We have, &c.

[Here follow 40 signatures.]

No. 24.

The Secretary for Railways to Mr. W. Smith and others.

Gentlemen,

14 March, 1890.

In reply to your letter of 8th instant, requesting the erection of a platform and siding between Ourimbah and Wyong, I have the honor to inform you that the Commissioners have approved of the accommodation being provided at 60 miles 50½ chains, and the engineer has been instructed to expedite the work.

I have, &c.,  
H. M'LACHLAN,  
Secretary.

No. 25.

No. 25.

## Office Memo.

Platform and Siding between Ourimbah and Wyong.

PLEASE return at once previous paper, with report.

Mr. Halligan.

J.A., 17/3/90.

Previous papers and tracing attached. You will see that all papers, and especially the one approved of, show the siding should go in at 60 miles 52½ chains. The plan sent to me to work to shows siding to go in at 61 miles 10 chains. Work is now delayed pending your instructions as to where siding is to go. Please expedite reply.—E.M.H., 21/3/90. Mr. Angus.

I am greatly surprised at the delay in carrying out this work. Please have the siding laid in at once at the mileage shown on plan (61.10). This must be completed within a fortnight. I have made other arrangements with reference to platform and waiting-shed.—J.A., 29/3/90. Mr. Halligan.

No. 26.

## Mr. W. Smith to The Railway Commissioners.

Sir,

Ourimbah, 10 March, 1890.

I have the honor to forward the enclosed document for your information, and trust you will kindly excuse the liberty I thus take in addressing you.

I may also request you will let me know the result of the accompanying paper, as those who have signed it are very anxious to hear about it.

I have, &amp;c.,

WILLIAM SMITH.

No. 27.

## Mr. W. Smith and others to The Railway Commissioners.

Sir,

Ourimbah, 19 March, 1890.

In reply to yours of the 14th instant, we beg to inform you, most humbly, that a part of the material for the platform and siding was laid down to-day at 61 miles 10 chains, which we believe to be a mistake, as there is no access to that place at the present time whatever. The mileage in your letter is in every way convenient for the public,—60 miles 50½ chains.

Your, &amp;c.,

WILLIAM SMITH, and others.

No. 28.

## The Secretary for Railways to Mr. W. Smith.

Sir,

Department of Railways, 22 March, 1890.

I am directed by the Railway Commissioners to acknowledge the receipt of your letter of the 19th instant, relative to the site of the new platform between Wyong and Ourimbah, and beg to inform you that the matter is having attention, and a further reply will be sent to you in the course of a few days.

I have, &amp;c.,

H. M'LACHLAN,

Secretary.

No. 29.

## W. J. Chapman, Esq., J.P., to The Secretary for Railways.

Sir,

Wyong, 26 March, 1890.

As I understand an agitation exists for the erection of a siding between Wyong and Ourimbah Creeks, I think it my duty to point out a few facts that the Commissioners may not be aware of.

1. At the present time there are not more than eight families who would be immediately benefited by the proposed siding.

2. Those people are so divided as to the site to be determined on that each party declares its intention to make no use of the siding unless placed where it "ought to be."

3. The revenue derived at a siding in this locality could not pay interest on the capital expended for the next ten years.

4. The same amount of money required for the erection of this proposed platform would build a bridge across Wyong Creek; and now that the Government has granted a sum of £450 for the making of a road to the bank of the creek, all that is required to give the people between Wyong and Ourimbah Creeks access to Wyong Station is for a bridge to be erected across the creek, which would cost not more than £6,000.

5. This would be a much greater convenience to all parties concerned, and obviate any necessity for the expense and delay to trains which must attend an additional stopping-place.

6. I have no purpose to serve in thus placing this matter before the Commissioners, except to save a waste of the public money, and the creating additional inconvenience and delay to the travelling public.

7. I would most respectfully suggest that, to meet the requirements of the whole case, the Commissioners might urge upon the Department of Works the necessity of erecting a bridge across Wyong Creek, in close proximity to the railway line.

I have, &amp;c.,

W. J. CHAPMAN, J.P.

Letter acknowledged.

No. 30.

## No. 30.

Mr. T. Smith to The Railway Commissioners.

Sir,

Tuggerah, Wyong, 27 March, 1890.

I believe a dissatisfaction exists between a few as regards the site of siding between Wyong and Tuggerah Creeks. I wish to bring under your notice that there is a very steep hill at crossing 60·55, which will be a great drawback to us in getting our heavy timber and other produce away, should the above siding be erected at this place, and be a great inconvenience to the sporting public in getting to our lakes, as a glance at the parish map will show. I hope you will give this your earnest consideration before having the above siding removed from 61·10 miles, as it is the most convenient place between those two creeks, likewise avoiding a sharp curve in the line at 60·55½.

Yours, &amp;c.,

THOMAS SMITH.

## No. 31.

R. Stevenson, Esq., M.P., to The Railway Commissioners.

Sir,

When in my electorate on Saturday last I visited the site chosen for the siding now in course of erection at 61 miles 10 chains. I would respectfully suggest that the siding should have been put in the site petitioned for, and promised to the residents by letter from the Railway Department, viz., 60 miles 52½ chains, to which there is already good access by roads, with gates at the crossing alongside. To complete the siding where commenced would, in my opinion, be a huge mistake, and could not be used when erected. I know the surrounding country well, and without wishing to be considered in any way dictatory to the Commissioners, I would, after visiting the place on Saturday last, respectfully request the Commissioners to reconsider their decision, and erect the platform where petitioned for and promised, which I am informed is the spot where the Commissioners drew up their special train and met the residents. It would be a large saving of money to put the siding in at 60 miles 52½ chains, even now, than to continue present work, which is a waterhole, with holey ground all round it; while the siding, unless provision is made to carry off the water, will act as a dam and throw the water on to Mr. Smith's land, who informed me he had written to the Railway Department asking for a drain to be constructed.

The road at 60 miles 52 chains is the one always used to reach the lakes, upon which the Government has erected a large bridge and culverts where required, being the direct route from the Gosford and Maitland road to Tuggerah Lakes, and is extensively used by the fishermen; while for a very small outlay a short but pleasant walk could be provided for excursionists, who would use the platform, which, I trust, the Commissioners will, though rather late, yet see their way clear to remedy by placing the same at 60 miles 52½ chains, which, I am certain, the whole of the correspondence will prove is the correct site, the one frequently petitioned for, and, lastly, promised to my constituents by the Railway Commissioners. Hence I ask, with every confidence, that the matter may receive reconsideration.

I have, &amp;c.,

R. STEVENSON.

Platform between Wyong and Ourimbah. Mr. Hodgson for report.—H.M'L., 28/4/90.

## No. 32.

Mr. C. A. Hodgson to The Secretary for Railways.

Platform and Siding between Ourimbah and Wyong.

8 May, 1890.

I VISITED the site 61 miles 10 chains where the siding has been put down, on Saturday last, and met there a dozen or more of the inhabitants.

They all, with one exception, pointed out that the siding and platform had been asked for at 60·52½, where the Government road crosses the line, and they stated that the siding at 61·10 would be of no use to them, as there was no road formed leading to it, and also that the land between them and the siding was a swamp.

Plans of the district show a direct road leading past 61·10, to the shores of the lake, but the road is only in existence on paper, and I understand that if the road is ever made it will have to be logged for a greater part of the way, on account of the water lying there.

In your memo. of 16th January, 1890, to Mr. Angus, you give the site as 60·52½, but I now learn from the Engineer's Department that the site approved on the ground was at 61·10.

At the present time the siding has been laid in, and the front row of piles driven in for the platform, but no road of access to the siding has yet been made.

The people of the district ask for a loading-bank to be erected, for timber, if the siding is removed to 60·52½.

C. A. HODGSON.

## No. 33.

Memorandum by Mr. J. Angus.

Railway Department, Office of Engineer for Existing Lines, Sydney, 8 May, 1890.

REFERRING to our conversation to-day, I herewith send you papers and plan, and shall be glad if you will have the matter looked up. It was decided for you to send an officer first to make inquiry from the two men whom we met on the ground, and, on receiving his report, we were to go ourselves and settle the matter. As this has been a long time on hand, I shall be glad to know when you can go, when, if possible, I will arrange to go with you.

I have, &amp;c.,

J. ANGUS.

The Chief Traffic Manager.

8/5/90.

## No. 34.

R. Stevenson, Esq., M.P., to The Railway Commissioners.

Gentlemen,

12 May, 1890.

This question is creating considerable attention at the present time, and, I am creditably informed, a petition has been sent in—not through the representative—signed, it is alleged, by those not directly interested, in favour of the present site. I know the place, but am content to leave the correspondence which was sent in—not to-day—which expresses the wishes of those interested, and should be ample to guide the Commissioners in arriving at a decision. I have received a private letter, from which I append an extract, as it puts the whole question very fairly:—

“If the platform were to remain where it is now being built, at 61 miles 10 chains, it would necessitate the roads approaching it being cleared and made in all directions, as there is not a track within 2 miles, excepting the present Government road, which crosses the railway at the other proposed site, 60 miles 52½ chains. This road work would be very expensive, but when done the platform would be very convenient for the Lakes, Maitland Road, near to Tangy Augy, and also some of the farms. On the other hand, if built at 60 miles 52½ chains, or, in other words, at foot of the hill on Government road, it would be very convenient for every resident in the vicinity, and for the fish-carts that come from the navigable waters of Ourimbah Creek, and cross the line at this place. I am informed that at times twelve carts a day go to and fro. This site, however, would make the distance to the Lakes a few chains further, but if the road was cleared it would be a very pleasant walk for excursionists, and there would be no difficulty in getting there. To open new roads to where the platform is now being placed, 61 miles 10 chains would be costly, owing to the boggy nature of the soil.”

I am, &amp;c.,

R. STEVENSON.

## No. 35.

Mr. G. Fowler to The Railway Commissioners.

[Presented by Mr. R. Stevenson, 12/5/90.]

Gentlemen,

Rosebank, Tuggerah, Wyong, 9 May, 1890.

I write to say we had the inspector to see the siding, and Mr. Hinchcliffe was up the same time. We called a good muster of people to meet him. All seemed in favour of it being removed, except Thomas Smith; he has got up a letter of protest, and got a few outsiders to sign it. It was sent on Monday last we understand, so you must oppose it strongly. Mr. Hinchcliffe spoke strongly in favour of it being removed; likewise stating that they had an interview with Mr. McFaden, the secretary to Fishermen's Union, who states that he is coming up with Mr. Stephen, Member for Redfern, to see about snagging Ourimbah Creek, and establishing a fishing station on the same. If you can see Mr. Hinchcliffe he will explain matters to you. Please let us know how things are going on, as there are about 100 people interested in this letter, and are anxious for a reply.

I am, &amp;c.,

GEORGE FOWLER.

## No. 36.

Mr. G. Fowler to The Secretary for Railways.

Dear Sir,

Rosebank, Tuggerah, Wyong, 12 May, 1890.

I write on behalf of the persons signing the petition for siding on Northern Railway, distance 60 miles 52½ chains, of which an officer was recently sent up to report on site. We understand that a petition has been sent by Thomas Smith, opposing the removal of materials to a better site, as his house fronts the materials laid down now; he has got a lot of outside persons to sign it which have no interest in the siding, and others that get their living by working on roads which they know would take an immense amount of money to make to the present site; therefore we ask that you will be kind enough to send us a copy of that petition and names of persons signing, so that we can point out the interests of those persons to the Railway Department.

Yours obediently,

(For the petitioners),

GEORGE FOWLER.

## No. 37.

Memorial from certain inhabitants of Wyong and Tuggerah Lakes.

The Petition of the undersigned inhabitants of Wyong and Tuggerah Lakes being concerned in the erection of a Platform between Wyong and Ourimbah Creeks,—

RESPECTFULLY SHOWETH:—

1. We hear with regret of the probability of the platform in question being shifted from the site previously chosen, namely, 61 miles 10 chains to a position nearer Ourimbah Creek.

2. A glance at the parish map will show that in the near future, when the available land becomes occupied, the site at first determined on will be very much more central and more easy of access, being upon the only Government road in this locality leading from the Maitland Road to Tuggerah Lakes, and at a point at which the roads from Wyong Creek and Kangy Hill converge.

3. That the proposed site will be for all time unsuitable to the general public, and if erected at this point will serve the purpose of a few individuals only, there being no room round it for any increase of population, as Kangy Mountain is in such close proximity to the railway line at this point. This hill is so steep as to form an almost insuperable barrier to traffic leading to and from this proposed site.

4. Should there be any doubt in your minds as to the suitability of the previous site above the one now proposed we respectfully request that the matter be kept in abeyance until the population becomes more settled, when it will certainly be found that the original site is the proper one, and indeed the only one, that can ever possibly pay for the outlay.

And your Petitioners, as in duty bound, will ever pray.

[Here follow 21 signatures.]

11

No. 38.

Mr. J. Lees to The Secretary for Railways.

Dear Sir, Tuggerah Lake, 13 May, 1890.  
 Having heard that a petition signed by forty or fifty local residents had been forwarded within the last few days against the platform being erected at 60 52½, I would feel obliged if you would supply me by return post with a copy of the name and address of the petitioners, as I feel sure, as an old resident, that there are not one quarter who have an interest in this matter.

Yours, &c.,  
 JOSEPH LEES.

No. 39.

The Secretary for Railways to Mr. Lees.

Sir, 16 May, 1890.  
 In reply to your letter of the 13th instant, I have the honor to inform you that the question of the site for the platform between Ourimbah and Wyong is now under consideration.

I have, &c.,  
 H. M'LACHLAN,  
 Secretary.

No. 40.

Office Memo.

Railway Department, Office of Engineer for Existing Lines, Sydney, 16 May, 1890.  
 The Chief Traffic Manager,  
 When arranging our visit to inspect the site for proposed station platform near Wyong, milcage 62.10 north, the Commissioners desire that you will request Mr. Joseph Rankin and Mr. Stephenson, M.P., to be present.

F. ANGUS.

No. 41.

Mr. H. Denny to The Secretary for Railways.

Dear Sir, Ourimbah, 15 May, 1890.  
 Being informed, it was proposed to hold a meeting to consider which would be the most suitable place to have the platform and siding, and on account of being a land-owner near the proposed place, and have already laid out an orchard, I have an interest in giving my opinion as to the most suitable place. I am decidedly in favour of it being erected at 60 miles 50½ chains, and consider it the most central position for the benefit of the inhabitants.

I am, &c.,  
 H. DENNY.

No. 42.

Mr. H. Foot to The Railway Commissioners.

Gentlemen, Ourimbah, 15 May, 1890.  
 I understand there is a meeting to decide the interests of the people requiring the siding and platform, therefore I state that I am living on my mother-in-law's property, and we are continually going to Sydney and back on business, therefore the platform would be of far more benefit to us if it was at 60 miles 52½ chains.

Yours, &c.,  
 HENRY FOOT.

No. 43.

Mr. J. Denny to The Secretary for Railways.

Kangy Angy, 15 May, 1890.  
 J. DENNY, teamster, landowner, and resident within a short distance of the proposed platform and siding. I am in favour of it being erected at the public crossing, 60 miles 50½ chains.

JOSEPH DENNY.

No. 44.

Mr. D. J. Goldie to The Secretary for Railways.

Sir, Golden Point, 15 May, 1890.  
 I am a landowner and teamster, and reside at Golden Point, near Kangy Angy. If the siding is put at 60 miles 52½ chains I could draw to it as soon as completed; if put at the place where the material is laid I could not draw to it at all as it is impossible to get to it with a team.

I have, &c.,  
 DAVID J. GOLDIE.

No. 45.

## No. 45.

## Mr. F. Ebert to The Railway Commissioners.

[Letter from the Secretary of the Fishermen's Association, Tuggerah Lakes, to the Railway Commissioners. Forwarded per favour of Captain Thompson, 19/5/90.]

Sir,

WYONG, 16 May, 1890.

As the public of the parish of Tuggerah are advocating the removal of the siding between Wyong and Ourimbah Creeks, I, on behalf of the fishermen of Tuggerah Lakes, humbly sheweth that by placing the said platform as near as practicable to Ourimbah Creek it would be a great advantage to the fishing industry, as the distance from Wyong Station to the said lake is 4 miles, and the distance from Tuggerah bridge is only 2 miles; therefore the rowing daily of a heavy fishing boat 8 miles is a great consideration to an ill-treated industry. Another important feature is the enormous private carriage we have to pay before getting our fish to the railway. Praying that you will grant the said removal,

I have, &c.,

F. EBERT.

## No. 46.

## Mr. G. Fowler to The Railway Commissioners.

Gentlemen,

ROSEBANK, TUGGERAH, WYONG, 17 May, 1890.

I write on behalf of people signing petition for siding at 60 miles  $52\frac{1}{2}$  chains. We now find out how our petition has been undermined by Thomas Smith and a few others. He told the Commissioners the day the train stopped at the place, when they asked him had he signed it he said he did, which he did not, as you will see his name is not there. A short time after those promised it he writes a letter to the department, pretending to be for the petitioners, unknown to them, asking them to put it at 61 miles 10 chains, fronting his own house. When your officers came up on 15 May to take names of people interested, he had several people on his side whose names are not on the petition, namely—Mr. Rankin, Wyong; Mr. Allison, Wyong; Mr. Walmsley, Ourimbah; and the latter told us all in the presence of officer, he did not care if there were no sidings for twenty years, so you can see the interest of these gentlemen.

I have, &c.,

GEORGE FOWLER.

## No. 47.

## Mr. C. Alison to The Railway Commissioners.

Gentlemen,

WYONG ESTATE, WYONG, 19 May, 1890.

I hear that there is at present an agitation by a small section of people here to have the proposed platform, now being erected, at 61 miles 10 chains on the Northern line, removed a mile or more further south. The arguments in favour of the present site are—

1. That it is on a surveyed main road to Tuggerah Lake, and would benefit greatly a large number of people living at Kangy Angy.
2. There is a public road about to be constructed from the present site to Wyong Creek.
3. It would benefit a larger number of even the immediate settlers than the proposed alteration.

The arguments in favour of the alteration I am unable to imagine, and I have an intimate knowledge of the country. If it were deemed advisable we could easily secure an overwhelming majority of names in a petition on the matter, as, so far as I can understand, the agitation is confined to a very small number (comparative) who would each like a platform at their door.

Hoping that the original site will be adhered to, and apologising for troubling you,

I have, &c.,

CHAS. ALISON.

## No. 48.

## Office Memo.

Memo. for Mr. W. B. Smith *re* siding at either 60 m.  $52\frac{1}{2}$  ch. or 61 miles 10 chains.

WHEN the Commissioners went north about November last (Mr. Kirkcaldie thinks), two men met them there, also a surveyor, and they suggested that a siding should be put down at 61 m. 10 ch.; now a lot of people are saying that the siding ought to be at 60 m.  $52\frac{1}{2}$  ch.

Mr. Kirkcaldie wants Mr. Smith to go down there on Monday next, and try and find out the people who saw the Commissioners, also the surveyor.

When this has been done, make inquiries of all the people in the neighbourhood, so as to find out which would be the most convenient place for the siding.

Mr. Kirkcaldie wishes Mr. Smith to be very careful respecting this matter.

E.B., 10/5/90.

Memo.—Attached is a report *re* siding at 60 m.  $52\frac{1}{2}$  ch., and at 61 m. 10 ch.—E. COOLE, 19/5/90.  
C.T. Manager.

## No. 49.

## Mr. E. Coole to The Chief Traffic Manager.

Siding at either mileage 60 m.  $52\frac{1}{2}$  ch. or 61 m. 10 ch.

Sir,

19 May, 1890.

I went to these mileages on Northern line on Wednesday, the 14th, but was unable to see many of the petitioners concerned, as they were away from their homes. However I arranged for a meeting the next day at 12.30.

As arranged, I attended at this time and met a number of the petitioners, and on referring to this matter I made them aware that I was not there to decide this question, but to gather information for your guidance.

I may mention that those present in favour of site 61 m. 10 ch., where the siding is laid in, gave their names as follows, and, as far as I could learn, that, with one exception; they are directly interested:—Thos. Smith, Thomas Collins, R. Douglas, Jno. Thompson, Wm. Chaseling, and Thos. Douglas.

Those present in favour of site 60 m. 52½ ch. were:—M. Smith, sen., Geo. Smith, Wm. Smith, Robt. Smith, Geo. Fowler, Joseph Lees, F. Sard, E. Mead, Wm. Kellon, D. Thompson, T. Stump, Thos. Hawkins, Michl. Smith, jun., and Robert, David, and James Goldie.

I elicited from those present that in November last the Commissioners' train stopped at 60 m. 52½ ch., and that they were interviewed by Messrs. T. Smith and Wm. Smith, residents of the locality, and by Mr. W. Smith (road surveyor for that district). Wm. Smith says that on that occasion the Chief Commissioner was then in possession of a petition asking for a siding at 60 m. 52½ ch., and that he did not hear any other site referred to at that time. T. Smith, the petitioner in favour of site 61 m. 10 ch., says that Mr. Smith (roads surveyor) produced plans when conversing with the Chief Commissioner, and pointed out to him that the next crossing at 61 m. 10 ch. was on the main road, and that he recommended that the siding be laid in at this site, as he considered it the most suitable for present and future traffic requirements.

I was unable to meet Mr. W. Smith (surveyor), his head-quarters being at Newcastle, and, as far as I could learn, he was not in the district; but it was well known by those present that he advocated site 61 m. 10 ch.

The arguments advanced in favour of site 60 m. 52½ ch. were:—That the bulk of the inhabitants of that locality reside adjacent to this site; that they originally petitioned for a siding at this site; that at the present time this site, 60 m. 52½ ch., is only accessible to a Government road leading from the main Maitland Road; that the siding at 61 m. 10 ch. was not accessible to them, and therefore they could not make use of it; that should the siding be removed to 60 m. 52½ ch., as originally petitioned for, they would commence to clear their selections, and thereby open up a timber traffic similar to that at Wyong, and for the first year or so their outward traffic would consist principally of timber, but to what extent they were not prepared to say.

Thos. Smith, the principal mover and supporter of site 61 m. 10 ch., and who was present at the interview of the Commissioners, is without doubt a *bonâ fide* producer of farm and dairy produce, and which industries are supplemented by the hewing of felloes for the Sydney market.

He, with other petitioners mentioned, is in favour of present site at 61 miles 10 chains, and they contend that the siding is laid in at the most suitable site, and at the main road crossing, and that the opening up of new and accessible roads to this siding must follow as a matter of course, and it is only a question of a short time, and that, as a matter of fact, a sum of money is already granted for the opening up of a new road 66 feet wide, extending from the Maitland Road to crossing at 61 miles 10 chains, thence to Tuggerah Lakes.

It is contended that this road will be available and accessible to all the inhabitants of the locality, and that the same will extend a further development of traffic, and which must of necessity take place in that direction. The petitioners admit that until new roads are opened out a siding at 60 miles 52½ chains might at the commencement have some slight advantage in the way of an outward traffic, but certainly not ultimately.

I have set before you, as far as I am able, the views of the petitioners, *pro* and *con*; at the same time I would say that it was a most difficult matter to get a fair expression of opinion from some of them owing to family connections and other influences.

It was represented by the petitioners in favour of site 60 miles 52½ chains that opposition petitions had been signed by persons not interested in the locality. As far as I could see this charge cut both ways. However, I may say that all those who were present in favour of site 61 miles 10 chains on 15th instant, with one exception, satisfied me that they were interested. The exception referred to is a man named Douglas, who admitted that he was not a landowner, but he said he had already submitted an application to the Railway Department to place a saw-mill on the platform, and if such was granted he would commence work as soon as the platform was finished.

As the question of accessible roads to a railway station is of great importance, I travelled over the road leading from crossing 60 miles 52½ chains for some distance with the petitioners for the purpose of seeing its condition, as it is referred to in petition dated 6th instant. This road is represented as being well-nigh impassable with a heavy-loaded team owing to its gradient. As to its grade and condition the petitioners have not overstated facts. This road on leaving the crossing at 60 miles 52½ chains rises abruptly, and on reaching the crown of the hill it is very rocky and uneven. Of course there is this to be said, the grade of this road is favourable to teamsters coming in the direction of the railway station. This road, I am told, connects with the Maitland Road at about 2 miles from Ourimbah Station.

Mr. Hodgson's report shows that the only road to 61 miles exists on paper only, and which is quite true at the present time. But on referring to the parish map you will see the indication of a road running from the Maitland Road to railway crossing 61 miles 10 chains—thence to Tuggerah Lakes. In regard to this road, when at Wyong Post Office on 15th instant, I saw specifications calling for tenders for clearing and its formation, and the conditions were that the work was to be completed within two months; and further, that the amount sanctioned for this work was £470. I presume this is the book referred to by Mr. Hodgson.

The question of opening up of the new roads in that locality refers, and is as of much importance, to a siding at 60 miles 52 chains as at 61 miles, and certain roads which now exist on paper only, and which I have indicated on attached rough sketch, must of necessity be opened up to make a siding at either side of any use to the residents and payable to the Railway Department, so that the question of roads refers equally to either sites. As to the further development of traffic, I shall again refer you to parish maps, and you will see that the land on the eastern side of the railway and adjacent to site 60 miles 52½ chains has already been selected to the water reserve, so that further expansion can take place in that direction; and it is contended by the petitioners in favour of site 61 miles 10 chains that future developments of selections and population must take place in a northerly direction, and more adjacent to the site just mentioned; and in support of this contention Mr. Rankin, agent to Mr. Allison, produced plans showing that a syndicate floated in England had purchased 1,500 acres of land off Mr. Allison, skirting the selections facing the new road, and that this acreage had been subdivided into 40 and 50 acre lots, and that a sale was to take place shortly. The petitioners in favour of site 60 miles 52½ chains, in answer to this, say that

that the land referred to is unsaleable, and unfit for anyone to settle upon it, as it is low and swampy, and therefore the increase of population is improbable. You will see by the parish map that the site of siding at 61 miles 10 chains will, on completion of new road, for which tenders are called, be the nearest point and the most direct route to the Tuggerah Lakes—a holiday resort for excursionists. The Wyong Station-master told me that at one time the Tuggerah Lakes were much frequented at holiday times, and it seems to me that it would be so again with increased rail facilities. With the aid of the attached rough sketch I may personally be able to make my views clear to you

E. COOLE.

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No. 50.

Telegram from Mr. T. Hinchcliffe to The Secretary for Railways.

Gosford Station.  
Work going on at platform 61, 10 Local residents very indignant; talk of bringing matters before Parliament.

THOMAS C. HINCHCLIFFE.

---

Orders distinctly given for this to be stopped temporarily. Who is going on with work?—H.M.L. Wired instructions last Thursday to stop work. Wired also and asked for explanation. 27/5/90.

Wire from E. M. Halligan to J. Angus, re siding at 61 miles 10 chains:—Work was stopped immediately on receipt of your wire, and nothing has been done to it since.

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No. 51.

The Secretary for Railways to W. H. Vivian, Esq., M.L.A.

Sir,

13 June, 1890.

I am directed by the Chief Commissioner to inform you that the Chief Traffic Manager and Engineer for Existing Lines will visit the site of the proposed siding between Wyong and Ourimbah, and will be on the ground shortly after 11 o'clock on the 21st instant (Saturday).

I have, &c.,

H. M'LACHLAN,  
Secretary.

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No. 52.

The Secretary for Railways to R. Stevenson, Esq., M.L.A.

Dear Sir,

13 June, 1890.

With reference to your many calls relative to the proposed siding between Wyong and Ourimbah, I beg to inform you that Messrs. Kirkcaldie and Angus have arranged to visit the locality in question on Saturday, 21st instant, and will be on the ground shortly after 11 a.m.

Yours faithfully,

H. M'LACHLAN,  
Secretary.

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No. 53.

Memo. from The Secretary for Railways.

I beg to confirm the arrangement made to-day, that the Chief Traffic Manager and the Engineer for Existing Lines shall visit the site of the proposed siding between Wyong and Ourimbah, on Saturday, 21st instant, leaving Sydney at 9:30 a.m.

H.M.L., 13/6/90.

Chief Traffic Manager and J. Angus, Esq., to note. This matter will, I understand, be dealt with by the Commissioners. The papers were handed to Mr. Angus in the special train which left here for Newcastle at 1:30 p.m.—D. KIRKCALDIE, per W.H.C., 18/6/90.

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No. 54.

Memo. by The Railway Commissioners.

Siding 61 miles 10 chains, or 60 miles 52½ chains.

THE Commissioners inspected this section of the line again, and found that the accommodation was being provided at the spot they agreed to when on the ground, and from the further inquiries made it would appear to be the right spot, looking at all the surrounding circumstances. Decided that the work be completed as early as possible.

E.M.G.E., W.M.F., C.O., 19/6/90.

15

No. 55.

The Secretary for Railways to R. Stevenson, Esq., M.P.

Sir,

19 June, 1890.

With reference to my note to you of the 13th instant, intimating that officers of the Department would visit the locality between Wyong and Ourimbah, in connection with the proposed alternative site for siding at 61 miles 10 chains, or 60 miles 52 chains, I am now directed to inform you that, taking the opportunity of passing through the locality on Tuesday, the Commissioners looked into the question, and carefully considered it in all its bearings, and it appears to them that the best position is that originally selected, and where the works are now in course of construction. There is, therefore, no necessity for the officers to visit the ground, as proposed, on Saturday next.

I have, &amp;c.,

H. M'LACHLAN,

Secretary.

[Mr. Vivian, M.P., similarly informed.]

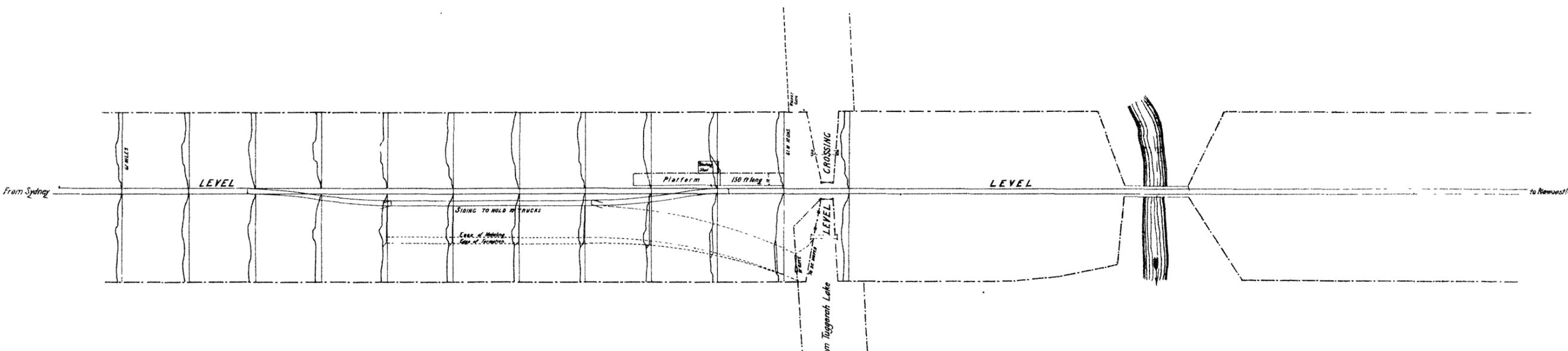
Acting Engineer for Existing Lines.—H. M'LACHLAN, per J. 19/3/90. Instructions have been issued.—J. ANGUS, Superintendent. 28/6/90.

[Three Plans.]

[2s. 3d.]

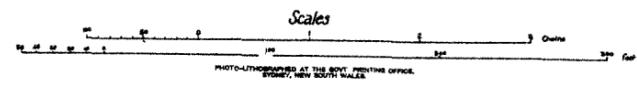
Sydney : Charles Potter, Government Printer.—1890.



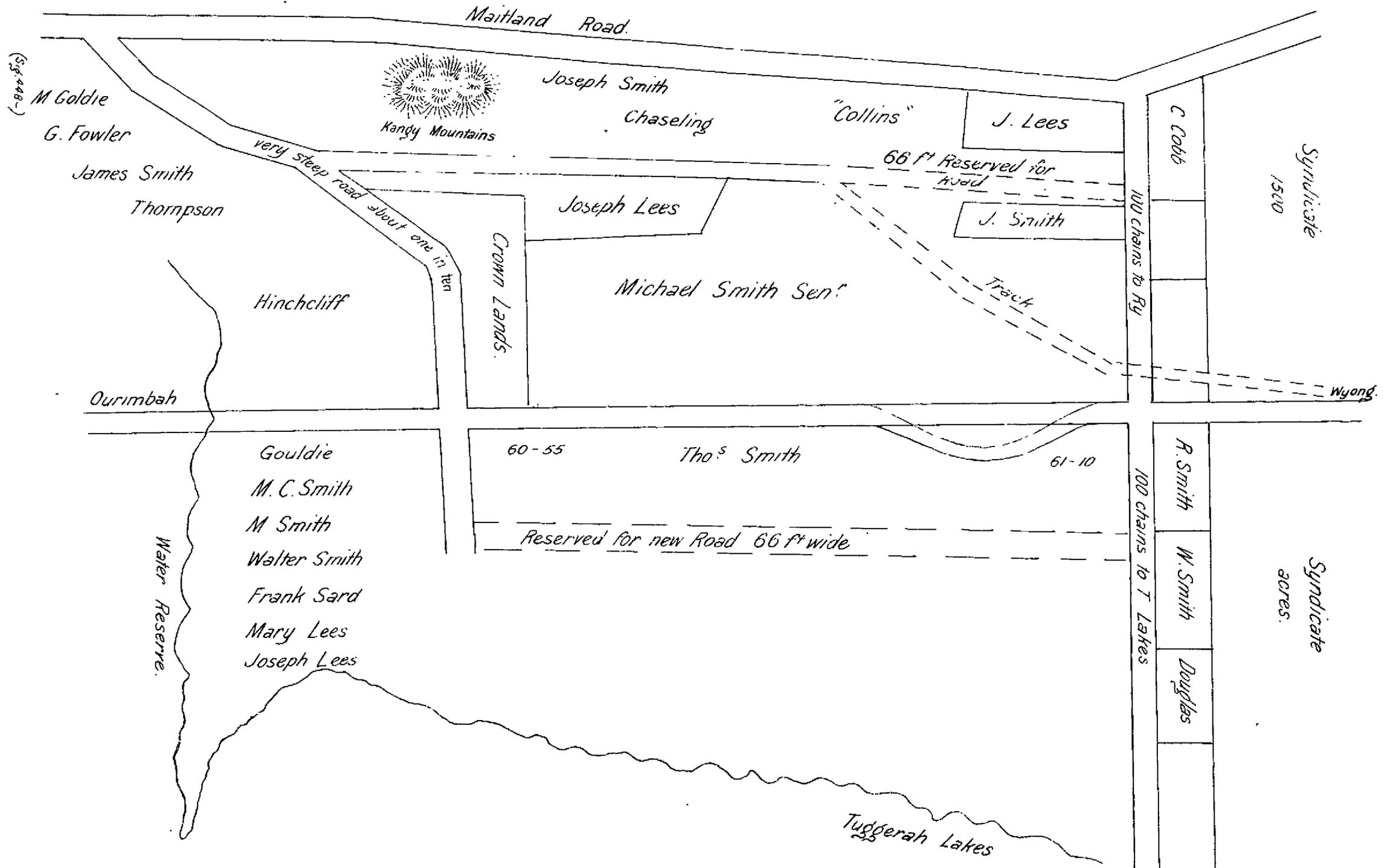


**C.N.R.**  
**SYDNEY TO NEWCASTLE**  
 SITE FOR PROPOSED PLATFORM AND SIDING  
 61 M.10C<sup>MS</sup>

(Sig. 448)

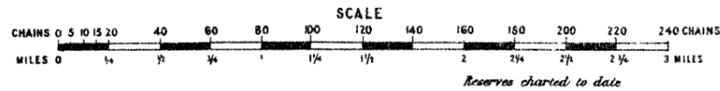


*J.M.M.*  
 5/2/90.



# PARISH OF TUGGARAH COUNTY OF NORTHUMBERLAND *Land District of Gosford*

Note  
Portions are shown on this map only as far as  
finally dealt with by the Charting Branch 20<sup>th</sup> Jan 1887

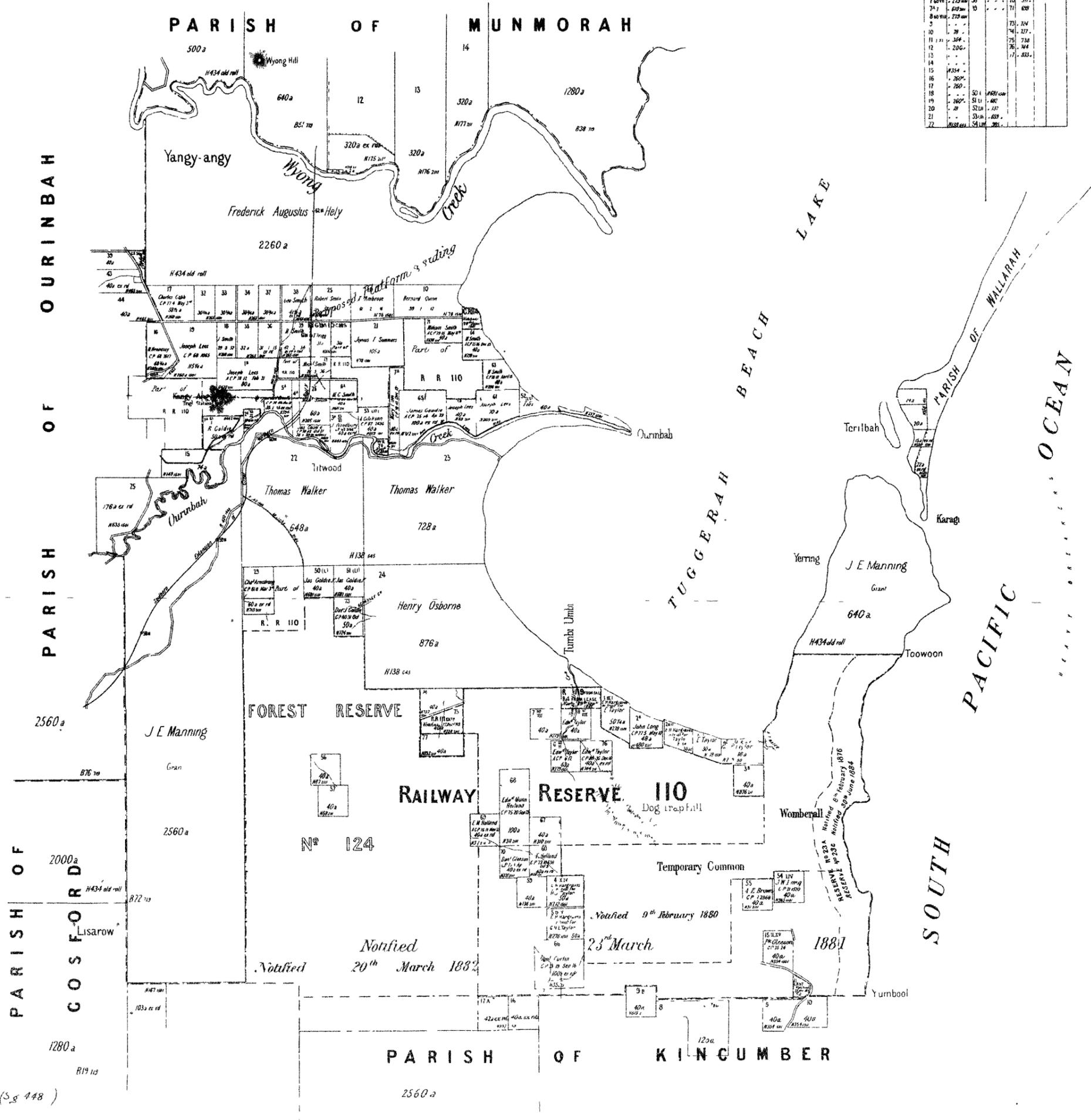


EASTERN DIVISION N. S. W. 1887

Sig. W. Freeman  
Chief Draftsman  
Feb 1887

Distinctive Boundaries  
Parish Boundaries shown thus ---  
Reserve ---

Part	Cont.	Part	Cont.	Part	Cont.	Part	Cont.
1	121	23	113	45	10	77	10
2	141	24	114	46	11	78	11
3	161	25	115	47	12	79	12
4	181	26	116	48	13	80	13
5	201	27	117	49	14	81	14
6	221	28	118	50	15	82	15
7	241	29	119	51	16	83	16
8	261	30	120	52	17	84	17
9	281	31	121	53	18	85	18
10	301	32	122	54	19	86	19
11	321	33	123	55	20	87	20
12	341	34	124	56	21	88	21
13	361	35	125	57	22	89	22
14	381	36	126	58	23	90	23
15	401	37	127	59	24	91	24
16	421	38	128	60	25	92	25
17	441	39	129	61	26	93	26
18	461	40	130	62	27	94	27
19	481	41	131	63	28	95	28
20	501	42	132	64	29	96	29
21	521	43	133	65	30	97	30
22	541	44	134	66	31	98	31
23	561	45	135	67	32	99	32
24	581	46	136	68	33	100	33
25	601	47	137	69	34	101	34
26	621	48	138	70	35	102	35
27	641	49	139	71	36	103	36
28	661	50	140	72	37	104	37
29	681	51	141	73	38	105	38
30	701	52	142	74	39	106	39
31	721	53	143	75	40	107	40
32	741	54	144	76	41	108	41
33	761	55	145	77	42	109	42
34	781	56	146	78	43	110	43
35	801	57	147	79	44	111	44
36	821	58	148	80	45	112	45
37	841	59	149	81	46	113	46
38	861	60	150	82	47	114	47
39	881	61	151	83	48	115	48
40	901	62	152	84	49	116	49
41	921	63	153	85	50	117	50
42	941	64	154	86	51	118	51
43	961	65	155	87	52	119	52
44	981	66	156	88	53	120	53
45	1001	67	157	89	54	121	54
46	1021	68	158	90	55	122	55
47	1041	69	159	91	56	123	56
48	1061	70	160	92	57	124	57
49	1081	71	161	93	58	125	58
50	1101	72	162	94	59	126	59
51	1121	73	163	95	60	127	60
52	1141	74	164	96	61	128	61
53	1161	75	165	97	62	129	62
54	1181	76	166	98	63	130	63
55	1201	77	167	99	64	131	64
56	1221	78	168	100	65	132	65
57	1241	79	169	101	66	133	66
58	1261	80	170	102	67	134	67
59	1281	81	171	103	68	135	68
60	1301	82	172	104	69	136	69
61	1321	83	173	105	70	137	70
62	1341	84	174	106	71	138	71
63	1361	85	175	107	72	139	72
64	1381	86	176	108	73	140	73
65	1401	87	177	109	74	141	74
66	1421	88	178	110	75	142	75
67	1441	89	179	111	76	143	76
68	1461	90	180	112	77	144	77
69	1481	91	181	113	78	145	78
70	1501	92	182	114	79	146	79
71	1521	93	183	115	80	147	80
72	1541	94	184	116	81	148	81
73	1561	95	185	117	82	149	82
74	1581	96	186	118	83	150	83
75	1601	97	187	119	84	151	84
76	1621	98	188	120	85	152	85
77	1641	99	189	121	86	153	86
78	1661	100	190	122	87	154	87
79	1681	101	191	123	88	155	88
80	1701	102	192	124	89	156	89
81	1721	103	193	125	90	157	90
82	1741	104	194	126	91	158	91
83	1761	105	195	127	92	159	92
84	1781	106	196	128	93	160	93
85	1801	107	197	129	94	161	94
86	1821	108	198	130	95	162	95
87	1841	109	199	131	96	163	96
88	1861	110	200	132	97	164	97
89	1881	111	201	133	98	165	98
90	1901	112	202	134	99	166	99
91	1921	113	203	135	100	167	100
92	1941	114	204	136	101	168	101
93	1961	115	205	137	102	169	102
94	1981	116	206	138	103	170	103
95	2001	117	207	139	104	171	104
96	2021	118	208	140	105	172	105
97	2041	119	209	141	106	173	106
98	2061	120	210	142	107	174	107
99	2081	121	211	143	108	175	108
100	2101	122	212	144	109	176	109



(S. 448)

1890.

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LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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LEVEL CROSSINGS ON RAILWAYS BILL.

(MESSAGE No. 25.)

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*Received by the Legislative Assembly, 16 July, 1890.*

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CARRINGTON,  
*Governor.*

*Message No. 25.*

In accordance with the provisions contained in the 54th section of the Constitution Act, the Governor recommends, for the consideration of the Legislative Assembly, the expediency of making provision to meet the requisite expenses in connection with a Bill to enable the Railway Commissioners of New South Wales to close level crossings, and to substitute, where necessary, overhead bridges or subways in lieu thereof.

*Government House,*  
*Sydney, 14th July, 1890.*

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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 311

LECTURE 10

PROBLEMS

10.1

10.2

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAY EMPLOYEES PROVIDENT AND PENSION  
FUND BILL.

(MESSAGE No. 40, RECOMMENDING.)

*Ordered by the Legislative Assembly to be printed, 10 September, 1890.*

CARRINGTON,

*Message No. 40.*

*Governor.*

In accordance with the provisions contained in the 54th clause of the Constitution Act, the Governor recommends for the consideration of the Legislative Assembly the expediency of making provision to meet the requisite expenses in connection with a Bill "To facilitate the establishment of a provident and pension fund for the relief and support in sickness, on retirement, and other contingencies of persons employed at weekly or daily wages on the New South Wales Government Railways and Tramways, and of their families; to authorize contributions by such persons and by the Railway Commissioners; to protect the interests of persons entitled to the benefits of the said fund; to regulate the administration of the fund; to make certain provisions affecting liabilities of and contributions to the Civil Service Superannuation Account; to allow contributions to the fund to stand instead of the life insurance required by the sixty-fourth section of the 'Government Railways Act of 1888'; to make further provision in connection with the said fund, and for other purposes."

*Government House,*

*Sydney, 10th September, 1890.*



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RAILWAY FROM HORNSBY TO ST. LEONARDS.**  
(PETITION FROM RESIDENTS OF NORTH SHORE, &c, IN FAVOUR OF.)

*Received by the Legislative Assembly, 6 May, 1890.*

To the Honorable the Speaker and Members of the Legislative Assembly of New South Wales, in  
Parliament assembled.

The humble Petition of the undersigned, residents and property owners of North Shore, North  
Willoughby, Chatswood, North Sydney, Gordon, Hornsby, and Gosford,—

SHOWETH:—

(1.) That the extension of the North Shore Railway from its present terminus at Gore Hill to  
Milson's Point having been referred to the Public Works Committee, was, notwithstanding that the  
evidence was entirely in favour of such extension, not recommended by the Committee, for reasons  
which, in the opinion of your Petitioners, are inadequate and invalid.

(2.) We therefore pray your Honorable House to take the premises into consideration, and affirm  
the expediency of at once constructing the railway to Milson's Point.

And your Petitioners, as in duty bound, will ever pray.

[Here follow 2,118 signatures.]



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

CLARENCE RAILWAY CONSTRUCTION AND  
HARBOUR IMPROVEMENT.

(PETITION FROM RESIDENTS OF THE CLARENCE IN FAVOUR OF).

*Received by the Legislative Assembly, 6 May, 1890.*

To the Honorable Members of the Legislative Assembly of New South Wales, in Parliament assembled.

The Petition of the Executive Committee of the Clarence Railway Construction and Harbour Improvement League, for and on behalf, and by direction of the Citizens of Grafton, and the people of the Clarence in Public Meeting assembled, on the 16th day of April, 1890, in the Theatre Royal, Grafton,—

HUMBLY SHOWETH:—

1. That your Petitioners in the month of November, 1888, presented their two several Petitions for the construction of Harbour Works at the Clarence River on the designs of Sir John Coode, and of lines of Railway from Grafton to The Tweed River, Grafton to Glen Innes, and Glen Innes to Inverell, and your Petitioners crave leave to refer to the said Petitions herewith.

2. That your Petitioners are impressed with a profound sense of the national importance and public expediency of the Harbour and Railway Works above referred to, and believe that the adverse recommendations of the Public Works Committee in respect thereof are due solely to their failure to grasp this view of the question.

3. That the Clarence is the principal sea-port on the north coast of this Colony which has not yet been developed up to her capabilities and deserts, and that the designs of Sir John Coode alone are adequate to doing so, and worthy to fit her for her rightful service.

4. That the proposal for the line of railway from Grafton to The Tweed River having been submitted to Parliament as the first instalment of a national coast line, inquiry should be made into the general merits of such a line before any isolated section of it is approved by your honorable House.

5. That your Petitioners, led by this reasoning, reiterate their desire for the execution of such works as national undertakings, and at the meeting abovementioned have unanimously adopted Resolutions in the following terms:—

(1st.) That this meeting protests against the recommendations of the Public Works Committee as regards the Clarence Harbour Works being only partially carried out, and would urge upon the Government the necessity of carrying out the works as designed by Sir John Coode in their entirety.

(2nd.) That this meeting also protests against the recommendations of the Public Works Committee that the Grafton-Tweed Railway should only be constructed from The Tweed to Lismore, and would urge upon the Government the necessity for constructing the whole line from Grafton to The Tweed as originally submitted by the Premier to Parliament as the first instalment of a north coast line.

Your Petitioners, therefore, humbly pray that your honorable House will take into your early and favourable consideration the execution of the aforementioned works, and afford such relief in respect of the same as to your wisdom may seem expedient in the general interests of the whole Colony.

And your Petitioners, as in duty bound, will ever pray.

[Here follow 14 signatures.]



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

**RAILWAY FROM LISMORE TO THE TWEED.**

(PETITION FROM MAYOR OF CASINO, URGING CONSTRUCTION OF.)

*Received by the Legislative Assembly, 14 May, 1890.*

To the Honorable the Speaker and the Honorable Members of the Legislative Assembly of the Colony of New South Wales.

The Petition of Members of the Railway League, Casino, Richmond River, in the Colony of New South Wales,—

HUMBLY SHOWETH:—

1. That the Public Works Committee having recommended the construction of a line of railway from Murwillumbah (Tweed River) to Lismore (Richmond River), your Petitioners would respectfully urge your Honorable House to adopt that recommendation, so as to enable the Government to provide for the immediate construction of the line in question and thus afford relief to thousands of settlers, who at the present time have no means of getting their produce conveyed to the principal markets of the Colony, except under crushing difficulties; and at the same time lead to the development of what is admittedly the richest Electorate—as regards agriculture, dairying, and pastoral pursuits—in the Colony, and one that is capable of sustaining a population of at least one million.

2. Your Petitioners would further urge the construction of the proposed railway from Murwillumbah to Lismore, in that it must inevitably prove to be the first section of a line that will connect these northern districts with the main Railway system of the Colony, at or near Tenterfield.

3. That your Petitioners feel this Electorate is justly and equitably entitled to the expenditure necessary for the construction of the proposed railway from Murwillumbah to Lismore, and ultimately to Tenterfield—apart altogether from the important factors that such a line will not only be a commercial success but also an undoubtedly national undertaking, especially in view of the almost assured early accomplishment of the federation proposals so wisely and ably promulgated by Sir Henry Parkes—in view of the fact that this northernmost portion of the Colony has not participated in the benefits directly and indirectly derived from the expenditure of over forty million pounds of loan votes, for which the residents in this Electorate have been and are paying a proportionate share of the interest payable on such loans.

4. Your Petitioners therefore pray that your Honorable House will take these premises into your earnest and favourable consideration; and with the view of assisting the residents of this Electorate, and promoting the welfare of the Colony, will so view the request of your Petitioners as to speedily grant the boon and relief they ask for.

And your Petitioners, as in duty bound, will ever pray.

Signed for and on behalf of the members of the Casino Railway League.

F. G. CROUCH,  
Mayor, Chairman.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(PETITION FROM INHABITANTS OF CUDAL, PROTESTING AGAINST CONSTRUCTION OF—FROM  
MOLONG TO PARKES AND FORBES.)

---

*Received by the Legislative Assembly, 10 June, 1890.*

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To the Honorable the Legislative Assembly, in Parliament assembled.

The humble Petition of the undersigned, inhabitants of the farming settlements of Cudal and surrounding districts,—

RESPECTFULLY SHOWETH:—

That your Petitioners humbly yet most emphatically protest against the decision of the Parliamentary Standing Committee on Public Works *re* the Molong to Parkes and Forbes and the Borenore to Forbes Railway lines, as being contrary and opposed to the great bulk of evidence given thereon.

That your Petitioners view with surprise that the Borenore to Forbes line should have been dismissed from consideration by the Public Works Committee on account of the steep gradients thereon, whilst, according to the evidence given by Mr. Surveyor Kennedy at Molong before the Sectional Committee, there are no less than three portions of the line from Molong to Parkes with gradients quite as steep.

That your Petitioners would respectfully ask that a fresh survey be made on that portion of the line where the steep grade occurs, having no hesitation in saying that the gradient can be considerably reduced if a further survey were granted, such fresh surveys having already been carried out twice on the Molong to Parkes line for the same purpose.

That your Petitioners assert that a line from Borenore, *via* Cudal to Forbes, will pass through an agricultural district with a population of at least three to one over that of Molong to Parkes, which can be verified by reference to the Educational and Postal Departments, and is more centrally situated.

That your Petitioners further state that the line from Molong *via* Bocoble Gap to Parkes will not serve the district of Cudal, as the majority of the population are south of Cudal and of the Borenore-Forbes line, and that they would be at considerable loss if they had to cart their produce to the Parkes line, a distance in many instances of over 18 miles, the nearest point on the Parkes line from Cudal being not less than 8 miles by any charted road, besides having to pay for 26 miles haulage from there to Borenore, whereas the distance from Cudal to Borenore by road is only about 18 miles.

Your Petitioners also state that they have every reason to believe, from the nature of the country, that if a survey were made from Eugowra to Parkes it would be found that a line could be constructed from Borenore *via* Eugowra to Forbes, and from Eugowra to Parkes, at about the same cost as a line from Molong to Parkes and Forbes, and would thus give Forbes, Parkes, Eugowra, Murga, Toogong, Cargo, and a large district south of Cudal, railway communication with the Sydney market.

Your Petitioners would further point out to your Honorable House that the line from Borenore *via* Cudal to Forbes having been passed by three successive Parliaments with very large majorities, and the report of the Railway Commissioners showing that the construction of the Molong to Parkes and Forbes line would involve a loss to the Colony of £15,000 per year, your Petitioners are of the opinion that the Borenore to Forbes line should be constructed in preference to the Molong-Parkes Line.

Your humble Petitioners, considering the vital importance of obtaining direct railway communication with the metropolis, and being convinced that the Borenore to Forbes line will prove one of the best paying lines in the Colony, a fact of which your Honorable House "has long been convinced," now solicit your Honorable House to take such steps as will secure the adoption of that line.

And your humble Petitioners, as in duty bound, will ever pray.

[*Here follow 218 signatures.*]

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAYS.

(PETITION FROM CERTAIN RESIDENTS OF FORBES AGAINST CONSTRUCTION OF—FROM MOLONG TO PARKES AND FORBES.)

*Received by the Legislative Assembly, 18 June, 1890.*

To the Honorable Mr. Speaker and Members of the Legislative Assembly of New South Wales, in Parliament assembled.

May it please your Honorable House,—

The Petition of the residents of Forbes and surrounding districts,—

RESPECTFULLY SHOWETH:—

That at a public meeting held in the town of Forbes, New South Wales, on the twenty-eighth day of May last, and which meeting was duly convened by the Mayor of Forbes in response to a numerously signed requisition, the following resolutions were duly proposed and carried:—

- “1. That the report of the Sectional Committee, wherein they state that they have made careful and minute investigations concerning not only the proposed line (Molong to Parkes and Forbes), but also of the rival routes, Borenore to Forbes and Cowra to Forbes, is incorrect, inasmuch as a distance of 40 miles of the last-named route was not traversed by any Member of such Committee.”
- “2. That the recommendation of the Committee, as embodied in the final paragraph of their report, is contrary to evidence.”
- “3. That this meeting is of opinion that before the sanction of Parliament is obtained for the purpose of carrying out the Government proposal, petitions should be at once sent in from the residents of Cowra, Goolagong, Canowindra, Nyrang Creek, Eugowra, Forbes, Condobolin, and the residents on the Lachlan River generally, praying Parliament to withhold its sanction to any proposed line of railway to Forbes until a full and complete report has been obtained respecting railway extension from Cowra or Woodstock to Forbes.”

Your Petitioners, in support of the last-named resolution, respectfully beg to draw the attention of your Honorable House to the particulars of a debate which took place in the Legislative Council on the eighth day of October, one thousand eight hundred and eighty-six (*vide Hansard*), when the Honorable W. H. Suttor moved an amendment on the Government proposal to construct a railway from Borenore to Forbes, substituting a line from Mandurama or Lyndhurst or Wood's Flat to Forbes in lieu thereof, and which resulted in the original motion being lost, the Honorable John Lackey and the Honorable G. H. Cox both speaking in support of Mr. Suttor's amendment.

Your Petitioners respectfully submit that the arguments against the construction of a line of railway from Borenore to Forbes are equally applicable, and even in a greater degree to any extension from Molong to Forbes, and that a line from one of the points named on the Murrumburrah-Blayney line to Forbes would result as follows:—

- (a) A large number of people settled on the land would be benefited by its construction; (b) it would pass through first-class agricultural and well watered land the whole of the way; (c) it would be shorter and cheaper to construct than any other line; (d) the question of elevation and gradients is all in favour of the line traversing the Lachlan Valley as against any other.

On these grounds your Petitioners pray that you will give the third resolution embodied herein your most favourable consideration; and, as in duty bound, they will ever pray.

[*Here follow 277 signatures.*]

Similar Petition from certain residents of Eugowra received 18th June; 290 signatures.



1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAYS.

(PETITION FROM CERTAIN RESIDENTS OF CANOWINDRA DISTRICT AGAINST CONSTRUCTION OF  
MOLONG TO PARKES AND FORBES.)

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*Received by the Legislative Assembly, 10 June, 1890.*

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To the Honourable the Members of the Legislative Assembly of New South Wales.

The Petition of the undersigned residents of Canowindra District,—

HUMBLY SHOWETH,—

That your Petitioners respectfully protest against the proposed construction of the Molong to Parkes and Forbes Line of Railway, for the following reasons, viz.:—

Firstly: That the merits of the Cowra to Forbes route had not been sufficiently inquired into.

Secondly: That the Cowra to Forbes route, as proved officially, can be constructed for £200,000 less than the Molong route.

Thirdly: That this saving of £200,000, with an extra £60,000, would construct a railway from Forbes to Parkes, a distance of 20 miles, at £1,000 per mile, also a line from Forbes to Condobolin, a distance of 60 miles, at £3,000 per mile, when these three important towns would have railway communication.

Fourthly: That the Cowra route is shorter than the Molong route by several miles.

Fifthly: That by adopting the Cowra route in preference to the Molong-Parkes route, a distance of 70 miles would be saved by persons wishing to take advantage of the Southern Market.

Sixthly: That the difference in elevation between Cowra and Forbes is 200 feet, whereas the difference in elevation between Molong and Forbes is 1,800 feet.

Seventhly: That the Cowra-Forbes route had not been personally inspected by the Sectional Committee.

Eighthly: That the inhabitants of Condobolin, Forbes, Eugowra, Canowindra, Goolagong, Cargo, and Cowra, are opposed to the adoption of the Molong route.

Ninthly: That the valley of the Lachlan is the true grand line of railway that should be constructed from a national standpoint, being the great highway of traffic, having the greatest population, and must therefore benefit the greatest number of people.

We pray that your Honorable House will take into careful consideration our earnest protest.

And your Petitioners, as in duty bound, will ever pray, &c., &c.

[Here follow 41 signatures.]

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1890.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

**KIAMA TO NOWRA RAILWAY.**

(PETITION FROM CERTAIN RESIDENTS OF NOWRA IN OPPOSITION TO.)

*Received by the Legislative Assembly, 2 July, 1890.*

To the Honorable the Speaker and Members of the Legislative Assembly of New South Wales, in Parliament assembled.

The Petition of the undersigned Residents and Freeholders of Nowra, in the Electorate of Shoalhaven and its vicinity,—

HUMBLY SHOWETH :—

1. That your Petitioners and others, through their representatives in past Parliaments, requisitioned the Government to extend the South Coast Railway Line to Nowra.

2. That a trial survey was made by the Railway Department, and an estimate of cost made.

3. That on the                    day of                    1883, your Honorable House voted £804,000, to construct a line of Railway from Kiama to Jervis Bay.

4. That on the 27th July, 1886, your Honorable House approved of the plans, sections, and books of reference of section 1 of the said then proposed line, and that the same was on the 11th day of August of the same year, laid on the table of the Legislative Council, which did not come to a vote on it in consequence of the dissolution of Parliament, and that the plans, sections, &c., of No. 2 section of the said line, including the town of Nowra, were laid upon the table of your Honorable House on the day of                   , 1886, and was not come to a vote upon in consequence presumably of the immediately subsequent dissolution of Parliament.

5. That the line designated "Kiama to Nowra," as introduced in 1889 by the Hon. Sir Henry Parkes, G.C.M.G., Premier, amongst the Government proposals included the town of Nowra.

6. That the proposed line was, subsequently, in accordance with section 13 of the Public Works Act, submitted to the Railway Commissioners for report, the estimated cost then being £538,663, including £100,000 for crossing the Shoalhaven River to Nowra.

7. That the Commissioners for Railways, viewing as large the excessive estimate of £100,000 for a bridge, recommended the omission of the said sum.

8. That in evidence on oath before the Parliamentary Standing Committee on Public Works (*vide* Report of Parliamentary Standing Committee of Public Works, page 4, questions 117 and 118) Henry Dean, Esq., Engineer-in-Chief for Railways, states that the line can be constructed into Nowra for £441,663, or £97,000 less than the estimate upon which the Railway Commissioners recommended the omission of Nowra from the line.

9. That the Sectional Committee of the Parliamentary Standing Committee on Public Works visited the district, made an extensive inquiry, and *inter alia* states in their report: "Your Committee also urge the necessity for taking the line into the town of Nowra, in order to secure the maximum amount of traffic. The speedy erection of a railway bridge would render unnecessary the proposed branch line from Bomaderry to the existing bridge over the Shoalhaven River."

10. That the line, as at present proposed to your Honorable House, is not a line "to Nowra," as designated, but a line to a point by the nearest practicable highway 141 chains from Nowra, on the Berry Estate, which the line enters 7 miles south of Kiama, and traverses the said estate alone for 15 miles, to the proposed terminus at a settlement called Bomaderry, on the said Berry Estate.

11. That, as the terminus with the expensive station buildings, &c., may remain at Bomaderry for an indefinite number of years, the effect will be detrimental to the interests of Nowra and the district south of the Shoalhaven River, and injurious to the monetary prospects of the line, inasmuch as the public steamer wharf is much nearer Nowra, and much more convenient to the residents of the said district for goods traffic than will be the proposed terminus.

12. That Nowra and the district immediately south of the Shoalhaven River of which it is the centre still contains much Crown Lands, is capable of considerable expansion and development as a centre for fruit-growing and other purposes; and that the effect of terminating the line at Bomaderry for any time will be to inflate the value of private land at the public expense, whilst the public estate south of it will be reduced in value.

In view of the foregoing facts,—

Your Petitioners humbly pray that your Honorable House may be pleased to cause such amendment to be made in the Bill for the railway designated "Kiama to Nowra" as shall avert the consequences foreshadowed by your Petitioners.

And your Petitioners, as in duty bound, will ever pray, &c.

[Here follow 98 signatures.]

1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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## RAILWAY TO WALGETT.

(PETITION FROM PROGRESS COMMITTEE OF WALGETT, URGING THE CONSTRUCTION OF A LINE OF.)

*Ordered by the Legislative Assembly to be printed, 26 August, 1890.*

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To the Honorable the Legislative Assembly of New South Wales in Parliament assembled.

The Petition of the undersigned members of the Progress Committee, of Walgett and surrounding districts acting for and on behalf of the residents thereof,

HUMBLY SHOWETH:—

That, at a public meeting of the residents of Walgett and the surrounding districts, held at the Walgett School of Arts on Wednesday evening, 2nd July, it was unanimously resolved:—

1. That, in the opinion of this meeting, it is most desirable that Walgett should have railway connection as early as possible.

2. That the resolution be most respectfully conveyed by Petition to your Honorable House by the local Progress Committee on behalf of the residents aforesaid.

3. That, in view of the importance and urgency of the matter and of the previous agitations in this behalf, and the constant promises of the different Governments in support of the very strong claims of the district of such extension, the matter be represented to the Government by Petition.

And your petitioners most respectfully pray that, after taking the premises into your most favourable consideration, you will be pleased to sanction the construction of a line of railway to Walgett as early as possible.

And your petitioners as in duty bound will ever pray, &c., &c.

[Here follow 17 signatures.]

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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**RAILWAYS.**

(PETITION FROM CERTAIN SERVANTS, PRAYING THAT THE SERVICES OF EMPLOYEES, KNOWN AS  
EXTRA HANDS, MIGHT BE RETAINED.)

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*Received by the Legislative Assembly, 18 September, 1890.*

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To the Honorable the Speaker and the Honorable Members of the Legislative Assembly of New South  
Wales, in Parliament assembled.

The humble Petition of the undersigned,—

RESPECTFULLY SHOWETH:—

1. That your Petitioners are servants of the Railway Department of New South Wales.
2. That about the middle of July last nearly 600 of the Railway employees, known as extra hands, received a fortnight's notice that their services would be dispensed with.
3. That, although the carrying out of the notice has not yet taken effect, that your Petitioners verily believe that the same is to be carried out at the end of this present month of September.
4. That your Petitioners verily believe that there is much danger to public safety in giving the work which has previously been done by the men now under notice and other similar men over to public contract.
5. That your Petitioners verily believe that no saving can be effected in the cost of such works as carried out at present by such contracts as are proposed, except at the imminent and permanent risk of the travelling public.
6. Your Petitioners respectfully point out that many of the men under notice as hereinbefore described are old and faithful servants of the Railway Department, some having been in the service for periods varying from ten to twenty years. Some of them have also received special thanks from His Excellency the Governor of New South Wales for special services in preventing accident, &c.
7. Your Petitioners respectfully point out that a large number of entirely new hands have been permanently appointed to the Railway Service, while these old and faithful servants as aforesaid have been continually passed over, and that, consequently, their discharge is now a grievance and an injustice to them.

Wherefore, your Petitioners pray your Honorable House to make such inquiry as you may deem fitting into the premises, and thereafter to grant your Petitioners such relief as your Honorable House may deem befitting.

And your Petitioners, as in duty bound, will ever pray, &c.

[Here follow 442 signatures.]

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

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RAILWAY FROM NEW ENGLAND TO THE COAST.

(PETITION FROM CERTAIN RESIDENTS OF THE TABLELAND OF NEW ENGLAND AND DISTRICT WEST OF INVERELL).

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*Received by the Legislative Assembly, 13 November, 1890.*

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To the Honorable the Speaker and Members of the Legislative Assembly now assembled.

The Petition of the undersigned residents of the Tableland of New England and district west of Inverell,—

HUMBLY SHOWETH:—

That in the interests of the northern districts and the Colony generally a line of railway should be constructed at once from New England to the coast.

That the proposed line from Grafton to Guyra has been favourably reported upon by Messrs. Scarr and Price.

That from the facts contained in their reports has been shown the central position of Guyra station is half-way between Sydney and Brisbane. The nature of the country through which such a line would pass, and the cost of construction being estimated at £88,539, exclusive of the bridge, less than the cost of constructing a line from Glen Innes to Inverell, although the length of line from Guyra to Inverell is longer, and the probability of the line from the coast being connected with the Great Northern Railway at Guyra.

That the proposed line of railway to Inverell should have its starting point at Guyra, which would bring Inverell within easier distance of Sydney and the coast, and avoid the heavy traction ascending and descending Ben Lomond and Waterloo if the line were constructed from Glen Innes.

That in view of all these facts, and that the proposed lines, while being the most economical as regards cost of construction and maintenance, would also better serve the requirements of the northern districts than any other lines suggested, and encourage the settlement of population upon land that is capable of sustaining it, and benefit the Colony generally. Your Petitioners humbly pray that the proposed railway lines from Inverell to Guyra and Guyra to Grafton be referred to the Committee for Public Works for report and consideration at the same time as the Glen Innes and Inverell line is considered.

And your Petitioners will ever pray.

*[Here follow 177 signatures.]*

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1890.

LEGISLATIVE ASSEMBLY.  
NEW SOUTH WALES.

RAILWAY ROUTE FROM GUYRA TO INVERELL.

(PETITION FROM CERTAIN RESIDENTS OF OLLERA, WANDSWORTH, AND TENTERDEN, &c.)

*Received by the Legislative Assembly, 2 December, 1890.*

To the Honorable the Speaker and Members of the Legislative Assembly of New South Wales, in  
Parliament assembled.

The humble Petition of the undersigned residents of Ollera, Wandsworth, Tenterden, and their  
surroundings,—

RESPECTFULLY SHOWETH:—

That the railway route from Guyra to Inverell is the most desirable one, and, on its construction, the greater number will be benefited thereby, and will prove remunerative to the Colony at large.

Although your humble servants fairly agree with Messrs. Scarr and Price in their report of this route, yet we mention that the above-named gentlemen overlooked the commodity of timber, there being abundance of the finest quality and in close proximity to the line.

Your humble petitioners would draw your honorable attention to the ample supply of stone for ballast, as well as the suitable earth for bricks which already has been tested by buildings having been erected thereof.

We therefore pray that this route will be submitted for consideration to the Works Committee.

With the foregoing, and many other advantages, your petitioners most respectfully pray, that is your wisdom, your Honorable House will take such steps as will cause the speedy construction of this route.

And your petitioners, as in duty bound, will ever pray.

*[Here follow 99 signatures.]*



1890.

## NEW SOUTH WALES.

## PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND AT COMO FOR ADDITIONAL SIDING ACCOMMODATION.)

Presented to Parliament, pursuant to Act 44 Vic. No. 16.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
THE "PUBLIC WORKS ACT OF 1888."

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
Council, Knight Grand Cross of the  
(L.S.) Most Distinguished Order of Saint  
CARRINGTON, Michael and Saint George, Governor and  
Governor. Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS the Railway Commissioners of New South Wales are desirous of acquiring the land described at the foot hereof, which is adjacent to other land belonging to the said Railway Commissioners, for the purpose of erecting additional siding and other railway works and conveniences thereon, and it is estimated that the cost of carrying out the said works will not exceed the sum of two thousand pounds: And whereas under the provisions of the "Public Works Act of 1888," I, the Governor aforesaid, with the advice of the Executive Council, have in due form directed that the said work shall be carried out under the provisions of the said Act by the Railway Commissioners, who in respect of the said work I have declared, shall be deemed to be the constructing authority; and also, that the land required for carrying out the said works shall be acquired under the "Public Works Act of 1888": And whereas the land described at the foot hereof, is the land required for carrying out the said work: Now, therefore, I, CHARLES ROBERT, BARON CARRINGTON, the Governor aforesaid, with the advice of the Executive Council of the said Colony, in pursuance of the powers on this behalf given to or vested in me by the "Public Works Act of 1888," do, by this notification published in the Gazette and in a newspaper, that is to say, in the "Daily Telegraph" circulated in the Police District wherein the said land is situated, declare that the land hereinafter described, has been resumed for the purpose hereinafter mentioned, that is to say, for the purpose of constructing and erecting thereon additional siding and other railway works and conveniences, to the intent that upon the publication of this notification in the Gazette, the land hereinafter described, shall forthwith be vested in the Railway Commissioners, as the constructing authority on behalf of Her

Majesty for the purposes of the said Act, for an estate in fee simple, in possession, freed and discharged from all trusts, obligations, estates, interests, contracts, charges, rates, rights-of-way, or other easements whatsoever; and to the intent, that the legal estate therein, together with all powers incident thereto or conferred by the said Act, shall be vested in the said Railway Commissioners as such constructing authority as a trustee: And I declare that the following is the description of the land hereinbefore referred to, that is to say:—

All that piece or parcel of land situate in the parish of Sutherland, county of Cumberland and colony of New South Wales, being part of the Holt Sutherland Estate: Commencing at the junction of the north-eastern boundary of the railway from Sydney to Wollongong and Kiama with the south-eastern boundary of Railway Road; and bounded thence by the said boundary of Railway Road bearing north 51 degrees 24 minutes east 80 links; thence by a line bearing south 38 degrees 33 minutes east 3 chains  $\frac{1}{2}$  link; thence by a line bearing south 61 degrees 4 minutes east 2 chains 31  $\frac{1}{2}$  links; thence by a line bearing north 56 degrees 2 minutes east 1 chain 25  $\frac{1}{2}$  links; thence by the south-western boundary of the Novara Parade bearing south 32 degrees 15 minutes east 1 chain 17  $\frac{1}{10}$  links, south 28 degrees 45 minutes east 1 chain 17  $\frac{1}{10}$  links, and south 25 degrees 30 minutes east 1 chain 17  $\frac{1}{10}$  links; thence by a line bearing south 66 degrees 6 minutes west 2 chains 99 links; thence by the eastern boundary of the aforesaid railway bearing north 25 degrees 27 minutes west 1 chain, north 29 degrees 20 minutes west 1 chain, north 32 degrees 17 minutes west 1 chain, north 35 degrees 44 minutes west 1 chain, north 38 degrees 21 minutes west 1 chain, and north 38 degrees 33 minutes west 3 chains  $\frac{1}{2}$  link, to the point of commencement,—containing 1 acre 1 rood 35  $\frac{1}{2}$  perches, and said to be in the possession of the trustees of the late Thomas Holt.

Given under my Hand and the Seal of the said Colony, at Government House, Sydney, this nineteenth day of May, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-third year of Her Majesty's Reign.

By His Excellency's Command,

W. MEMLIAN.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND FOR WIDENING THE LINE OF RAILWAY FROM SYDNEY TO EVELEIGH,  
PARISH OF ST. LAWRENCE.)

Presented to Parliament pursuant to Act 51 Vic. No. 37.

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
Council, Knight Grand Cross of the  
(L.S.) Most Distinguished Order of Saint  
CARRINGTON, Michael and Saint George, Governor and  
Governor. Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS it is expedient that the public work hereinafter mentioned shall be constructed, that is to say, the Widening of the Line of Railway from Sydney to Eveleigh and the erecting on the land required to be taken therefor of additional railway works and conveniences, the estimated cost of which public work will not exceed twenty thousand pounds: And whereas it is expedient that the said public work shall be carried out under the provisions of the "Public Works Act of 1888": Now, therefore, I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, and under and by virtue of the powers and authority vested in me by the said Act, hereby direct that the said public work shall be carried out under the provisions of the said Act, and that the carrying out of the same shall devolve upon the Railway Commissioners, who shall in that behalf be deemed the Constructing Authority: And I hereby further direct that the land described in the Schedule hereto, being in my opinion required for the purpose

of the aforesaid public work, shall be acquired for the aforesaid purpose, under the provisions contained in Part III of the said Act.

## SCHEDULE.

All that piece or parcel of land situate in the city of Sydney, parish of St. Laurence, county of Cumberland, and Colony of New South Wales: Commencing at a point bearing north 15 degrees 31 minutes east 186 feet 6½ inches from the intersection of the eastern building line of Regent-street with the northern building line of Clerland-street; and bounded on the west by a line bearing north 24 degrees 6 minutes east 121 feet; thence on the north by a line bearing north 89 degrees 45 minutes east 17 feet; thence on the east by a line bearing south 28 degrees 20 minutes west 128 feet 4 inches; and thence on the south by a line bearing north 65 degrees 54 minutes west 6 feet, to the point of commencement,—containing 4½ perches, and said to be in the possession of the Trustees of St. Paul's Church of England, Redfern.

Given under my Hand and Seal of the said Colony, at Government House, Sydney, this thirteenth day of September, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

W. McMILLAN.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND AT NEWTOWN IN CONNECTION WITH THE ERECTION OF ADDITIONAL RAILWAY WORKS)

Presented to Parliament pursuant to Act 51 Vic. No. 37.

## NOTIFICATION OF RESUMPTION OF LAND UNDER THE "PUBLIC WORKS ACT OF 1888."

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
(L.S.) Council, Knight Grand Cross of the  
CARRINGTON, Most Distinguished Order of Saint  
Governor. Michael and Saint George, Governor and  
Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS it is expedient that the public work hereinafter mentioned shall be constructed, that is to say, for the purpose of erecting thereon additional railway works and conveniences, the estimated cost of which will not exceed twenty thousand pounds: And that the said public work shall be carried out under the provisions of the "Public Works Act of 1888": Now, therefore, I, the Governor, aforesaid, with the advice of the Executive Council of the said Colony, and under and by virtue of the powers and authority vested in me by the said Act, hereby direct that the said public work shall be carried out under the provisions of the said Act, and that the carrying out of the same shall devolve upon the Railway Commissioners of the said Colony, who shall in that behalf be deemed the Constructing Authority; and I hereby further direct

that the land described in the Schedule hereto, being in my opinion required for the purpose of the aforesaid public work, shall be acquired for the said purpose under the provisions of the said Act:—

## SCHEDULE.

All that piece or parcel of land situate at Newtown, in the parish of Petersham, county of Cumberland, and Colony of New South Wales: Commencing at the junction of the eastern boundary of the Newtown Road with the southern boundary of the Great Southern Railway; and bounded thence by the said boundary of railway bearing north-easterly 2 chains 63 links; thence by part of the western boundary of the Mervale Estate bearing southerly 1 chain 94 links; thence by the northern boundary of the Newtown Markets bearing westerly 2 chains 70 links; thence by the aforesaid eastern boundary of the Newtown Road bearing northerly 95 links, to the point of commencement, and said to belong to the representatives of the late J. Donohoe.

Given under my Hand and Seal of the said Colony, at Government House, Sydney, this ninth day of September, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

W. McMILLAN.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND FOR TRAMWAY EXTENSION FROM LEICHHARDT TO FIVE DOCK.)

Presented to Parliament, pursuant to Act 51 Vic. No. 37.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
THE "PUBLIC WORKS ACT OF 1888."

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
Council, Knight Grand Cross of the  
(L.S.) Most Distinguished Order of Saint  
CARRINGTON, Michael and Saint George, Governor and  
Governor. Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS the Minister for Public Works of the Colony of New South Wales is desirous of acquiring the land described in the Schedule at the foot hereof for the purpose of erecting additional siding and other tramway works and conveniences thereon, and it is estimated that the cost of carrying out the said works will not exceed the sum of twenty thousand pounds: And whereas the land described in the said Schedule is the land required for carrying out the said works: Now, therefore, I, CHARLES ROBERT, BARON CARRINGTON, the Governor aforesaid, with the advice of the Executive Council, in pursuance of the provisions of the "Public Works Act of 1888," do hereby direct that the said works shall be carried out under the "Public Works Act of 1888," by the Minister for Public Works aforesaid, who, in respect of the said works, I hereby declare shall be deemed to be the Constructing Authority; and in further pursuance of the provisions of the said Act, I do hereby direct that the land described in the Schedule at the foot hereof may be acquired for the purpose of erecting thereon the

said additional siding and other tramway works and conveniences under the provisions contained in Part III of the said Act: And I hereby declare that the following is the description of the land hereinbefore referred to:—

## SCHEDULE.

All that piece or parcel of land situate in the parish of Petersham, county of Cumberland, and Colony of New South Wales, being part of the land comprised in certificate of title vol. 804, folio 157: Commencing at the intersection of the south-western side of Norton-street with the southern side of Marion-street; and bounded thence by the said boundary of Marion-street bearing 256 degrees 34 minutes 95 feet and  $\frac{1}{2}$  inch; thence by the north-eastern boundary of a right-of-way bearing 164 degrees 49 minutes 25 feet 4 inches; thence by a line bearing 75 degrees 9 minutes 95 feet; thence by the south-western side of Norton-street aforesaid bearing 344 degrees 54 minutes 22 feet 7 inches, to the point of commencement, containing 83 perches, numbered A over 1 on plan and book of reference, and said to be in the possession of Agnes Findlay.

In witness whereof, I have hereunto set my Hand, and caused the Great Seal of the Colony to be hereto affixed, at Government House, Sydney, this sixth day of August, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

## NEW SOUTH WALES.

## PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND IN CONNECTION WITH THE EXTENSION OF THE TRAMWAY FROM CASTLEREAGH-STREET TO THE RANDWICK ROAD, PARISH OF ALEXANDRIA.)

Presented to Parliament, pursuant to Act 51 Vic. No. 37.

NOTIFICATION OF RESUMPTION OF LAND UNDER  
THE "PUBLIC WORKS ACT OF 1888."

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BARON CARRINGTON, a Member of Her  
Majesty's Most Honourable Privy  
(L.S.) Council, Knight Grand Cross of the  
CARRINGTON, Most Distinguished Order of Saint  
Governor. Michael and Saint George, Governor and  
Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

WHEREAS it is expedient that the Public Work herein-after mentioned shall be constructed, that is to say, an extension of the Tramway from a point on the Botany tramway line, in Castlereagh-street, bearing northerly and distant 116 feet from the centre of Cleveland-street; thence along Cleveland-street to the Randwick Road; and thence along Moore Park to a point near the Association Ground, the estimated cost of which will not exceed £20,000, and that the said public work shall be carried out under the provisions of the "Public Works Act of 1888:" Now, therefore, I, the Governor aforesaid, with the advice of the Executive Council of the said Colony, and under and by virtue of the powers and authority vested in me by the said Act, hereby direct that the said public work shall be carried out under the provisions of the said Act, and that the carrying out of the same shall devolve upon the Minister for Public Works, who shall in that behalf be deemed the Con-

structing Authority; and I hereby further direct that the land described in the Schedule hereto, being in my opinion required for the purpose of the aforesaid public work, shall be acquired for the said purpose under the provisions of the said Act.

## SCHEDULE.

All that piece or parcel of land situate in the parish of Alexandria, county of Cumberland, and Colony of New South Wales: Commencing at the junction of the northern boundary of Cleveland-street with the eastern boundary of Castlereagh-street; and bounded thence on the west by Castlereagh-street bearing northerly 45 feet; on the north by a line parallel with Cleveland-street bearing easterly 95 feet; on the east by the western boundary of Pembroke-street bearing southerly 45 feet; and on the south by the aforesaid northern boundary of Cleveland-street bearing westerly 95 feet, to the point of commencement,—containing 15½ perches, and said to be in the possession of Mrs. Watkin and occupation of Henry Lloyd.

Given under my Hand and the Seal of the said Colony, at Government House, Sydney, this twenty-seventh day of August, in the year of our Lord one thousand eight hundred and ninety, and in the fifty-fourth year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!



1890.

NEW SOUTH WALES.

PUBLIC WORKS ACT OF 1888.

(RESUMPTION OF LAND FOR CONSTRUCTION OF A LINE OF TRAMWAY FROM ASHFIELD RAILWAY STATION TO PORTLAND PLACE)

Presented to Parliament pursuant to Act 51 Vic. No. 37.

NEW SOUTH WALES, } Proclamation by His Excellency The  
to wit. } Right Honourable CHARLES ROBERT,  
BAYON CARRINGTON, a Member of Her  
(L.S.) Majesty's Most Honourable Privy  
CARRINGTON, } Council, Knight Grand Cross of the  
Most Distinguished Order of Saint  
Governor. } Michael and Saint George, Governor and  
Commander-in-Chief of the Colony of  
New South Wales and its Dependencies.

bearing north-westerly 3 chains 68 links and 1 chain 4 links ;  
thence by the eastern boundary of the Burwood Road bearing  
northerly 1 chain 2 links ; thence by a line bearing south-  
easterly 4 chains 68 links ; thence by a curved line bearing  
generally easterly 1 chain 70 links ; thence by the north-western  
boundary of the George's River Road bearing south-westerly  
1 chain 60 links, to the point of commencement,—containing 1  
rood and 28 perches, numbered 5 on plan and book of reference,  
and said to be in the possession of W. H. Wilkinson, and  
occupation of John Jones.

WHEREAS it is expedient that the public work hereinafter  
mentioned shall be constructed, that is to say, a Line of  
Tramway from Ashfield Railway Station to Portland Place,  
the estimated cost of which public work will not exceed  
twenty thousand pounds : And whereas it is expedient that  
the said public work shall be carried out under the provisions  
of the "Public Works Act of 1888" : Now, therefore, I, the  
Governor aforesaid, with the advice of the Executive Council  
of the said Colony, and under and by virtue of the powers and  
authority vested in me by the said Act, hereby direct that the said  
public work shall be carried out under the provisions of the said  
Act, and that the carrying out of the same shall devolve upon the  
Minister for Public Works, who shall in that behalf be deemed  
the Constructing Authority : And I hereby further direct that  
the lands described in the Schedule hereto, being in my opinion  
required for the purpose of the aforesaid public work, shall be  
acquired for the aforesaid purpose, under the provisions con-  
tained in Part III of the said Act.

2. All that piece or parcel of land situate in the parish,  
county, and Colony aforesaid : Commencing on the western  
boundary of the Burwood Road, at a point bearing northerly  
and distant 4 chains 88 links from its junction with the north-  
western boundary of the George's River Road ; and bounded  
thence by a line bearing westerly 26 chains 35 <sup>1</sup>/<sub>10</sub> links ; thence  
by the eastern boundary of Portland-street bearing northerly  
75 <sup>1</sup>/<sub>10</sub> links ; thence by a line parallel to the first-described line  
bearing easterly 26 chains 35 <sup>5</sup>/<sub>10</sub> links ; thence by the aforesaid  
western boundary of the Burwood Road bearing southerly 75 <sup>1</sup>/<sub>10</sub>  
links, to the point of commencement,—containing 1 acre 3 roods  
and 35 perches, numbered 7, 8, and 9 on plan and book of  
reference, and said to be in the possession of W. Foy, J. P.  
Lannartz, and Frederick Hall.

SCHEDULE.

1st. All that piece or parcel of land situate in the parish of  
Burwood, county of Cumberland, and Colony of New South  
Wales : Commencing on the north-western boundary of the  
George's River Road, at a point bearing south-easterly and  
distant 4 chains 61 links from the junction with the eastern  
boundary of the Burwood Road ; and bounded thence by a line

Given under my Hand and Seal of the said Colony, at  
Government House, Sydney, this thirteenth day of  
October, in the year of our Lord one thousand  
eight hundred and ninety, and in the fifty-fourth  
year of Her Majesty's Reign.

By His Excellency's Command,

BRUCE SMITH.

GOD SAVE THE QUEEN!